Why Are There No Directionality Parameters?

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1. Introduction

A 'why'-question such as the one in the title can be interpreted in at least two ways. On the one hand it can be interpreted as asking for evidence that supports the assertion that there are no directionality parameters. Another interpretation, taking it for granted that it's true that there are no directionality parameters, asks why the language faculty should be put together in that fashion.

I will touch on some evidence of the standard sort in the first part of this paper (introduction and sections 2 and 3). (Subsequently, in section 4, I will move on to the second interpretation of the 'why'-question.) What, then, is the evidence for saying that there are no directionality parameters?

Basically, it is that under the view that was standard in the 1980s, to the effect that there are directionality parameters, one would expect to find oneself living in a symmetric syntactic universe, with specifiers to be found on either side of their head and complements on either side of theirs. Yet if one looks at the facts of human language syntax to the extent that we know them, in search of such symmetry, one does not find it, I think.

The expectation of symmetry breaks down in a number of ways. One very simple way rests on the following observation. Nobody has ever found two languages that are mirror images of one another, i.e. nobody has ever found two languages such that for any sentence in one, the corresponding sentence in the other would be its mirror image (taken either word-by-word or morpheme-by-morpheme).

Put another way, take some human language, e.g. English, and construct mirror-image English by taking the mirror image of each grammatical English sentence and then 'putting it into' mirror-image English. Though perfectly easy to imagine, such a mirror image of English has never come close to being found, and similarly for any other known language.

In a symmetric syntactic universe there should exist such pairs as English and mirror-image-English (even if the question whether you would expect to chance upon them is a complicated one), but clearly nobody has ever found any. I suspect that if you ask syntacticians to make educated guesses, most would agree that we are never going to find such pairs and that it is not an accident that we have not found them yet. This, I think, is relatively uncontroversial.

The antisymmetry hypothesis that I put forth in 1994 in *The Antisymmetry of Syntax* (henceforth *AS*) leads to much stronger expectations, though, stronger than what was said in the preceding paragraphs. This is the case since, if antisymmetry holds, then for any subtree (with both hierarchical and precedence relations specified) that is well-formed in some language, the mirror image of that subtree cannot be well-formed in any language. That of course is controversial; in fact the negation of it was standardly assumed to be correct in the 1980s.[1]

At first glance there do of course appear to be symmetrical pairs of substructures such as English VO and Japanese OV, that do give the impression that they are in a mirror-image relation. If antisymmetry is correct, though, all such cases must be misleading and must in fact involve pairs that differ in hierarchical structure.

 If we assume something like Baker's (1988) UTAH principle, along with a strong interpretation of Chomsky (2001) on uniformity, then in such cases as English VO and Japanese OV this hierarchical difference will necessarily be associated with some difference in movement (internal

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[1] See, for example, Chomsky and Lasnik (1993, sect. 3.1).

merge) in the corresponding derivations. Such movement differences will in turn be related, under a familiar view, to differences in the properties of functional heads.[2]

A strong position, but one that is not central to what follows and that I will not pursue here, would be:[3]

(1) Movement differences exhaust the universe both of word order differences and of morpheme order differences.

2. Movement leading to OV order

Let us take OV as a test case. Antisymmetry as in *AS* has the following immediate consequence:

(2) OV can never be associated with a structure in which O is sitting in the complement position of V.[4]

It seems completely clear and undeniable that there exist languages or subparts of languages in which OV-order is produced by movement. It is hard to see how anybody could disagree with that, if it is stated as an existential. One easy example in English would be:

(3) They're having their car washed.

in which object *their car* comes to precede via movement (of the sort found in passives) the verb *wash* that it is the object of.

Even more telling are examples of OV order involving movement of O where OV order is 'canonical' or 'neutral',[5] i.e. does not involve what one might think of as 'special' movements like the one found in (3). One such type of case is found in languages of a sort studied by Dryer (1992), with SONegV as a possible canonical order (as in Korean). As argued by Whitman (2005), on the assumption that Neg is merged outside VP, and therefore above O, the pre-Neg position of O in SONegV sentences must have been produced by movement.[6] In a SONegV sentence, O can clearly not be occupying the complement position of the pronounced V.

