

because these necessarily invoke movement in an unconstrained way.

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syntax

1 Introduction

There is general agreement that linguistic theory should account for linear asymmetries found in language. This paper presents a case study of one such asymmetry: the facts uncovered in work following up on Greenberg's universal 20 (Greenberg (1963); Hawkins (1983); Rijkhoff (1990, 2002); Cinque (2005)). We confront the known facts with a particular theory of linear asymmetry, Kayne's (1994) Linear Correspondence Axiom (LCA). We distinguish two claims made by the LCA, one concerning base generation and one concerning movement. Regarding base generation, the LCA claims that specifiers universally precede heads and that heads universally precede their complements; regarding movement, the LCA claims that all movement is to the left. Given the LCA, the second claim follows from the first. We will argue however that a weaker theory, one that embraces only the restriction to leftward movement and jettisons the idea that base-generation is universally ordered, is to be preferred (see also Ackema and Neeleman 2002). It may seem paradoxical, but the grounds for this preference come from restrictiveness. While our base component is more permissive, it allows the movement component to be restrictive to a degree that strengthens the theory as a whole.

How can this be shown? Our argument proceeds as follows. First we show that, as far as universal 20 is concerned, the restriction to a universal underlying specifier before head before complement order does not add restrictiveness. In the extended projection of the noun the same range of orders and associated structures can be generated as long as movement is uniformly leftward. The empirical burden of explanation thus rests entirely on restrictions on movement, including the ban against rightward movement.

This result generalizes to other linear asymmetries. They cannot be explained without a restrictive theory of movement. However, the base generation claim made by the LCA makes a restrictive theory of movement impossible since all variation in ordering has to be derived through movement. In (Abels and Neeleman, 2006) we provide a rationale from parsing for the assumption that movement must (at least in the cases at hand) be leftward while allowing symmetrical base generation. For reasons of space this part could not be included here.

2 Cinque's Theory

Extending earlier work of his on the order of elements in the noun phrase (Cinque (1996, 2000)), Cinque (2005) argues that the typology of word order in the extended nominal projection can be explained if four assumptions are made, among which Kayne's (1994) Linear Correspondence Axiom. The empirical domain that Cinque concentrates on concerns the orders in which demonstratives, numerals, adjectives and nouns appear in the extended nominal projection. On the basis of careful typological work, he argues that of the twenty-four logically possible orders of these elements, only fourteen are attested as unmarked word orders in natural language. The typological pattern is illustrated below:

- | | | | | |
|-----|----|-------|-----------------------|-----------------|
| (1) | a. | (i) | DEM NUM A N | <i>attested</i> |
| | | | these five young lads | |
| | | (ii) | DEM NUM N A | <i>attested</i> |
| | | (iii) | DEM N NUM A | <i>attested</i> |

	(iv)	N DEM NUM A	<i>attested</i>
b.	(i)	DEM A NUM N	<i>unattested</i>
	(ii)	DEM A N NUM	<i>attested</i>
	(iii)	DEM N A NUM	<i>attested</i>
	(iv)	N DEM A NUM	<i>attested</i>
c.	(i)	NUM DEM A N	<i>unattested</i>
	(ii)	NUM DEM N A	<i>unattested</i>
	(iii)	NUM N DEM A	<i>unattested</i>
	(iv)	N NUM DEM A	<i>unattested</i>
d.	(i)	NUM A DEM N	<i>unattested</i>
	(ii)	NUM A N DEM	<i>attested</i>
	(iii)	NUM N A DEM	<i>attested</i>
	(iv)	N NUM A DEM	<i>attested</i>
e.	(i)	A DEM NUM N	<i>unattested</i>
	(ii)	A DEM N NUM	<i>unattested</i>
	(iii)	A N DEM NUM	<i>attested</i>
	(iv)	N A DEM NUM	<i>attested</i>
f.	(i)	A NUM DEM N	<i>unattested</i>
	(ii)	A NUM N DEM	<i>unattested</i>
	(iii)	A N NUM DEM	<i>attested</i>
	(iv)	N A NUM DEM	<i>attested</i>

The main theoretical contribution of Cinque's paper consists in a demonstration that the assumptions given below generate the fourteen existing orders, while excluding the

not think that they provide evidence for Kayne’s antisymmetry hypothesis. As we show in this section, the pattern of attested and unattested orders also falls out from the assumptions in (7). The first three of these are identical or equivalent to the first three assumptions made by Cinque. The fourth assumption replaces the LCA. It is weaker than Kayne’s hypothesis, because it limits the asymmetry of syntax to movement.

- (7)
- a. The underlying hierarchical order of Dem, Num, A, and N in the extended nominal projection is $\text{Dem} \succ \text{Num} \succ \text{A} \succ \text{N}$, where \succ indicates c-command;
 - b. all (relevant) movements move a subtree containing N;
 - c. all movements target a c-commanding position;
 - d. all (relevant) movements are to the left.

