*Subjects, Adjuncts, and SOV-Order in Antisymmetric Syntax**

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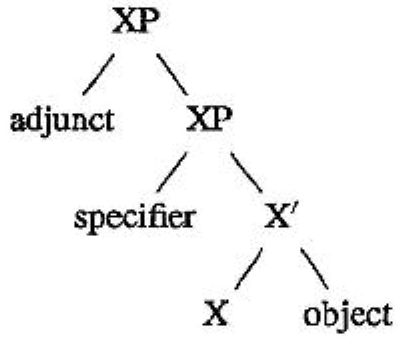
1. Introduction and Overview

One of the startling results of Kayne's (1993) theory of "Antisymmetric Syntax" is its ban on intermediate projections: the theory – which is summarized in Appendix 1 – does not allow non-maximal, non-lexical categories like X′ in (1), and thereby excludes the standard X-bar scheme (1) from the inventory of possible phrase structures.

(1)



However, as the theory treats specifiers on a par with adjuncts, it cannot account for asymmetries between them in a purely structural way. Since configurational theories like Chomsky's (cf. Chomsky 1986 and much related work) have sought to explain empirical differences between specifiers and adjuncts by referring to structural properties alone, it seems highly desirable to maintain the distinction and reconcile (1) with the system of "Antisymmetric Syntax."[1] It will be shown in this paper that

* I would like to thank Hap Kolb for his detailed criticism and his insightful comments on many formal inadequacies of an earlier version of this paper; I am also indebted to Gereon Müller, Kirsten Brock, and Arnim v. Stechow for further comments on content, style, and exposition.

[1] To mention just one such difference, consider the issue of barrierhood and recall from Chomsky 1986 that if some XP is a barrier, a phrase adjoined to XP can be moved away from XP without further stipulation. In contrast, the subject of XP, not being an adjunct in Chomsky's theory, in general cannot always be removed from its host, so that finite IPs can be barriers for the subject position. Furthermore, Müller & Sternefeld (1993) have shown that adjunction never

the above structure can, contrary to appearance, easily be reconciled with Kayne's theory.

I will start in section (2.) by proposing a simple and more direct restatement of Kayne's theory, one which can be shown to imply Kayne's original system. I will then go on to show that intermediate projections such as X′ in (1) can be readmitted by assimilating them to segments with respect to a certain property, namely the (in-)ability of segments to c-command. By saying that neither segments nor intermediate projections can c-command, we can preserve (1) without losing the original theory's strong predictions as regards linear order of adjuncts, specifiers, heads, and objects.

As a prerequisite for stating any condition to the effect that certain projections have or not have certain properties, one must be able to refer to and sort out the relevant projections before and independently of any application of the LCA. It will be made clear in section (3.) that standard notions of X-bar theory, albeit an essential part of anyone's theory of phrase structure, cannot be derived from the LCA, and are in fact alien to Kayne's theory. The central idea to be developed here is the notion of a projection, which remains external to the notional apparatus of the LCA.

In section (4.) I will turn to some consequences of the revision proposed in section (2.). In particular I will show how to reduce the number of specifiers to only one, and how to regain the possibility of multiple adjunctions to one and the same category.

Section (5.) is devoted to SOV languages and the problem of integrating language particular head final constructions into the system. I will assume that it is unnatural to always treat them as transformationally derived; hence, I will try to uncover conditions that would allow us to treat them as base generated phrase structures – again an impossibility in the system as it stands.

The basic technology employed here (and elsewhere in previous sections) is to modify (asymmetric) c-command in such a way as to 1) leave c-command in accord with the demands imposed on the notion by anaphoric binding, chain formation, and other purposes; 2) leave untouched the "positive" conjectures of Kayne's system, e.g., the restrictions on the order of phrases and the principles of extended structure preservation (i.e., no adjunction of phrases to heads, no adjunction of heads to phrases, etc.); but 3) readmit hitherto forbidden phrase structures, so that (appropri-

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creates opacity for movement across the adjunct, but movement into the specifier position normally has this blocking effect, so that movement across the specifier is likely to induce a violation of subjacency, while movement across an adjunct does not. Hence, one of the reasons that speak out in favor of (1) is that these effects can be predicted as part of a structural theory of barrierhood, while Kayne's theory precludes any explanation of these differences on purely structural grounds.

ately modified) asymmetric c-command no longer excludes the basic structures of X-bar theory.

2. Intermediate Projections

2.1. Restating the Theory

The condition that rules out (1) from the inventory of admissible phrase structures is Kayne's Linear Correspondence Axiom (LCA) which will be restated here in a somewhat modified version. The original version allows each tree to surface in two different orders, where one of the orders is just the reverse of the other. This, however, is unintended, and Kayne takes great pains to exclude the mirror image language that has its object precede the specifier – a linear order that would be perfectly consistent with his LCA. As I do not consider the stipulations that were intended to explain away this order satisfactory, I will start here with slightly different assumptions that will enable us to derive the desired result directly from our restatement of the LCA.

The first assumption is that a tree already comes along with an ordering of its terminal elements. This is expressed as (2-a). The LCA is then reformulated in (2-b):

(2) a. If n_i and n_j are terminal elements of a tree, then either n_i precedes n_j, or n_j precedes n_i (but not both).

b. In a well-formed tree, a terminal node n_i precedes a terminal node n_j iff there are α and β such that α dominates n_i, β dominates n_j, and α asymmetrically c-commands β.

(3) α *asymmetrically c-commands* β iff α c-commands β and β does not c-command α.[2]

(4) α *c-commands* β iff α and β are categories, α excludes β, and every category that dominates α dominates β.