Whitman argues more specifically that SONegV is produced by remnant VP-movement. The verb moves out of the VP by head movement; subsequently the entire (verbless) VP containing O moves past Neg, much as in Nkemnji's (1992; 1995) analysis of one word order pattern in Nweh.[7]

A similar argument in favor of remnant movement carrying an object to the left of V is made by Baker (2005) for Lokạạ. One such case in Lokạạ is that of SONegV, matching Whitman, but Baker's

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[2] See, for example, Borer (1984, 29).

[3] Cf. Cinque (1999).

[4] More specifically this follows from the claim in *AS* and in Kayne (2003a) that specifier, head and complement are always found in the order S-H-C. (In bare phrase structure, this translates into the order 'second-merged-phrase H first-merged phrase'.)

A number of authors have jumped from S-H-C to SVO. This follows only if what we call objects are invariably complements of their verbs, which is certainly not always the case - see Kayne (1981a) and Larson (1988).

[5] Erdocia et al. (2009) argue that canonical SOV order in Basque is processed faster and more easily than non-canonical orders. They plausibly relate that to the canonical order involving less syntactic computation than non-canonical orders. At certain points, though, they seem to draw the further conclusion that canonical order involves no movement at all, which does not follow. In addition to the text discussion of canonical SOXV order in various languages, see the discussion of (6) below, as well as Pollock (1989) and Cinque (1999) on verb movement in (canonical order sentences in) French and Italian (and various other languages), and Bernstein (1991; 1997), Cinque (1994; 2005; 2010) and Shlonsky (2004) on noun movement (in canonical order DPs).

[6] Whitman makes the same point for the S-O-Tense/Aspect-Verb languages discussed by Dryer.

[7] Cf. in part Biberauer (2008). For a remnant movement analysis of West Germanic OV, see Haegeman (2000) and Koopman and Szabolcsi (2000). For a remnant movement analysis (in which O must move leftward first) of VO order in Malagasy and similar languages, see Pearson (2000).

argument for Lokạạ is extended to various other such cases of canonical SOXV orders, in particular where X is a gerundive morpheme, a mood morpheme or an auxiliary.[8]

An alternative to remnant VP-movement for SOXV is to have O move past X by itself. Kandybowicz and Baker (2003) argue specifically that both options are made available by the language faculty. While remnant VP-movement is appropriate for Nweh and for Lokạạ, movement of O by itself is called for in Nupe. (This difference correlates with the fact that Nweh and Lokạạ have S-PP-X-V, whereas Nupe does not.[9])

The SOAuxV order found in Lokạạ is, again, a clear instance in which O cannot possibly be in the complement position of the pronounced V. Such sentences are also found in (Dutch and) German in some cases, in particular in (embedded cases of) so-called IPP sentences,[10] in which the verbal complement of the auxiliary appears as an infinitive rather than as a past participle:[11]

> (4) Ich glaube dass er das Buch hätte lesen wollen. ('I believe that he the book would-have to-read to-want' = 'I believe that he would have wanted to read the book')

In this kind of embedded sentence (strictly speaking SOAuxVV, with two Vs) in standard German, the (definite)[12] object must precede the auxiliary:

> (5) *Ich glaube dass er hätte das Buch lesen wollen.

In other words, (4) is another example of a canonical/neutral word order (this time in German) in which O (*das Buch*) and V (*lesen*) do not even form a constituent.

It should be noted that in instances of SOXV in which the O is carried to the left of X by remnant movement, it might perhaps still be the case that the pronounced O is in the complement position of the trace/copy of V. This would nonetheless be compatible with (2) as long as O, if in complement position, does not precede the trace/copy of V. On the other hand, it is by no means clear that O is allowed to remain in its merge position, insofar as it might always have to move for Case and/or EPP reasons. (This point is strongest if, as in Kayne (1998) and Chomsky (2001), movement cannot take place at LF.) In this vein, thinking at the same time of the VP-/predicate-internal subject hypothesis[13] that is now widely held, of Kayne (2004) on prepositions as probes, and of Chomsky (2008) on the perhaps general raising of objects to Spec,V, one might well reach:

> (6) All arguments must move at least once.