If the LCA is abandoned in favour of (7d), we can base-generate eight of the fourteen attested linear strings, simply by allowing cross-linguistic variation in the linearization of sister nodes in the hierarchical structure described by (7a). Seven of these orders are derived through movement in Cinque’s system. In our trees the non-terminals in the extended projection of the noun are unlabeled and the demonstrative, numeral and adjective are not introduced by dedicated functional heads. This is because nothing in our argument hinges on the label of the nodes in the extended projection of the noun or the existence of dedicated functional heads hosting DEM, NUM, and A as specifiers. The reader is thus invited to resolve these issues in his or her favorite way.

- (8)
- a. [DEM [NUM [A N]]]
 - b. [[NUM [A N]] DEM]

- c. [DEM [[A N] NUM]]
- d. [[[A N] NUM] DEM]
- e. [DEM [NUM [N A]]]
- f. [[NUM [N A]] DEM]
- g. [DEM [[N A] NUM]]
- h. [[[N A] NUM] DEM]

The remaining six orders are derived by leftward movement of a constituent containing the noun:

- (9) a. [DEM [N [NUM [A t_N]]]]
- b. [N [DEM [NUM [A t_N]]]]
- c. [[A N] [DEM [NUM t_[AN]]]]
- d. [[N [NUM [A t_N]]] DEM]
- e. [N [DEM [[t_N A] NUM]]]
- f. [[N A] [DEM [NUM t_[NA]]]]

There are other derivations involving movement, but these do not extend the set of linear strings that can be generated. For example (1biii) can be base-generated as above or derived on the basis of, for example, (1bii) by short movement of N as in (10).

- (10) [Dem [[A N] Num]] \rightsquigarrow [Dem [[N [A t_N]] Num]]

The impossibility of the ten unattested orders is explained in essentially the same way as in Cinque's system. This is very clear in the case of noun-final structures. Since

movement is uniformly leftward and must affect constituents containing the noun, noun-final orders must be base-generated. But among the base-generated structures, all of which are given in (8), only (8a) is noun-final. Therefore, every other permutation of Dem, Num, and A is ruled out prenominally.

In fact, this argumentation carries over to prenominal material generally. All material preceding the noun must be base-generated there, and its linear order must consequently reflect the hierarchy in (7a).

Finally, the orders (1ciii) and (1civ) are excluded because their derivation either requires movement of a non-constituent or, again, violates (7b). This is because any constituent that contains N and Num also contains A. Therefore there is no way of placing Num and N in a position preceding Dem without also placing A in a position preceding Dem.

We have demonstrated that, in order to capture Cinque's result, it is sufficient to assume that movement is uniformly leftward. The stronger assumption that projections are uniformly right-branching, the LCA, need not be made and does not restrict the typology.

Another set of assumptions that play no role in restricting the typology, involve the number and the nature of landing sites for movement, but we cannot discuss the issue here.¹

The remaining assumptions, however, are crucial. Dropping any of them rules in unattested word orders. Thus, relaxing (7a) would incorrectly allow prenominal material to appear in permuted orders as illustrated very simply in (11a).² The same problem arises if movement of constituents that do not contain N were allowed; the

order ((1di)) can be derived either by separate movements of Num and A or by movement of N followed by remnant movement of the phrase containing Num, A, and the trace of the noun. This is illustrated in ((11b)). The c-command requirement on movement is well motivated on independent grounds, dropping it would wreak havoc on the typology, as illustrated in (11d) for (1di).

- (11) a. unattested: Num \ll A \ll Dem \ll N
 [NUM [A [DEM N]]]
- b. unattested: Num \ll A \ll Dem \ll N
 [NUM [A [DEM [t_{NUM} [t_A N]]]]] or
 [[NUM [A t_N]] [DEM [N t_{[NUM[A t_N]]}]]]
- c. unattested: N Num Dem A
 [Dem [Num [A N]]] \rightsquigarrow [Dem [[N Num] [A t_N]]]
 \rightsquigarrow [[N Num] [Dem [t_[NNum] [A t_N]]]]
- d. unattested: Num \ll A \ll Dem \ll N
 [[[NUM [A t_N]] DEM] N]

So far, the theory we have tested has fewer restrictions than Cinque's and therefore the derivations that it allows form a superset of the set of derivations allowed in Cinque's approach. This is in fact the basis for the claim that Cinque's findings ought not to be construed as an empirical argument for universal Spec \prec Head \prec Complement order, since the extra derivations allowed on the assumptions in (7) do not give rise to additional orders. Consequently, the assumed universal Spec \prec Head \prec Complement order does not carry any of the empirical burden. Cinque's and our explanations rest entirely

on the assumption of a universally fixed underlying hierarchy of elements in the extended projection of the noun and on restrictions on movement. The LCA does not contribute anything to the explanation of the linear asymmetry inherent in the universal-20 data. We will demonstrate below that this carries over to the explanation of other linear asymmetries as well.