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[2] As implied in the title of Kayne's paper, asymmetric c-command is characterized as an "*antisymmetric*" relation, where antisymmetry is defined by Kayne as "not(xLy & yLx)." Note, however, that according to standard terminology a relation is antisymmetric iff (aLb & bLa) implies $a = b$; it is asymmetric iff Kayne's definition of "antisymmetry" holds. The two notions coincide when R is irreflexive. Since c-command (as defined below) is such a non-reflexive relation, the difference between a- and anti-symmetry does not really matter and will largely be ignored. Nonetheless, I will use "asymmetric" throughout the paper, but refer to Kayne's theory as the theory of "Antisymmetric Syntax."

Condition (2) is a modification of the Linear Correspondence Axiom (LCA), whereas (3) and (4) take up auxiliary notions as already defined in exactly the same way by Kayne.[3] In what follows, I will deliberately use (2) as the basic condition and keep referring to it as the LCA.

The LCA applies to (1) as follows. First observe that the specifier asymmetrically c-commands X, hence any terminal node n_i that is dominated by the specifier precedes the terminal node n_x dominated by X. But conversely, X′ asymmetrically c-commands the head of the specifier, hence any terminal node that is dominated by X′ precedes any terminal node dominated by the specifier. But this implies that n_x must precede n_i. Since this is a contradiction we have shown that the LCA rules out (1) from the inventory of possible phrase structures.

Next consider the structure in (5):

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(5)            XP
              /  \
           XP     specifier
          /  \
    object    X
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Since the specifier asymmetrically c-commands the object, it follows from (2) that it must precede the object. This consequence excludes (5), but does not follow from Kayne's theory; hence the above restatement of the theory is slightly more powerful.

2.2. Re-introducing Intermediate Projections

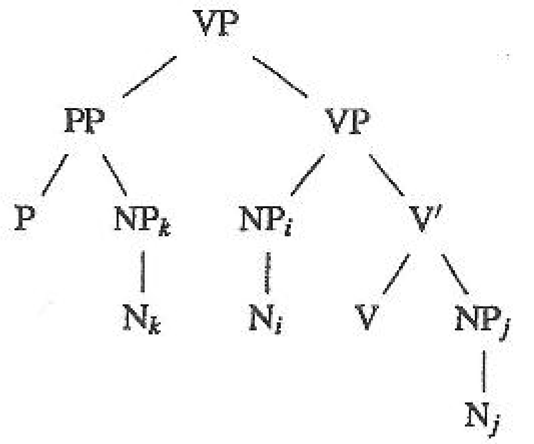
As pointed out above, I do not want to blur the distinction between adjuncts and specifiers; hence we will consider of ways to regain structures like (1). The basic idea to start with is that only heads or maximal projections can c-command. This is intuitively appealing, I think, since intermediate projections are syntactically "inactive." thus, their inability to c-command will *explain* why they cannot be moved, i.e., enter into binding relations to form chains.

I will show in the next section that it makes good sense (and will even be enforced by any reasonable conception of phrase structure grammar) to define notions like "head" and "maximal projection" independently of the LCA. It follows , then, that we can, before stating the LCA, also refer to *intermediate* projections and simply require that they do not c-command. The problem of licensing intermediate

[3] In contrast, Kayne's LCA was originally presented in a more complex way (cf. Appendix 1) but can be shown (cf. Appendix 2) to be almost equivalent to (2) above.

projections is resolved by simply showing that, under the present assumptions, the structure in (1), fleshed out as in (6), is consistent with the LCA:

(6)



In order to see this in some detail we have to check the biconditional in (2-b) from right to left and from left to right. In addition, (2-a) says that the order must be complete, i.e., all terminals have to be checked.

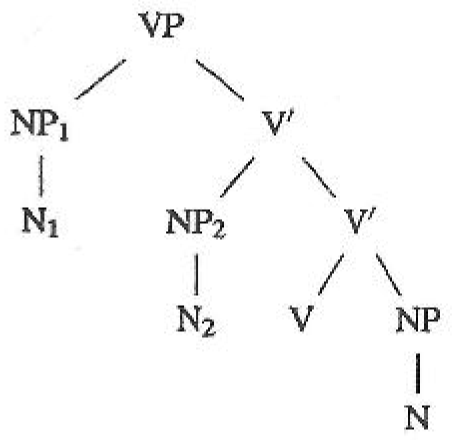
Starting with the direction from left to right, it is easy to see that for each pair of terminals we can find an asymmetric c-command relation of the required sort in the tree. To illustrate, consider the terminals dominated by N_i and V. We have to look for an asymmetrical command relation, such that V is asymmetrically c-commanded by N_i or anything above N_i. The required c-commander is NP_i. Observe here that V′, albeit not a node that can c-command, is nevertheless a real projection, i.e., it cannot be assimilated to a segment in each and every aspect of its behavior, because otherwise V would also c-command NP_i and no asymmetry would arise. Hence, our restriction on possible c-commanders delimits a proper subset of categories, and is not subsumed under the general assumption that segments do not c-command.

In general, however, the more consequential part of (2-b) is that from right to left. Here we have to look at all asymmetric c-command relationships and the linear order they predict for pairs of terminals. This order must be consistent with linear precedence; i.e., it must not turn out that some of the command relations induce conflicting predictions with respect to (2-a). This is exactly what would happen above if V′ were allowed to c-command N_i. According to our present assumptions, however, we can no longer derive that V should precede N_i, because V′ no longer (asymmetrically) commands N_i. Hence, no conflict will arise, neither for this pair of terminals, nor – as can be seen by checking all remaining asymmetrical command relations – for any other pair of terminals. Hence the structure is well-formed.