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[8] Similarly, Japanese honorific *o-* looks (to me) like a functional head that precedes the (nominalized) VP, all of whose arguments move past *o-*; for recent discussion of this *o-*, see Ivana and Sakai (2007). For related proposals, see Whitman (2001).

[9] Cf. also Aboh (2004).

[10] For discussion of IPP, see, for example, Hinterhölzl (2000) and Zwart (2007).

[11] OAuxV is also found in various languages in a way limited to certain subtypes of O. In Romance languages object clitics almost always precede a finite auxiliary, e.g.:

  i) Jean les a vus. (French 'J them has seen')

(For a possible link to certain cases of Scandinavian object shift, see Nilsen (2005, note 7). For a possible link between object shift and passive, see Anagnostopoulou (2005) and Bobaljik (2005).) In French the quantified objects *tout* ('all') and *rien* ('nothing') can precede an infinitival auxiliary (cf. Kayne (1975, chap. 1; 1981b)):

  ii) Jean croit tout avoir compris. ('J believes all to-have understood')

  iii) Jean croit ne rien avoir compris. ('J believes neg nothing to-have understood')

In Icelandic, too, negative phrases can do so - cf. Jónsson (1996) and Svenonius (2000).

  For instances of OAuxV in Finnish and further instances in Icelandic, see Holmberg (2000) and Hróarsdóttir (2000), respectively.

[12] In German, but not in Dutch, an indefinite object to some extent can act differently - see Wurmbrand (2005, Table 7).

[13] See, for example, Koopman and Sportiche (1991). For recent discussion of a canonical case of the raising of (genitive) subject and object arguments within DP, see Brattico and Leinonen (2009, 19).

Of importance both for (6) and for (2) are deverbal compounds of the English type, as in:

(7) an avid magazine reader
(8) that magazine-reading student over there

If we interpret (6) strongly by taking 'argument' there to cover the object in such deverbal compounds, then *magazine* must have moved at least once in both (7) and (8), in a way that would fit in straightforwardly with Baker (1988) on noun-incorporation. This is important for the antisymmetric claim of (2), since (2) says that *magazine* in these examples must not be sitting in the complement position of *read*. A noun-incorporation approach to (7) and (8) would, instead, have *magazine* left-adjoining to *read*, in a way compatible with (2) (and (6)).

Noun-incorporation is not the only approach to (7) and (8) that is compatible with (2). An alternative would be to take *magazine* to be moving to a (low) specifier postion. That might be supported by the possibility of an intervening particle such as *down*:

(9) an avid music downloader
(10) that music downloading student over there

with the pre-V position of *down* here related to the pre-V position of the particle in Swedish participial passives,[14] as well as by the possibility of having more than just a noun:

(11) an avid (?very) old car buyer
(12) an avid classical music downloader

3. Cross-linguistic gaps and asymmetries

Observationally speaking, there are apparent cross-linguistic symmetries such as VO/OV of the English/Japanese type. As discussed in the previous two sections, antisymmetry implies that the apparent symmetries are not true symmetries, when one looks more closely into hierarchical structure. In this section, I would like to touch upon some examples of cross-linguistic asymmetries that strikingly reflect the general antisymmetry of syntax. In each case, a precise explanation will of course ultimately involve other principles (e.g. locality) in addition to antisymmetry itself.

3.1. Dislocations and Hanging Topics

Cinque (1977) has shown that Italian has two distinct types of left-dislocation, one of which he calls 'hanging topics'.[15] Hanging topics occur at the left-hand edge of the sentence. As far as I know, there has never been a claim to the effect that there exists something exactly comparable on the right-hand edge of the sentence, in any language. If so, that is a sharp gap/asymmetry; if antisymmetry were not correct, what could we possibly attribute that to? (The core reason for the absence of right-hand hanging topics is the antisymmetric prohibition against right-hand specifiers.)

Note in particular that the other type of left dislocation that Italian has, namely CLLD (clitic left-dislocation, as discussed in more detail in Cinque (1990)) does seem to have a right-hand counterpart, usually called (clitic) right-dislocation. Yet the pairing of CLLD and clitic right-dislocation (CLRD) is itself misleading. As argued by Cecchetto (1999) for Italian and by Villalba (1999) for Catalan, there are sharp asymmetries within each of those two languages between CLLD and CLRD,[16] which would

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[14] Cf. Holmberg (1986) and Taraldsen (2000).