In this context we should note that our proposal requires fewer movements than the LCA-based alternative. This claim can be construed in two ways only one of which is relevant. First, Cinque's theory requires movement in 13 of the 14 licit derivations, while our alternative does so only in six. In each of those no more than a single movement is required, while Cinque's derivations require up to three movements. This distinction is quantitative and cannot be used as a basis for an argument one way or another. Second, as we will demonstrate, the movement types required in Cinque's theory form a superset of the movement types required in our theory. This is the crucial point. The fewer movement types there are, the more restrictive the theory of movement can be. As we will also demonstrate, this increased restrictiveness in the movement component gives rise to a more restrictive theory overall.

4 Comparing the two Theories

In the previous section we showed that the typology of word order in the nominal domain can be explained without appeal to the LCA. A weaker assumption barring rightward movement suffices. This means that at this point we have two largely equivalent theories that assign very different representations to the various linear

realizations of the extended nominal projection. In this section we try to evaluate the two approaches.

We begin by showing that the equivalence of the two theories is more dramatic than may seem to be the case at first sight. They assign very similar structures to each of the attested strings in (1). This, of course, further weakens the empirical content of the LCA. It should also dissuade any attempt at arguing against our theory on the basis of constituency; the theories are too similar to be distinguishable in terms of constituency at any level.

We then go beyond the nominal domain, demonstrating that for each ungrammatical string derived by movement to the right, there is an LCA-compatible analysis. Consequently, proponents of antisymmetry will still need to make a stipulation banning apparent rightward movement (that is, structures that are the LCA-compatible equivalent of rightward movement).

Finally, we show that there are well-motivated constraints on movement that can successfully be formulated in theories that adopt our more flexible structures, but not in antisymmetric theories, which are based on rigid trees and require additional movement operations in order to capture word order alternations.

4.1 Stretching and Shrinking Trees

The main claim of this subsection is that, despite appearances, for each attested word order in the extended nominal projection the gross constituency and command relations on Cinque's analysis are identical to those in the simplest representation allowed under our alternative proposal. (By 'gross constituency' we mean the grouping of all audible

material in the base structure, as indicated by traces, and on the surface.)

We demonstrate this by giving a mechanical procedure to change Cinquean trees into the trees in (8) and (9), as well as a mechanical procedure to do the reverse. We call the first of these procedures *Shrinking* and the second *Stretching*. Shrinking is defined in (12), (15), and (17). The point is the mere existence of such structure preserving algorithms, not the details of execution.

- (12) Prune the Cinquean tree by deleting the functional heads (W , Agr_W , X , Agr_X , Y , and Agr_Y) and their intermediate projections maintaining dominance relations.³

When applied to the tree in (13) this yields (14)

$$(13) \quad [\text{Agr}_{F_\alpha P} X [\text{Agr}_{F_\alpha P} \text{Agr}_{F_\alpha}^0 [\text{F}_{\alpha P} \alpha [\text{F}_{\alpha P} \text{F}_\alpha^0 t_X]]]]$$

$$(14) \quad [\text{Agr}_{F_\alpha P} X [\text{F}_{\alpha P} \alpha t_X]]$$

- (15) Delete any trace whose antecedent is the sister of the trace's mother.

This will transform (14) into (16).

$$(16) \quad [\text{Agr}_{F_\alpha P} X [\text{F}_{\alpha P} \alpha]]$$

- (17) Prune all non-branching non-terminals maintaining dominance.

The final step produces (18).

$$(18) \quad [\text{Agr}_{F_\alpha P} X \alpha]$$

It is easy to see that this three-step procedure takes us from the representation in (3) to one that is isomorphic to (8a). It is equally obvious that Shrinking will yield a representation isomorphic to (8h) when applied to (5). We will leave it to the reader to check that this procedure works for all admissible derivations in Cinque’s system. (It does.) Here we will only illustrate this result, by going through the effects of shrinking in one of the more complicated cases. When the rule in (12) is applied to (6) it yields (19).

$$(19) \quad [_{Agr_wP} NP [_{WP} DemP [_{Agr_{XP}} [_{Agr_{YP}} t_{NP} [_{YP} AP t_{NP}]]] [_{XP} NumP t_{Agr_{YP}}]]]]$$

Applying (15) will delete the traces of NP and Agr_YP as in (20a), which can be pruned to (20b) and which is equivalent to our (9e).

$$(20) \quad \begin{array}{l} \text{a. } [_{Agr_wP} NP [_{WP} DemP [_{Agr_{XP}} [_{Agr_{YP}} t_{NP} [_{YP} AP]]] [_{XP} NumP]]]] \\ \text{b. } [_{Agr_wP} NP [_{WP} DemP [_{Agr_{XP}} [_{Agr_{YP}} t_{NP} AP] NumP]]] \end{array}$$

Of course, the labelling in the representations resulting from shrinking does not adhere to standard requirements. This does not affect the point under discussion, however, since we are interested strictly in properties of tree geometry here. What is important, though, is that the nodes that make up the extended nominal projection bear labels revealing that. This information is indeed maintained under shrinking.