At the same time it follows that the tree in (6) represents the only linear order compatible with the LCA; there is no way to twist around single branches in a tree. As concerns linear order, this means that we have established a more restrictive extension of the original framework. As concerns further structural possibilities, our extension is almost conservative, there being only very few further additional structural possibilities that have not yet been mentioned but can be realized in the new system. (For example, the number of intermediate projections is still unbounded.) I will discuss (and rule out) these further possibilities in section (4.).

Before going any further, let us briefly verify the claim that the system is conservative in not admitting too radical departures from Kayne's system. What, for example, about adjunction to an intermediate projection. Is it possible?

(7)

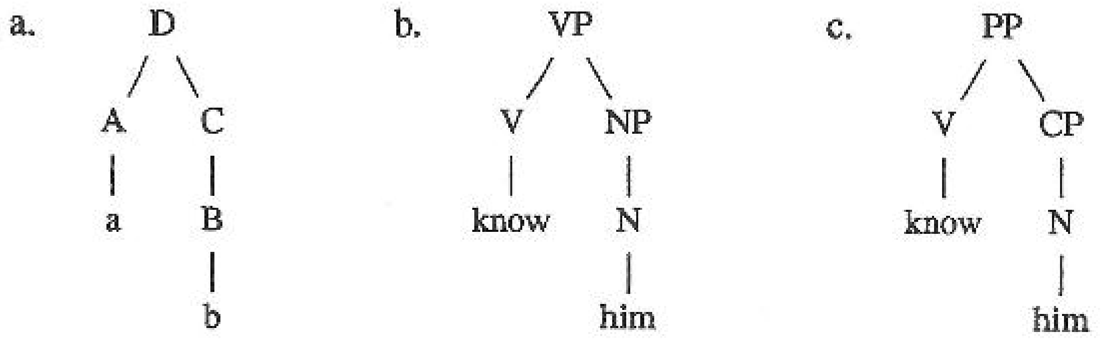


Again it is easy to see that we get crossing asymmetrical command in (7): NP_2 c-commands N_1 and NP_1 c-commands N_2. But this is precluded by the LCA. Accordingly, adjunction is possible only to maximal or minimal projections. The reader may also verify that the weakened system that generates these supplementary projections still does not permit ternary branchings. As we will see in the next section, ternary branching will involve two symmetrical *maximal* projections, hence no intermediate projections can be involved, and the construction will be ruled out for the very same reasons as before. This short demonstration should suffice to show that the original theorems carry over to the revised system, except that we now admit intermediate projections.

3. Projections and X-bar Theory

Consider the tree in (8-a). Its categorial realization in (8-b) visualizes that (8-a) is well-formed. The structure of (8-c) is exactly the same and, for that matter, is in accord with "Antisymmetry." However, it is obvious that the labeling of (8-c) is unacceptable and has to be ruled out.

(8)



(8) shows that the LCA only restricts configuration but does not, in and by itself, explicate or imply any notion of projection. Thus, in as far as projection is a central notion of X-bar theory, it cannot be claimed that the entire theory of phrase structure follows from the LCA; still there is some notion of "headedness" or "endocentricity" to be captured by grammar, perhaps in a trivial way, as exemplified in (9):

(9) Each category is a projection of exactly one of its daughters.[4]

The notion of projection as defined here and the uniqueness requirement embodied in (9) are additional but minimal parts of any theory of phrase structure.[5] Since there is no way of deriving (9) from purely structural conditions, we have to adopt some such principle, characterizing the notion of a projection as a primitive axiom of the theory. But once having done so we can define heads and maximal projections as derived notions:

(10) a. A category is a *head* iff it is a projection of a lexical item, i.e. of a morpho-phonological structure.[6]

b. A category α is a *maximal projection* iff it is not a head and is not dominated by a projection of α.[7]

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[4] I do not intend to exclude the trivial case of having only one daughter. Furthermore, "projection" is used here in the sense of "immediate projection."

[5] The attempt to drop the uniqueness requirement from (9), hoping that it will follow automatically from the LCA, will fail. A counterexample is [$_{XP}$ X X′]. This structure is in accord with the LCA, but nonetheless we have to exclude the possibility of XP being a projection of both the head X and the intermediate projection X′. In other words, only the uniqueness requirement can assure that "complements" are maximal projections.

[6] More accurately, one should perhaps say that a head is a projection of a lexical item or of its trace (or of relevant ϕ-features). The term "lexical item" is used here in a sloppy way, as I do not want to exclude heads from belonging to functional categories.

[7] The first clause of the definition excludes maximal projections that are at the same time heads. This has been done in order to be able to distinguish between adjunction of a head and adjunction of a maximal projection. Since proper maximal projections may not adjoin to a head, one would run into difficulties if real heads counted as maximal when being adjoined to a head.

c. A category is an *intermediate projection* iff it is neither a head nor a maximal projection.

I call a category *solid* if it is either a head or maximal, and proceed by defining c-command as one would expect:[8]

(11) α *c-commands* β iff α and β are solid categories, α excludes β, and every category that dominates α dominates β.

I will show in the next section that it might be useful to further restrict the c-command relation. But, before turning to additional modifications of command, this is the place to briefly clarify matters of X-bar notation. Maximal projections will be denoted by XP, heads by X, and intermediate projections by X′, regardless of how many "bars" an intermediate projection might have. In a well-formed configuration like $[_{XP}$ XP XP], it will moreover be necessary to mark which nodes are segments. Segments will be embraced by brackets, so that adjunction is to the left in $[_{(XP)}$ XP (XP)] and to the right in $[_{(XP)}$ (XP) XP]. Of course, it follows from the theory that only adjunction to the left is admissible.

As to the definition of segments and categories, I adopt standard assumptions with the following terminological qualifications. If a category α does not split up into several nodes (segments) in a tree, I will say that α contains one segment only. Thus, each category can be identified with a set of nodes in a tree. The only condition to be imposed on such a set is that it is contiguous, i.e. the nodes are connected by the dominance relation as defined for nodes. Formally, this means the following:

(12) A set of nodes δ is a category iff the following two conditions hold:

a. If α and β are segments (i.e., elements) of δ, then either α dominates β, or β dominates α.