[15] Although they might appear not to involve movement, note the scope reconstruction effect for a certain kind of topicalization in Basque pointed out by Ortiz de Urbina (2002, 520). Similarly for the fairly acceptable bound-variable-type reconstruction effect in (my) English:

  i) His youngest daughter, no man could possibly not love her.

in which *his* is bound by *no man*.

[16] Probably not related to antisymmetry, on the other hand, is the fact that, according to Villalba and Bartra-Kaufmann (2009, note 20), CLRD is "far less common" in Spanish than in Catalan. (Similarly, I have long had the

be quite surprising if our linguistic universe were not antisymmetric.[17] (Again, the core reason for this asymmetry is the antisymmetric prohibition against right-hand specifiers, which forces a remnant movement analysis and/or a bi-clausal analysis of CLRD,[18] but not of CLLD.)

Related to this left-right asymmetry is the fact that there are SVO languages (such as Haitian creole and Gungbe)[19] that lack CLRD entirely, but apparently no SVO languages that lack left dislocation entirely.

3.2. Clitics

Greenberg's (1966) Universal 25 states that if the pronominal object in a given language is post-V, so is the nominal object. Recast in movement terms and generalized beyond the position of V, this can plausibly be interpreted as:

(13) No language will systematically move its lexical objects further to the left than
       its pronominal clitics.

Put this way, there is an immediate link to the well-known English contrast between:

(14) I said I liked them all.
and
(15) *I said I liked those talks all.

Here, the pronoun arguably moves further left than the lexical DP. The proposal in (13) leads to the expectation that no variety of English could reverse these judgments and reject (14) while accepting (15). From this perspective, (14)/(15) is essentially similar to the French contrast given in:[20]

(16) Jean les voit. ('John them sees')
(17) *Jean les chiens voit. ('John the dogs sees')

with the (correct) expectation again being that no variety of French reverses these judgments.

Both (13) and Greenberg's narrower formulation are compatible with the pattern found in Italian infinitivals:

(18) Gianni desidera comprarli. ('G desires to-buy them')
(19) Gianni desidera comprare i libri. ('G desires to-buy the books')

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impression that French uses CLRD more than Italian.) What such differences might rest on (and how they can be made more precise) remains to be understood.

[17] It is of course logically possible that we will at some point in the future find other languages where things are the reverse of Italian and Catalan. As in any empirical science, there is no way to prove that that is never going to happen, but the weight of the evidence as of now in this subarea of syntax clearly tilts strongly toward the antisymmetric.

[18] Relevant to the bi-clausal possibility is:
 i) He's real smart, John is.
 ii) He's real smart, is John.
On these, cf. *AS*, sect. 8.3. On a bi-clausal analysis of first-conjunct agreement, cf. Aoun et al. (2010). For additional potential cases, see Kayne and Pollock (to appear, note 28).
  Relevant to the remnant movement possibility is Ortiz de Urbina's (2002) account of sentence-final (corrective) focus in Basque. (His observation (p.521) that post-verbal constituents are slightly marginal in some adjunct clauses in Basque recalls Vilkuna's (1998) partially similar observation on Estonian and Finnish; for a proposal, see Kayne (2003a, sect. 4.1).)

[19] Cf. Baker (2003) on Kinande and Torrence (2005, 70, 73, 75) on Wolof.
  On a possible link to the position of D, cf. Kayne (2003b, sect. 2).

[20] Also to some familiar cases of object shift in Scandinavian, with an important question again being whether the pronominal object in Scandinavian object shift is moving by itself, or being carried along by remnant VP-movement, as in Holmberg (1999, last sect.), Taraldsen (2000) and Nilsen (2003)).

in which both the clitic *li* and the full object *i libri* follow the infinitive. Greenberg's formulation looks wrong, though, for Basque, whose canonical order is generally taken to have the object preceding the verb, which in turn is followed by the auxiliary, so that Basque is canonically SOVAux. The term 'aux' here hides substantial complexity. As Laka (1993) shows, the Basque auxiliary must be decomposed into (at least) three parts, each of which can be preceded by a pronominal person clitic. If so, these clitics are post-V, despite the canonical object being pre-V, in a way that goes against Greenberg's original formulation.[21]

As far as (13) is concerned, Basque highlights an ambiguity in the term 'move', one that was touched on earlier in section 2 (and that is in fact relevant to the entirety of this section, too). When a lexical object moves, is it moving by itself or being carried along by the movement of a phrase containing it? One way to reconcile Basque with (13) is to say that (13) is interested only in movements affecting objects by themselves, and then to say that in Basque O comes to precede Aux (and the pronominal clitics within Aux) as the result of being carried along by some larger phrasal movement.