It should be clear that Shrinking preserves gross constituency. Material shared in the two types of analysis (Dem, Num, A, N and traces of ‘long’ movement) is grouped in the same way before and after shrinking. For example the representation in (6) and

the shrunken version of it in (20b) are both characterized by the following bracketing:
[*NP*[*DemP*[[*t_{NP}**AP*]*NumP*]]].

Shrinking also preserves *c*-command relations in the sense that any *c*-command relation that holds at some point during the derivation in the Cinquean analysis also holds at some point in the derivation in our analysis. This is trivial for the *c*-command relations determined by the functional sequence, given that the functional sequence determines height of attachment in base-generated structures. The movements that remain in the shrunken trees are inherited from the Cinquean input and so the extra *c*-command relations they give rise to are also present in LCA-based representations. In order to guarantee full preservation of *c*-command relations among material shared by both analyses, however, it must also be the case that movements that do not survive shrinking do not give rise to new *c*-command relations. This is indeed true, as the movements that shrinking eliminates are the roll-up ones. A look at (5) reveals that *NP*, *AP*, *NumP*, and *DemP* are properly contained in the moving constituent. The moving constituent itself of course acquires new *c*-command relations but its proper parts do not.⁴

It is true, of course, that *c*-command relations are not entirely equivalent. Thus, in (6) *NumP* *c*-commands *AP* before movement of *Agr_YP* but not after movement, whereas in our structure *NUM* *c*-commands *A* throughout the derivation. However, we know of no convincing analysis that crucially invokes the loss of *c*-command through roll-up movement (though see Kayne (1994); Cinque (2006) and footnote 6 for discussion). For movement that is not of the roll-up type, such effects do seem to exist, however (witness the failure of reconstruction for various phenomena, the possibility to

bind anaphors under successive cyclic *wh*-movement, etc.).

To complete our argument, we present a partial method for stretching trees. It is essentially the reverse of the three operations that constitute shrinking and is formulated in (21) and (21d). The procedure is only partial because it is designed to stretch trees with right specifiers or adjuncts, as this is the geometry that the LCA prohibits. In order to develop a complete method of stretching trees one would have to add a procedure that enriches structures with left specifiers and adjuncts. In the interest of space, we refrain from doing so here.

(21) In a structure $[_Y X \alpha]$

where

- (i) α is a non-projecting node,
- (ii) Y is projected from X , and
- (iii) α belongs to a class mentioned in (7a).
 - a. Insert a node $F_\alpha P$ between α and its mother;
 - b. insert a trace of X under $F_\alpha P$ and to α 's right;
 - c. relabel Y as $\text{Agr}_{F_\alpha P}$.
 - d. For every head-less node β , insert an identically labelled node γ between β and β 's right daughter and the appropriate head for γ as γ 's left daughter.

Like shrinking, stretching preserves gross constituency and c-command relations between Dem, Num, A and N, as well as traces of long movement.

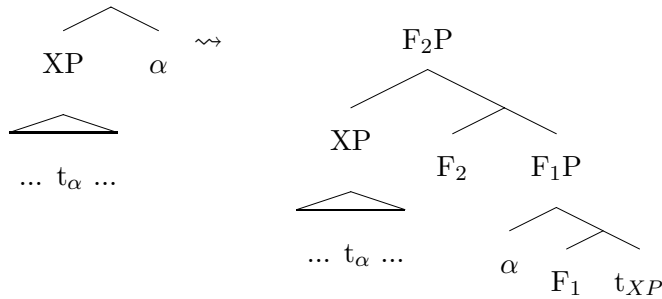
What the procedures of stretching and shrinking demonstrate is that the

LCA-based analysis of the typology of noun phrases is in fact very similar to the symmetrical analysis proposed here. Not only does it give rise to the same typological predictions qua word order (weak generative capacity), but it also generates very similar trees for those word orders (strong generative capacity). This does not mean, of course, that the theories are identical. In fact, we will show below that stretching trees is not innocent. However, we can already conclude at this point that the original motivation for the LCA is undermined since it does not impose additional restrictions on tree geometry. For every shrunken tree that violates the LCA, there is a stretched variant that is LCA-compatible. The LCA would of course restrict tree geometry if there were fewer functional projections that could host movements and if there were fewer admissible patterns of movement (e.g., if roll-up movement were to be disallowed). The problem that this would give rise to, however, is that the typology of noun phrases captured by Cinque's system would then be beyond the reach of the theory.

4.2 Rightward Movement and the LCA

We have claimed above that the LCA does not restrict the class of possible tree shapes. This entails, in particular, that it does not rule out structures in which a trace precedes its antecedent. We demonstrate this by taking a traditional rightward movement structure and applying the procedure of stretching defined above (modulo labels of inserted functional projections). This yields an LCA-compatible correspondent.

(22) Rightward Movement (gap-filler orders):



The trace and its antecedent can be arbitrarily far apart (in both linear and hierarchical terms), because nothing in the theory restricts the depth to which t_α is embedded in XP. For example, α could have undergone a number of steps of successive-cyclic movement within XP.