This would turn out to be the case by virtue of the second clause of the definition alone, i.e., by virtue of not being dominated by a projection of α. The above definition excludes all heads from masquerading as "maximal."

[8] Note that the way Kayne has modified c-command admittedly leads to trouble in the realm of binding theory. This is witnessed by the examples in (i), whose grammaticality is predicted to be just the opposite of what is the case:

(i) a. *John's mother likes himself

b. His_i mother likes $John_i$

The reason is that *his* in Kayne's system is adjoined to *mother*, so that the whole NP does not dominate the pronoun in (i-b), and this goes similarly for (i-a). These predictions no longer follow if the pronoun is a specifier rather than an adjunct.

b. if α dominates γ, γ dominates β, and α and β are segments of δ, the γ is a segment of δ.

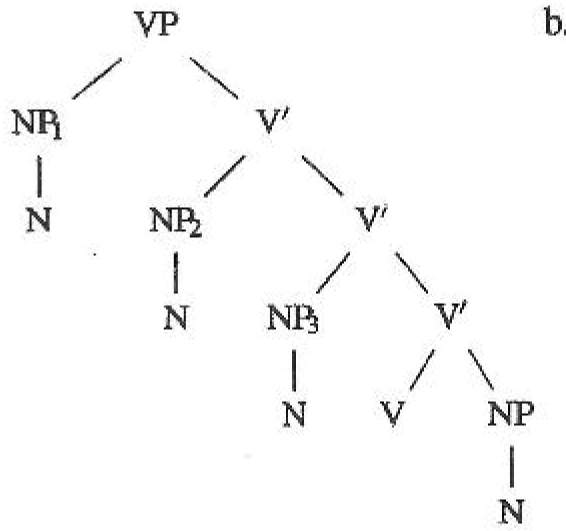
Category labels are really labels of these sets, so that it does not really make sense to say, e.g., that a segment of a category is a projection of another segment of the same category. All these notions are defined for categories only, but for convenience I will label segments with the same symbol as the category they belong to. The reader should bear in mind, however, that this is notational convention only; labels of segments do not really play a role in the theory, and the relational notion of a segment is identical to that of a node (simpliciter) of a category. Recall also that a category α dominates some β iff each segment of α dominates β.

4. Further Amendments

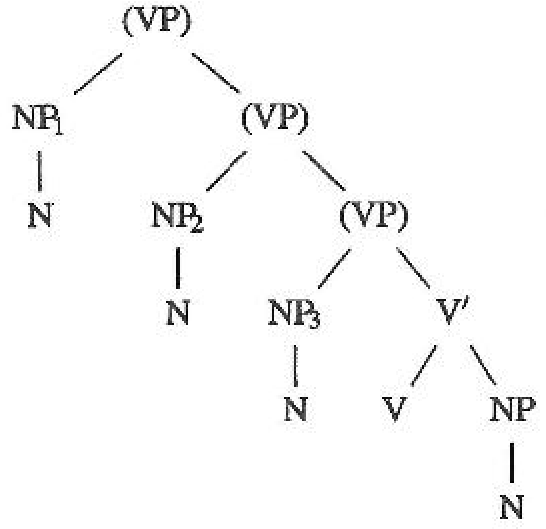
4.1. Multiple Adjunction

Another characteristic property of Kayne's system is that adjunction to a category can apply only once. It is easy to verify that this result is sustained by the above modification, although it is far from clear that it is indeed desirable. On the other hand, the new system predicts that there is no upper bound on the number of intermediate projections. (13-a), for example, would count as well-formed according to present assumptions, but (13-b) would not:

(13) a.



b.



Recall that according to our notational conventions the different V′ projections in (13-a) do not form segments of a single category, but constitute categories of their own. In contrast, the different "VP"-nodes in (13-b) are elements of only one category, the maximal projection VP. Since Kayne's theory does not really distinguish between base generated structures and derived ones, it is not particularly clear, however, what the difference between (13-a) and (13-b) will amount to in practice; in particular, it is unclear which one of NP_1 and NP_3 in (13-a) should count as the specifier of VP.

Another question that arises is whether (13-a) might imitate adjunction to V′, which according to classical theory should be ruled out.[9] Thus, (13-a) threatens to undermine the distinction between adjunct and specifier, whereas (13-b) faithfully represents the traditional view as regards specifiers and adjuncts: there is only one specifier, but there is no *a priopri* limit on the number of adjunctions to a category. Can we reconcile the traditional view with the LCA?

In trying to cope with questions of a similar nature, Kayne deliberately modifies c-command in order to get the desired results. Granted that this procedure is legitimate (which seems to depend on whether or not modified c-command notions still remain in accord with binding theory and other modules of grammar), we may speculate along the following lines.

Recall that c-command as defined by Kayne enables adjuncts to ignore segments they are dominated by, so that we arrive at the situation described in footnote 8 above. As there seems little empirical motivation for such a move, let us agree that segments might delimit domains for c-command, at least in the case of segments of maximal projections. From this intuition we derive the following redefinition of c-command:

(14) Let $D(\alpha)$, the *domain* of α, be the minimal segment γ such that

- a. γ dominates α,
- b. γ is a segment of a maximal projection or is immediately dominated by such a segment.

(15) α *c-commands* β iff

- a. α and β are solid projections,
- b. α excludes β, and
- c. β is dominated by $D(\alpha)$.