A second way (not mutually exclusive with the first) to reconcile Basque with (13) is to say that (13) is to be interpreted as referring to A-movement and not A-bar movement, in some sense of those terms. Clearly the French fact of (16) vs. (17) is not undermined by French allowing:

(20) Les chiens, Jean les voit. ('the dogs, J them sees')

This example of left-dislocation should not count as an exception to (13). Distinguishing between A- and A-bar movements (and taking pre-V O in Basque to be moved there by A-bar movement)[22] is one way to achieve this. (Another would be to exclude from consideration all sentences with clitic-doubling.)

Assuming that Basque is ultimately compatible with some interpretation of (13),[23] we can ask why (13) would hold in the first place. Part of the answer might lie in Cardinaletti and Starke's (1999) association of degree of movement and amount of internal structure, with pronominal clitics (and weak pronouns) being 'smaller' than strong pronouns and lexical DPs and therefore having to move further.

The other part of the answer is closer to the concerns of this paper. More specifically, the question is why 'moving further' should imply 'moving further to the left'. An answer is given in *AS*, in particular by the conclusion drawn there that all movement must be leftward.

3.3. Agreement

Just as the 'leftness' aspect of (13) would be surprising if we lived in a symmetric linguistic universe (but is not surprising in an antisymmetric one), so would the correctness of Greenberg's (1966) Universal 33 be surprising if syntax were symmetric:

(21) When verbal number agreement is suspended in an order-sensitive way, it's always when the verb precedes the NP.

Whereas the discussion of the preceding section concerned pronominal clitics (and weak pronouns) that in the general case convey person distinctions, Greenberg's Universal 33 as stated in

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[21]   There would not be much plausibility to trying to make this problem disappear by calling all of the Basque person morphemes in question agreement morphemes and then saying that agreement morphemes don't fall under Greenberg's Universal 25 (or under (13)). Laka (1993) sees a strong parallelism between these Basque person morphemes and Romance pronominal person clitics. (Preminger (2009) argues that the absolutive person morphemes are instances of (non-clitic) agreement, while continuing to take the ergative and dative ones to be clitics - cf. Etxepare (2006; 2009).)

[22]   Much as in Jayaseelan (2001) for Malayalam.
  Note that A-bar movements such as topicalization typically cannot even apply to pronominal clitics.

[23]   And similarly for Amharic and Persian.

(21) concerns number only and claims that number agreement in '...NP...V...' contexts is more widespread than in '...V...NP...' contexts. A controversial generalization of this would be:

> (22) Verbal number agreement always requires that the NP (or DP) in question precede the verb at some stage of the derivation.

This position has been taken (even more broadly) by Koopman (2003; 2005a),[24] who argues that Chomsky (2001) was wrong to allow for purely 'downward' agreement.

A particular proposal for the apparent counterexample to (22) constituted by:

> (23) There are books on the table.

is given in Kayne (2008) in terms of the idea that *there* in such sentences is a remnant that includes (a copy of and) the number features of *books*.[25] This proposal might carry over to Italian sentences like:

> (24) Ne sono arrivati tre. ('of-them are arrived three' = 'three of them have arrived')

if such sentences in Italian contain a silent preverbal (clitic) counterpart of *there*. On the other hand, Italian transitive sentences in which a verb seems to agree with a post-V subject:[26]

> (25) Lo hanno mangiato i gatti. ('it have eaten the cats' = 'the cats have eaten it')

will probably require having 'lo hanno mangiato' move leftward past 'i gatti'. Whether one or another of these proposals might carry over to the partially comparable Icelandic examples often discussed in the literature remains an open question.