The fact that Cinque’s analysis rules out this type of movement in the nominal domain has nothing to do with LCA. Rather it follows from a restriction on movement, the assumption that movement within the extended nominal projection must always target a constituent containing the lexical head. This rules out the occurrence of structure (22) in the nominal realm, since the two moving elements, XP and α , cannot both contain N. If α contains N, then XP doesn’t, and vice versa.

The requirement that every movement pied-pipe the lexical head does not seem to have a counterpart in the extended projections of other lexical categories.⁵ In fact, the structure in (22) is not just a hypothetical possibility, it is a widely used analytical tool known as remnant movement (den Besten and Webelhuth (1987); Müller (1998); Koopman and Szabolcsi (2000); Nilsen (2003) and references cited there). A particularly striking example comes from Kayne (1998), who argues that negative quantifiers in English raise to [Spec, NegP], a movement that is followed by remnant movement of VP to the specifier of an as yet unidentified functional projection WP.

This derivation instantiates the possibility raised above.⁶

$$(23) \quad [WP [VP \dots t_{NegDP}] [W^0 [_{NegP} NegDP [Neg^0 t_{VP}]]]]$$

In sum, every tree-geometric shape, including rightward-movement structures, have an LCA-compatible counterpart, not just hypothetically but also in analytical practice. Therefore, a number of cross-linguistic generalizations that have been used to motivate the LCA do not follow from the theory, unless a way can be found to block remnant movement in the relevant cases.⁷ For example, it has been observed that *wh*-movement and long NP raising are universally leftward (Bresnan (1970), Perlmutter and Postal (1983/1972)).⁸ These generalizations have been used to motivate the LCA (e.g., Cinque (1996)), but do not in fact follow from it, as just shown. Similarly, Kayne (1994, p. 50) observes that while there are languages with verb-second, languages with the verb systematically in penultimate position do not seem to exist. This generalization extends to other second-position phenomena such as second-position cliticization. Kayne argues that this asymmetry is a result of the LCA, as it implies that heads precede their complement and specifiers are unique and precede heads; therefore, both head movement and phrasal movement must be leftward. Verb-second results if the highest functional projection is targeted by both. But in fact there is an LCA-compatible derivation that results in the offensive pattern, as shown in (24). The derivation requires a sequence of two functional heads both of which attract the head of their respective complement. In addition, the lower functional head (F_1^0) attracts some maximal projection (YP) out of its complement, as is independently required for verb-second. Finally, the higher head attracts the complement of F_1^0 , as required for

roll-up structures.⁹ Although we have not provided a procedure for shrinking trees like (24), where the functional head positions contain moved material, we suspect that removal of structure required only for LCA compatibility yields a structure with head and phrasal movement to the right.

$$(24) \quad [_{F_2P} [_{XP} \dots t_{X^0} \dots t_{YP} \dots] [X^0 + F_1^0 + F_2^0 [_{F_1P} YP [t_{X^0+F_1^0} t_{XP}]]]]$$

What these observations show is that developments in the field subsequent to the introduction of the LCA in Kayne (1994) have led to a situation in which LCA-based theories fail to capture the data that motivated the LCA in the first place. In other words, the LCA provides no insights into the type of generalizations quoted above.¹⁰

4.3 Is Stretching Harmless?

So far we have shown that there is no particular advantage in adopting the LCA over the more traditional alternative advocated here. There is an important disadvantage, however, that convinces us that the LCA should be abandoned. This disadvantage is that the movements required to reconcile the LCA with the attested word-order patterns stand in the way of arriving at a restrictive theory of movement. The general problem manifests itself in at least two ways, each one associated with a type of movement required by Cinque's analysis. The two movements in question are the very local movement that generates roll-up structures and the movement of NP in (6), where pied-piped material is stranded in an intermediate position.

Very local movement is problematic in the light of Saito and Murasugi (1993); Bošković (1997); Abels (2003a,b); Boeckx (2008). In those works an anti-locality

condition on movement is proposed according to which no complement can recombine through movement with a projection of its selecting head.¹¹ Abels (2003b) argues that this condition has the following rationale: A head and its complement are in a local relation in the base structure (they mutually c-command each other) and no different relation is established by recombining the complement with a projection of the head. For any category that only permits extraction through an escape hatch, the prediction is that the complement of that category cannot be extracted. There is good evidence that extraction from CP must proceed through just such an escape hatch. It is therefore predicted, correctly, that IP will resist movement when generated as the complement of C^0 (den Dikken 1995 calls this the IP Immobility Principle). This pattern is striking, since extraction out of IP is possible. Both facts are illustrated in (25).

- (25)
- a. ✓What do you think that Mary has read?
 - b. ✓Nobody thought that anything would happen.
 - c. ✓That anything would happen, nobody thought.
 - d. *Anything would happen, nobody thought that.

The general pattern extends to a number of other categories; thus, preposition stranding is blocked in languages where movement out of PP needs to proceed through an escape hatch while movement out of the complement of PP is unproblematic. Similarly, VP can never strand *v*, although extraction out of VP is, of course, allowed. Beyond these cases, which are discussed at length in Abels (2003b), patterns of extraction that parallel the data in (25) are found with several other categories. This would follow if these other categories also require extraction through an escape hatch.