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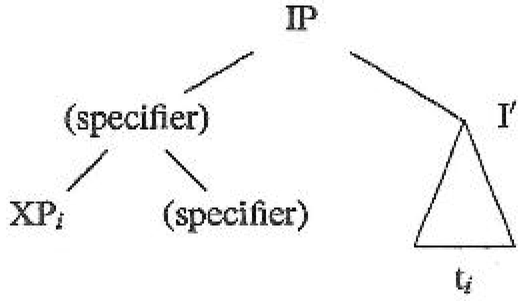
[9] What appears as "adjunction" is nevertheless base generated and exploits the fact that our rudimentary X-bar theory does not pose any upper limit on the number of levels.

Although the distinction between base generated and derived structures will be irrelevant in the following, it is clear that something more must be said about it. For instance, Kayne's system is incapable of ruling out base generated adjunction of a maximal projection to an intransitive verb – as in $[_{VP}\ [_{(V)}\ NP\ (V)]]$ – but nonetheless it is quite obvious that such a structure can and presumably must be ruled out on purely structural grounds, and therefore should (but cannot) be blocked by a version of the LCA. This remains true in our modified system, perhaps pointing to some ill-understood deficiency of the system.

Let us see how these conditions license multiple adjunction to an XP. According to (14), c-command exercised by any of the NPs in (13-b) cannot climb up segments: if it could, we would get mutual asymmetric c-command between two adjuncts, which excludes the possibility of multiple adjunction. Hence, there is asymmetrical c-command between all NPs, which suffices to demonstrate the well-formedness of the tree.

On the other hand the system now enforces adjunction in cases where Kayne excludes adjunction to an XP but, as a substitute, recommends adjunction to the specifier of that XP. Within the present system, however, adjunction to the specifier does not lead to a structure where the adjunct could c-command its trace. This follows since in a configuration like (16),

(16)



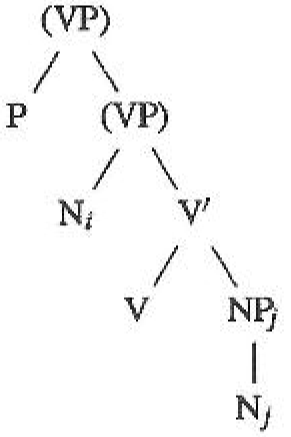
the upper segment of the specifier constitutes the domain of the adjunct, hence no binding relation can be established between XP_i and t_i. If follows that adjunction of XP_i to IP is mandatory.

Turning next to (13-a), the highest V′ is the domain of all NPs except NP_1. From this it follows that these NP_i's, $i \neq 1$, all symmetrically c-command each other, which immediately excludes the structure. In fact, as a net effect, only one V′ level can be allowed; and in addition it is impossible to adjoin to that level. This is exactly what we were after. Moreover, as regards all structural possibilities below that level, we predict exactly the same results as Kayne does. In particular, head movement c-commands its trace, and adjunction to a head can only occur once. Hence we derive a contrast between adjunction of maximal projection and of heads: whereas multiple adjunction to a maximal category is sanctioned by now, multiple adjunction to a head is still proscribed.

4.2. Adjunction of a Head to an XP

Another oddity of Kayne's system is that adjunction of a head to a maximal projection cannot be ruled out in matrix clauses. This deficiency becomes even more dramatic in the revised proposal; not only is it impossible to derive that a head like "P" in (17) cannot be adjoined to VP, but we also cannot derive the obligatory maximality of the specifier N_j. Thus, the following tree would have to be excluded by mere stipulation:

(17)



I propose to block such dangling heads by assuming that in certain configurations heads cannot properly c-command. Basically, there are only two configurations in which heads have to be able to command. Either they c-command via their own projection, as is the case of V in (17), where V′ is the c-domain of V; or they command "parasitically," i.e., they are licensed to command in the presence of another head to which they are adjoined.

The above restriction can be implemented at various places in the system: e.g. as part of the notion of a solid projection, as part of the notion of c-command, as part of the definition of domains, etc. For reasons of expository clarity (and since it is somewhat arbitrary where the additional constraint is placed) I have decided not to revise previously defined notions but to state the required constraint as a separate well-formedness condition. Thus, the following constraint, stated in terms of a condition on domains of heads, can be viewed as directly restricting the well-formedness of trees:

(18) If h is a head, then
  a. $D(h)$ is a projection of h, or
  b. $D(h) = D(\gamma)$ for some head $\gamma \neq h$.

I will say that in case (18-b) h is parasitic on γ. The parasitic case can arise in basically three situations. The first is adjunction to a head, as in $[_{(V)}$ P (V)], the second is adjunction to an intermediate projection, e.g., when P is adjoined to some V′, and the third is where the structure appears to be "double headed," as in $[_{V'}$ P V] and $[_{VP}$ V P]. In all cases, the head P is close enough to another head so that both heads have the same domain. But only the case of adjunction to V yields asymmetrical c-command, which is fine; in all other cases we get symmetrical c-command between V and P, which is proscribed.

Returning to (17), we observe that $D(N_i)$ and D(P) are the two segments of VP which do not constitute domains of any other head. Hence, the structure is ruled out by (18-b). We conclude from this that heads can only be adjoined to heads.