Two of these can be found in English. Extraction of NP stranding the determiner is ungrammatical but extraction from NP is unproblematic. Furthermore, it can be shown that English has two types of degree expression, one of which is a functional head selecting AP and the other a modifier that adjoins to AP as well as to other categories (see Neeleman et al. (2004)). Extraction of AP stranding modifying degree expression is possible, but similar movement stranding degree expressions that are functional heads is ruled out. As before, extraction out of AP is fine in both cases. The structures to be ruled out, then, are given in (26a-e).

- (26) a. $*[_{CP} IP [C^0 t_{IP}]]$
 b. $*[_{PP} DP [P^0 t_{DP}]]$
 c. $*[_{vP} VP [v^0 t_{VP}]]$
 d. $*[_{DP} NP [D^0 t_{NP}]]$
 e. $*[_{DegP} AP [Deg^0 t_{AP}]]$
 f. $\checkmark[_{XP} \alpha [X^0 [_{YP} \dots t_{\alpha} \dots]]]$

where X ranges over C, P, v, D, and Deg.

The structures discussed so far are all head-initial, but the same patterns are found with complements that precede the head. Thus the IP Immobility Principle applies to Japanese, Korean, and Turkish as well as to English, and the ban on preposition stranding is as common with postpositions as it is with prepositions. Needless to say, extraction from IP and from the complement of postpositions is unproblematic (see e.g. Sener (2006) for an illustration based on Turkish postpositions). The set of structures to be ruled out should therefore be extended to (27a-e).

- (27) a. $*[{}_{CP} IP [t_{IP} C^0]]$
 b. $*[{}_{PP} DP [t_{DP} P^0]]$
 c. $*[{}_{vP} VP [t_{VP} v^0]]$
 d. $*[{}_{DP} NP [t_{NP} D^0]]$
 e. $*[{}_{DegP} AP [t_{AP} Deg^0]]$
 f. $\checkmark[{}_{XP} \alpha [[{}_{YP} \dots t_\alpha \dots] X^0]]$

where X ranges over C, P, v, D, and Deg.

As far as we can tell, the anti-locality constraint on movement must remain toothless in theories that assume syntax to be antisymmetric.¹² To account for head finality, LCA-based theories can adopt one of the following two structures. The problem with adopting (28a) (suggested in Kayne (1994)) is that it violates the anti-locality condition. However, giving up the anti-locality condition implies that the immobility of IP can only be stipulated. If, on the other hand, the anti-locality thesis holds, then (28a) must be rejected in favor of (28b). This implies that the escape hatch for extraction from the CP domain cannot be [Spec, CP] but must be [Spec, Agr_CP], which in turn has the unfortunate consequence that the account of IP's immobility is lost. Thus, either the anti-locality constraint must be abandoned, or it must be voided of its empirical content.¹³

- (28) a. $[{}_{CP} IP [C^0 t_{IP}]]$
 b. $[{}_{Agr_{CP}} IP [Agr_C^0 [{}_{CP} C^0 t_{IP}]]]$

Essentially the same problem arises in the case of unstrandable postpositions.

We now turn to a second restriction on movement that cannot be reconciled with the derivations proposed in Cinque’s paper. In general the movements that derive neutral orders are assumed to target the noun. This explains why only movements of constituents containing the noun are admissible. Such movements can be construed as instances of pied-piping. Cinque is actually quite explicit about this; indeed, it is hard to see what else could explain the limitation to subtrees containing the noun. With this in mind, consider again the structure in (6). On the proposed analysis this must be a derivation in which material pied-piped in an initial step of movement (of Agr_YP to [Spec, Agr_XP]) is stranded by a subsequent one (movement of NP to [Spec, Agr_WP]). The problem is that such derivations seem to be systematically ruled out in other domains. Thus Postal (1972) observed that prepositions pied-piped under *wh*-movement cannot be stranded in intermediate positions, as shown in (29).¹⁴ Movement under relative clause formation is subject to the same restriction, as (30) illustrates.

- (29) a. ✓_{[PP} With which friend] did you say t_{PP} that she went home t_{PP}?
 b. ✓_{[DP} Which friend] did you say t_{DP} that she went home with t_{DP}?
 c. *_{[DP} Which friend] did you say [PP with t_{DP}] that she went home t_{PP}?
- (30) a. ✓the rock [DP pictures of which] I think t_{DP} that Bill has seen t_{DP}
 b. ✓the rock [PP of which] I think t_{PP} that Bill has seen pictures t_{PP}
 c. *the rock [PP of which] I think [DP pictures t_{PP}] that Bill has seen t_{DP}

At the very least, the derivation Cinque assumes complicates the generalization that pied-piped material cannot be stranded. Therefore, it may well make it harder to develop an explanation of the relevant data. In contrast, the more conservative analysis

of the N-Dem-A-Num word order advocated here ((1biv)) does not rely on stranding and therefore does not give rise to the same complication. This is a second example, then, where tree-stretching is potentially harmful.¹⁵

Cinque suggests that the crucial order (N-Dem-A-Num) could be spurious. Since our argument rests on its existence, we should take a closer look at the languages that display it. Cinque mentions Pitjantjatjara, Nkore-Kiga, and Noni. Noni has the relevant order as an alternate to N-Dem-Num-A, which suggests that we should put it to one side. For Pitjantjatjara, Bowe (1990, 29-54, 111, 146-150) claims that the order in question is the only admissible one. Indeed, in Eckert and Hudson's 1988 textbook examples like those in (31) can be found. The morpheme glossed SubjT is an ergative case marker appearing at the end of a subject DP and repeated in case of apposition, as shown in (31c). Therefore, material to the left of this morpheme can safely be taken to belong to a single extended nominal projection. The examples in (31a) and (31b) establish the sub-orders N-Dem-A and N-A-Num, respectively. An example of the N-Dem-A-Num can be found in (31c), on the reasonable assumption that *many* behaves like a numeral. (Eckert and Hudson (p. 130-134) treat numerals and quantifiers as adjectives of quantity and give a single rule for positioning them among the nominal modifiers.)¹⁶

- (31) a. Tjitji pala tjukutjuku -ngku -ni ungu
 child that small -SubjT -me gave
 'That small child there gave (it) to me.' (Eckert and Hudson, 1988, p. 89)
- b. Kulata wara kutjara nyara mantjila!
 spear long two yonder get
 'Get the two long spears over there!' (Eckert and Hudson, 1988, p. 132)

- c. Tjitji tjuta -ngku katingu, tjitji panya pulka tjuta -ngku
 child many -SubjT took child that.known big many -SubjT
 ‘The children took it, you know those big children’ (Eckert and Hudson,
 1988, p. 139)

Nkore-Kiga has been studied even less than Pitjantjatjara. There appears to be only one source, Taylor (1985), to which all claims about the language can be traced.¹⁷

Taylor (p. 55) characterizes word order in the Nkore-Kiga noun phrase as follows (we omit categories not relevant to the present discussion).

- (32) noun – demonstrative adjectives – pure adjectives/appositives – quantifiers –
 verbal adjectives

Some of the orders mention in (32) are illustrated in the following example. (We have adjusted Taylor’s gloss slightly.)

- (33) ekitabo kyawe ekyo eki- hango ekimwe eki- riku- tukura ekiri aha
 book your that 7- large one 7- partic.contin- be.red which.is on
 meeza nikyo
 table itself
 ‘that selfsame single large red book of yours on the table’

Taylor’s (p. 55) discussion of the order in the noun phrase clearly suggests that the order in (32) is the neutral order. It is not “rigidly adhered to,” but it is “preferred”. Taylor (p. 75) further explains that for pure adjectives the alternate N-Dem-Num-A serves to emphasize these elements. This order is therefore marked, and hence irrelevant to our concerns.

In view of these data, we think that discarding N-Dem-A-Num is not justified.

The predictions of our theory (assuming that pied-pipers never strand pied-pipees) diverge from those of Cinque’s theory once more than four elements are taken into consideration. Consider a structure in which there are five hierarchically ordered elements. Cinque’s theory would then allow the order in (34), but our theory would rule it out, as every derivation consistent with the assumptions we make would require stranding of a pied-pipee (namely ‘4’ in (34)).

$$(34) \quad [5 [1 [[4 t_5] [2 [3 t_{[4 5]}]]]]]]$$

We do not think that such orders exist, but the issue is worth exploring in some depth as this provides an opportunity to test the theories empirically. Notice that these diverging predictions underline the fact that our theory is overall more restrictive than its LCA-based competitor.

5 Concluding Remarks

Two main conclusions can be drawn from the discussion in this paper. First, the claim that base-generated structures are anti-symmetric, as stated in Kayne’s 1994 Linear Correspondence Axiom, is empirically vacuous, at least within the nominal domain. The structures allowed by Cinque’s 2005 LCA-based theory are identical in gross constituency to those generated by our more conservative alternative. Although we cannot demonstrate this here, we believe that this conclusion holds more generally.

Second, in order to capture the typological patterns uncovered by Cinque, (certain

types of) movement must be exclusively leftward. Although a ban on rightward movement was originally argued to follow from the LCA, we have shown that this is not true, except in the most legalistic sense. Every rightward-movement structure can be paired with an LCA-compatible remnant-movement structure that shares its gross constituency.

These conclusions lead us to reject the LCA, especially in view of evidence that the LCA stands in the way of a restrictive theory of movement. However, whether we reject the LCA or not, the question presents itself why movement in the nominal domain should be leftward. In work in progress (Abels and Neeleman, 2006, section 6) we argue that a parsing explanation might be available on fairly uncontroversial assumptions.

Notes

¹Formally, given the base hierarchy in (2a) or (7a) or (3), the set of fourteen strings representing attested orders in (1) is closed under permutation by movement according to (2c), (2b), and (2d) or (7c), (7b), and (7d).