5. Head Final Constructions

Another problematic consequence of Kayne's system is that it is impossible to base generate SOV-order. In itself, this does not seem disastrous, since one could resort to well-known principles that can enforce movement of the object and/or the verb, so that S-structural SOV order can be derived from SVO order at D-structure.[10]

Whether or not one order is derived from the other, we may give credit to the theory by assuming that in each case we can motivate specific syntactic conditions that trigger movement of verbs and objects, so that underlying structure remains consistent with the LCA. However, if a language (e.g. Japanese, Korean, Turkish, etc.) is consistently head final, with all heads including complementizers showing up at "the wrong place," it becomes necessary to invent all sorts of dubious principles that enforce movement of everything except the heads. Although Kayne takes great pains to justify such a possibility, I take it for granted that such a theory is not desirable, perhaps not even feasible, and evidently not appealing as regards simplicity and common sense.[11]

The situation is similar in a language like German, which is only partially head final. Thus, a typical structure standardly assumed for German (but excluded by the theory) is (19):

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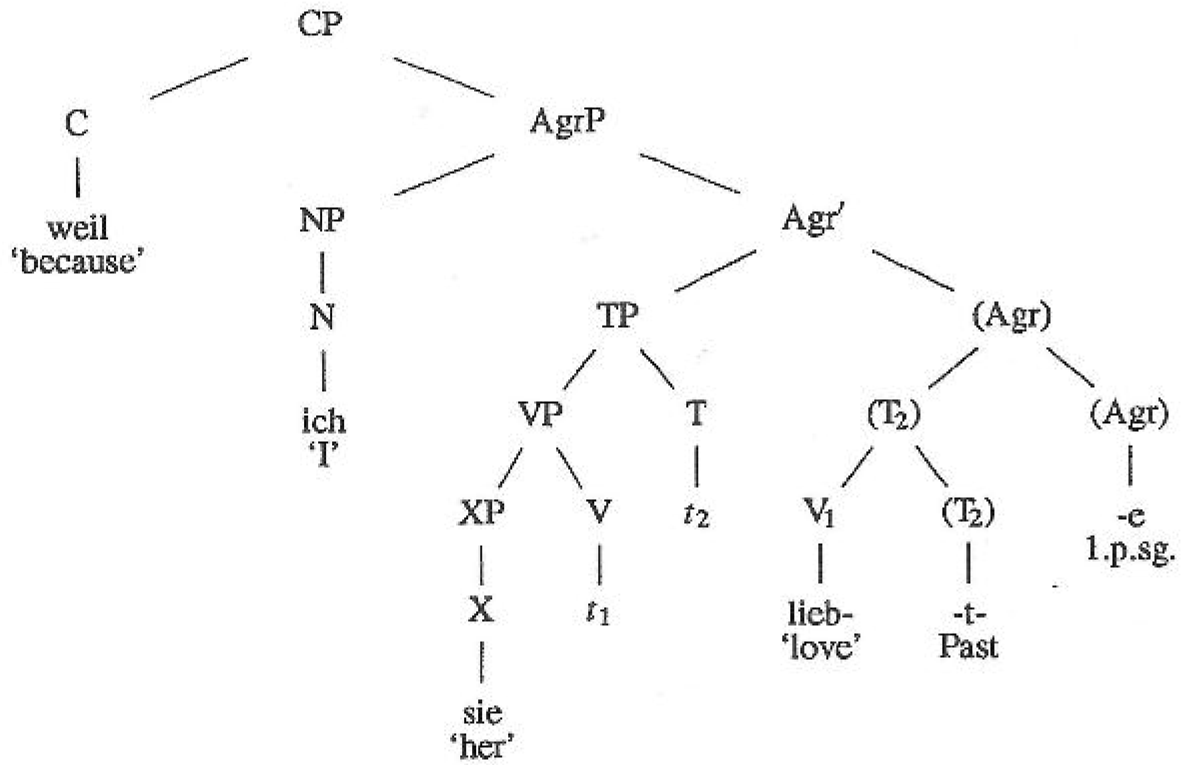
[10] Note that the opposite has also been proposed in the literature (cf. Koster 1988, Müller 1993, Klein & v. Stechow 1991) so that SVO order in English could as well be derived from an underlying SOV order. These theories take advantage of arguments against affix hopping in English: contrary to Chomsky 1992, where V is moved to Tense at LF only, it has occasionally been suggested that V-movement is overt (cf. Ouhalla 1990, Johnson 1991), so that underlying head-complement order is no longer visible at surface structure. From this it follows that underlying SOV is at least a theoretical possibility, and in fact one that might have welcome consequences when dealing with "object before adjunct" word order. Cf. Larson 1988 and the above mentioned literature for further discussion.

[11] Note, e.g., that the required movement of IP into SpecC is at least dubious: not only is IP-movement as such already unexpected (why don't we find it in other languages and contexts?), it also shows inconsistencies with central parts of the theory, because using the SpecC position as an escape hatch no longer seems possible. This calls for a completely different theory for cyclic movement of adjuncts – a consequence that is not even mentioned in Kayne's paper.

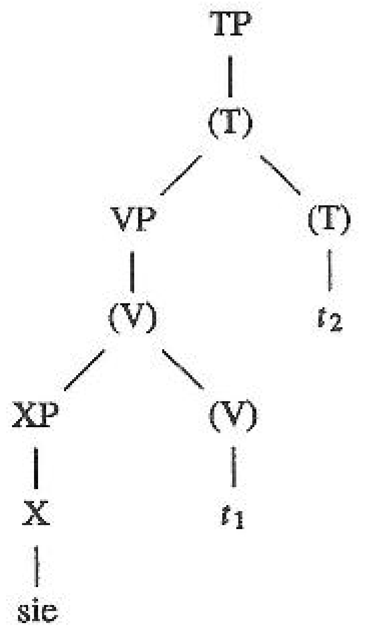
(19)



It is crucial here that Agr is final but C is not. The first problem to account for in a "no final head" theory like Kayne's is head order within TP, where multiple embeddings of auxiliaries, modals, ECM-verbs etc., consistently yield a non predicted order, with the most deeply embedded verbal element appearing as the rightmost element within IP. Here again it seems rather unmotivated to assume that surface order is necessarily derived; the only thing one can say is that the derivational principles that would take care of the complement-precedes-head order are not yet invented, and if they were it seems they would be bound to lack intuitive plausibility.