²Incidentally, Brugè (2002) assumes that the structure in (11a) represents the underlying universal hierarchy and that demonstratives sometimes surface in this low underlying position. The discussion in the main text indicates that Brugè's hierarchy is incompatible with the cross-linguistic record. Her suggestion, largely motivated by Spanish, where the article and demonstrative may co-occur on opposite sides of the noun, also fails to make sense of the observation by Rijkhoff (2002, chapter 6) that in all languages that allow demonstratives and articles to co-occur prenominal, the demonstrative always precedes the article.

³Starke (2004) argues on independent grounds that functional heads whose only purpose is to host specifiers of a particular type should be jettisoned from the theory. Since Cinque provides no morphological motivation for any of the proposed functional heads, our algorithm treats them uniformly as empty. See also Koopman's 1996 generalized doubly filled COMP filter.

⁴According to the letter of Kayne's (1994) definition of c-command this is false since specifiers of specifiers c-command out. We cannot pursue the consequences of this here.

⁵Indeed, even in the NP the restriction holds only if we abstract away from optional

movements, movements of arguments of the noun, etc. Given these simplifications, the restriction might actually carry over to other lexical categories.

⁶Movement of NegDP to [Spec, NegP] is intended to overtly mark scope. This implies that the subsequent movement of VP should not erase c-command relations. Recall that this assumption was part of the argument we made for saying that c-command relations are preserved under shrinking. See Cinque (2006) for an account where underlying c-command relations are, in effect, destroyed by movement just to be recreated later, while binding principle A is computed somewhere along the way.

⁷Remnant movement cannot be ruled out across the board, as it is required for the analysis of structures like the following.

- (35) a. Painted by Picasso, this painting doesn't seem to be.
b. How likely is there to be a riot?

⁸Signed languages are sometimes cited as counterexamples to the claim that *wh*-movement is universally leftward (for diverging points of view see Neidle et al. 1997, 1998; Petronio and Lillo-Martin 1997).

⁹Remnant movement of headless phrases has been motivated for German by Müller (1998) and for Japanese by Koizumi (1995) and Vermeulen (2005), contra Takano (2000). Should it turn out to be the case that head movement bleeds remnant movement, then the argument can be reconstructed by simulating head movement through remnant movement à la Koopman and Szabolcsi (2000) or Nilsen (2003).

¹⁰Kayne (1994, p. 140 fn. 8) acknowledges that even with the more restrictive theory of movement assumed at the time, the LCA doesn't by itself rule out the analogue of rightward V-to-C. "It is also essential to rule out derivations involving leftward movement of the finite verb to C⁰ followed by leftward movement only in root contexts of IP to Spec,CP."

¹¹Grohmann (2000) suggests an even more radical anti-locality constraint.

¹²Thus, Kayne (2005, p. 272, 331) assumes that the "complement of a given head H can never move to the Spec of H," but given the proliferation of silent functional heads we do not see what empirical predictions follow from this assumption.

¹³Proponents of LCA-based theories face an additional question in this area. Kayne (1994) cites lack of obligatory *wh*-movement in complementizer-final languages as possible evidence for (28a). However, if it is adopted, there is an additional potential position following IP and preceding C⁰. If that position were used for *wh*-movement, head-final languages would have rightward *wh*-movement. Thus, the question must be answered why [Spec, CP] is systematically empty.

In Kayne (1999, 2004) (see Borsley (2001) for discussion) a different account of head-finality is proposed. Under this proposal certain prepositions and complementizers are merged in a VP external position and combine with their apparent complements through movement. Along the way, a number of remnant movements occur. We leave it to proponents of such analyses to demonstrate how the IP immobility principle, the ban against P-stranding, and the word order typology in the NP can be made to follow. The proposals are not sufficiently worked out to allow general evaluation yet.

¹⁴Du Plessis (1977) claims that such derivations do exist in Afrikaans, but the analysis is dubious according to (Den Besten, p.c.) who reanalyzes the relevant data as involving parentheticals. Den Besten suggests that Du Plessis' analysis cannot account for the verb placement in the examples involving putative intermediate stranding.

¹⁵There is one class of analyses according to which quantifier float may give rise to stranding of pied-piped material. Sportiche (1988), in particular, argues that quantifier and DP are generated as a constituent, and that the quantifier can be stranded, not only in its base position, but in any A-position through which the DP passes. However, there are several alternative accounts of quantifier float. Bošković's (2004) proposal comes very close to Sportiche's without allowing stranding of pied-piped material. Other authors have argued that floating quantifiers are base-generated as adverbs, rather than as part of the associated DP (see, for instance, Bobaljik 1995 and Janke and Neeleman 2005).

¹⁶The morphemes analyzed as demonstratives can stand alone. They are therefore not clitics and hence not subject to special ordering restrictions.

¹⁷Cinque bases his claims about Nkore-Kiga on Dryer (to appear) and Lu (1998). Dryer (to appear) cites Taylor (1985) as his source and Lu (1998) cites Rijkhoff (1990), who in turn cites Taylor (1985).

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