As pointed out above, however, there might be a possibility to generate head final constructions within Kayne's system, in fact one that seems to have been overlooked. For assume that the internal structure of TP is as follows:

(20)



As such, the structure is well-formed. But apart from raising the question of how to justify that complements now show up as base generated adjuncts, (20) does not solve the problem. The reason is that we still have to insert (20) into the larger tree. Mere substitution of the former TP cannot do, since then Agr would asymmetrically c-command everthing within TP. And adjunction to Agr is also impossible, since it still follows from the system that adjunction *to a head* can occur only once. Thus, there is no way to combine (20) with head movement to the right.

Let us try now to reconcile phrase structures like (19) with the principles of asymmetry. We have seen above that the only way to achieve consistency is to revise asymmetrical command, perhaps alongside with the very notion of c-command. My first step, therefore, is to restrict the c-commanded domain of certain heads: I assume here that these heads, which I will call *weak*, can only c-command other heads. I do not see that this has any damaging consequences with respect to the use of c-command in other modules of grammar, and in and by itself this assumption alone changes nothing within the system of "antisymmetric" determination of linear order. Thus, with or without this restriction, we get the same structures as before. For instance, even though V, which is a weak head in German (precisely because it is head final), does not strictly speaking c-command XP in (20), it still c-commands X, and therefore the structure is still ruled out. But assume now that weak heads when participating in the determination of linear order can do so only in a very local domain. The relevant restriction seems to be that weak heads cannot asymmetrically c-command across maximal projections. As a result, then, V in (20) cannot asymmetrically command X, and since it also cannot c-command XP, this yields the further consequence that XP can now asymmetrically command V. This is exactly what makes a change of linear order possible.

On the other hand, observe that we get the same results as before within a non-maximal projection, i.e., within a head. Thus, V_1 in (19) still asymmetrically c-commands T_2, which in turn asymmetrically c-commands Agr – although all heads involved here are weak. We also know that V_1 c-commands V and T_2 c-commands T, but it is crucial that this relation does not enter into the determination of asymmetric command.

In order to make this precise, I will handle the requirement that no maximal projection intervene between two heads by saying that they must have the same domain, so that here again some kind of "equi-distance" is involved. We now define *alateral* command (= a-command) as an antisymmetric relation that has to replace the notion "asymmetric c-command" in (2-b):

(21) α *a-commands* β iff
  a. α c-commands β,
  b. β does not c-command α, and
  c. if α is a weak head, then $D(\alpha) = D(\beta)$.

To illustrate again, Agr c-commands every head within TP, and so do T_2 and V_1. But Agr does not a-command these nodes, since they do not belong to its domain. On the other hand, V_1 a-commands T_2, which in turn a-commands Agr, so that the internal order of affixation is still fixed by the LCA.

Replacing asymmetrical command by alateral command is only the first step of revisions of earlier assumptions. Assume that we generate verb second order by moving the complex verb to C by adjunction. Then the verb precedes everything within the IP and it also a-commands C, which in turn a-commands everthing within IP. This fixes a definite linear order, but unfortunately it does not suffice to satisfy the LCA, since for any element α within IP the verb or an element that dominates the verb must a-command α. But this is not the case, since the verb is weak and therefore only a-commands C. Neither can the weak verb a-command anything within IP, nor is there any category that *includes* the verb and that could.

One way out is to understand dominance in the LCA in the weaker sense, so that the head C, which a-commands α, can serve as the relevant node that dominates the verb and thereby fixes its linear position in the tree: if C dominates the verb, then there is an element above the verb that a-commands α, and the LCA is satisfied.

It turns out, however, that this solution fails if we adjoin a strong head to weak one. Incorporation of a preposition into a weak verb might be a case in point, although it is unclear whether or not this process should be dealt with in syntax. The more productive cases in German arguably involve incorporation of a postposition, i.e. of a weak head. This is illustrated in (22):

(22) a. Er sah sie [$_{PP}$ die Mauer entlang] fahren
He saw them the wall alongside drive

b. [$_{PP}$ Die Mauer entlang] sah er sie fahren

c. *Die Mauer$_i$ sah er sie [$_{PP}$ t_i entlang] fahren

d. Die Mauer sah er sie entlangfahren

e. Er sah sie die Mauer entlangfahren

In (b) the PP is fronted and therefore must be a constituent. The analysis in (c) is predicted to be impossible, since the fronted NP has been extraced out of the PP, and it is well-known that P-stranding of full NPs is ungrammatical in German. As (d) shows, the surface order is nevertheless grammatical. This is possible only if the postposition has incorporated into the verb, perhaps already in the lexicon (i.e., without leaving a syntactic trace). This becomes evident in (d) and (e) where the postposition and the verb are amalgamated to one single word. As it stands, the theory predicts that this kind of incorporation is permissible for postpositions, but cannot occur with prepositions, i.e. strong heads.[12]

6. Conclusion

The above modifications of Kayne's system, albeit perhaps not particularly pervasive, reveal that the notion of command as determined by the requirements of binding of anaphors and traces still leaves room for further manoeuvring. As we have shown in section (2.), modifications of command enable us to describe a further range of structural possibilities, without losing the basic intuitions about the linearization that is exercised by asymmetrical command between NPs. Whether or not this enlargement will be approved of, the very fact that different notions of command imply different structural possibilities may contribute to some clarification of the role of asymmetric command in "Antisymmetric Syntax."

Last but not least it seems to me that simple facts of word order in SOV languages require a modification of the system, otherwise we run the risk of ending up with no theory at all: if, as Kayne seems to imply, projections (and empty heads)

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[12] If, on the other hand, incorporation of *strong* heads should occur regularly in certain languages, we are in trouble. It seems then that the correct generalization is that the adjoined heads will acquire properties of the host, which is to say that a strong head becomes weak if it adjoins to a weak one, and vice versa. But if this is correct, it implies a change of perspective: the property of "weakness" is in part a contextual one. Basically, then, a certain type of head will become faible only when being directly confronted with a maximal projection as its sister. This result, however, is hardly satisfying, because it throws us back to mere descriptive stipulation that directly involves certain *configurations*, rather than lexical properties alone.

can be justified solely on the grounds of providing landing sites for movement, the theory is no longer restrictive. In other words, movement is largely used as a wild card to generate any permutations of the underlying scheme. As regards the few underlying structures permitted by Kayne's system, it seems to be difficult to gain positive empirical evidence in favor of them: one would have to argue that more liberal versions of X-bar theory permit the *wrong* structures. No such argument, e.g., against base generating SOV-order, has been given. The only evidence is theory internal: X-bar theory allegedly permits too articulated structures. This claim, however, must be evaluated against the background of the theory as it stands, which in turn seems to imply too unrestricted uses of empty heads and transformational devices.

To sum up, we either need further restrictions on derivations, or we must allow for more types of base structures. As I have no idea of how to restrict derivations, I tried to pursue the second alternative.

Appendix 1: Kayne's Construction

The following definitions are adapted from Kayne 1993.

Let $d(X)$ be the set of terminals that X dominates. Let $d\langle X, Y\rangle = \{\langle a, b\rangle : a \in d(X)$ and $b \in d(Y)\}$. Let S be a set of ordered pairs $\{\langle X_i, Y_{,i}\rangle\}$ for $0 \leq i \leq n$. Then $d(S)$ = the union of $d\langle X_i, Y_i\rangle$ for all $i, 0 \leq i \leq n$. Consider the set A of ordered pairs $\langle X_j, Y_j\rangle$ such that for each j, X_j asymmetrically c-commands Y_j. Let T be the set of terminals of a given phrase marker P.

(23) *Linear Correspondence Axiom:*
$d(A)$ is a linear order of T.

The LCA still has to be "interpreted" in a particular way. The condition is to be understood as defining *the (!)* linear order of a tree. This has two implications. First, the LCA is not meant to express that a phrase marker P is well-formed as soon as $d(A)$ is an *arbitrary* linear order of its terminals, where the *actual* order of terminals differs from $d(A)$. Thus, the LCA is meant to fix the one and only (actual) order of terminals of a tree. Second, the LCA still leaves open two possibilities: in one language, it may imply the order "specifier before head before complement," in another it may be consistent with the mirror image language "complement before head before specifier." Kayne rules out the second possibility by stipulation.

Appendix 2: Proof of Equivalence

Suppose P is a phrase marker such that Kayne's LCA plus the above mentioned qualifications are satisfied. We first show that this implies (2), repeated as (24):

(24) a. If n_i and n_j are terminal elements of a tree, then either n_i precedes n_j, or vice versa (but not both).

b. In a well-formed tree, a terminal node n_i precedes a terminal node n_j iff there are α and β such that α dominates n_i, β dominates n_j, and α asymmetrically c-commands β.

Part (a) trivially follows. In order to show (b), assume first that n_i precedes n_j. We show that there are α and β such that α dominates n_i, β dominates n_j, and α asymmetrically c-commands β. This is straightforward, since by definition there exists the pair $\langle n_i, n_j \rangle \in d(A)$, which implies some pair $\langle X_i, Y_i \rangle \in A$ such that $n_i \in d(X_i)$ and $n_j \in d(Y_i)$. Since A is composed of pairs standing in the asymmetric c-command relation, $X_i = \alpha, Y_i = \beta$. This is all we need to establish the direction from left to right.

Assume next that there are α and β such that α dominates n_i, β dominates n_j, and α asymmetrically c-commands β. We have to show that, given Kayne's LCA, it follows that n_i precedes n_j. Since α asymmetrically c-commands β, $\langle \alpha, \beta \rangle \in A$, hence $\langle n_i, n_j \rangle \in d(A)$. Thus, it is obvious that n_i precedes n_j.

The reverse direction is more involved, since Kayne's construction is more complicated than (24). Assume that (24) holds. We have to show that Kayne's LCA is satisfied. First observe that if (24) holds then there cannot be any α' and β' such that α' dominates n_i, β' dominates n_j, and β' asymmetrically c-commands α'. If there were, it would follow from using the direction from right to left in (24) that both n_i precedes n_j and n_j precedes n_i, which, by definition of a linear order, would require that $n_i = n_j$. This situation, however, is precluded by the *exclude*-clause of the c-command definition. Let us call this result "lemma 1."

Assume next that $n_1, n_2, \ldots n_n$ is the linear order of a tree determined by (24). We have to show that the tree also satisfies the LCA. This means that for each n_i, n_j we have to consider the set $A' \subseteq A$ of all pairs $\langle X, Y \rangle$ such that either $\langle n_i, n_j \rangle$ or $\langle n_j, n_i \rangle \in d\langle X, Y \rangle$. Since A contains all and only the pairs of nodes standing in asymmetric c-command relations, we know from (24) that A' is not empty. From lemma 1 we know that there is no pair $\langle X', Y' \rangle \in A'$ such that $\langle n_j, n_i \rangle \in d\langle X', Y' \rangle$. Since this holds for arbitrary pairs taken out of the linear order that satisfies (24), it is clear that $d(A)$ defines a linear order, namely the same linear order that was presupposed for the given tree. From (24-a) we know that this order is complete – it covers all elements of a tree. Hence, by having constructed the set A of Kayne's asymmetric relations and having established that this set defines the order

$n_1, n_2, ...n_n$, we have shown that (24) implies the LCA. Q.E.D.

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