Both (21) and (22), which is compatible with Agree necessarily being accompanied by movement, fit well with the facts of Italian past participle agreement.[27] A basic contrast is:

> (26) Li ho visti. ('them I-have seen(m.pl.)')
> (27) *Ho visti loro. ('I-have seen(m.pl.) them')

The past participle *visti* can agree with preceding *li* but not with following *loro*. Similarly for passive vs. active in:

> (28) I libri saranno visti. ('the books will-be seen')
> (29) *Ho visti i libri.

In the active (29), the past participle cannot agree with the object. In the corresponding passive, the participle can (and must) agree with the preposed object (which has moved to subject position).

As with (25), large phrasal movement will in all likelihood underlie:[28]

> (30) Saranno visti i libri.

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[24] On complementizer agreement, see Koopman (2005b, note 25).

[25] In a way akin to Moro (1997) and especially Sabel (2000), but differently from Chomsky (2001, 7), yet in agreement with him concerning the desirability of eliminating categorial features.

Kayne (2009b) contains a proposal (differently than Marantz (1997)) that makes unnecessary the use of such features to distinguish noun-like elements from verb-like elements, by taking antisymmetry to underlie the noun-verb distinction.

[26] A challenge is to extend this in a principled way to Moro's (1997; 2000):

i) La causa sono io. ('the cause am I')

[27] And with French past participle agreement, relative to a gender agreement counterpart of (22). (Number agreement on French past participles is not pronounced.)

[28] Cf. Belletti (1981).

(Alternatively, (30) will contain a silent counterpart of *there*, as suggested for (24).) Either phrasal movement or head movement will underlie the partially similar:

(31) Una volta vistili, Gianni... ('one time seen them, G...' = 'once he saw them, G...')

in which the past participle *visti* agrees with the pronominal clitic *li* that it ends up preceding.[29]

It should be noted that (22) is a necessary, but not sufficient, condition for past participle agreement to hold. This is shown by the fact that wh-movement does not license past participle agreement in Italian:[30]

(32) *Quali libri hai letti? ('which books have-you read(m.pl.)')

As a final remark on agreement, note that in Italian sentences like (26), (28) and (30), the finite verb shows person (and number) agreement, while the past participle shows number (and gender) agreement, but never any person agreement. Insofar as the finite verb in these cases is higher than the participle, this discrepancy between person agreement and number agreement recalls Harbour's (2008) claim that in cases of discontinuous agreement, person generally precedes number. Thinking of Shlonsky (1989), the natural proposal is that (within a given local domain) PersonP is higher than NumP, from which the ordering of person before number observed by Harbour will follow,[31] given antisymmetry.

3.4. Relative clauses

In a symmetric syntactic universe, one would expect pre-nominal and post-nominal relatives to be similar, merely differing in their order with respect to the 'head'. However, Downing (1978) and Keenan (1985) noted substantial differences. These can be stated as follows (setting aside correlatives, and keeping to relatives that are in their canonical position for the language in question):

(33) Prenominal relatives (as opposed to postnominal relatives) generally lack complementizers akin to English *that*.
(34) Prenominal relatives (as opposed to postnominal relatives) usually lack relative pronouns.

(These two properties of canonically prenominal relatives are just one, if Kayne (to appear) is correct in taking English *that* and similar elements to be relative pronouns.)

(35) Prenominal relatives (as opposed to postnominal relatives) tend to be non-finite.

These differences fed into the proposal in *AS* that prenominal relatives originate postnominally.[32] A piece of evidence in favor of that view comes from Kornfilt (2000), who observes that the Turkic languages Sakha and Uigur have prenominal relatives whose subjects trigger agreement such that the agreement morpheme actually appears following the 'head' noun. She makes the plausible proposal that this agreement is produced via leftward movement of an originally postnominal relative containing a high Agr element. Put another way, what preposes past the 'head' NP in these languages

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[29] Better than (29) is:
 i) ?G si è comprata una mela. ('G refl. is bought an apple' = 'G has bought himself an apple')
It may be that with auxiliary 'be', the object can in Italian move higher (and so precede the participle at a certain stage in the derivation) than with auxiliary 'have'.
 For further discussion of French and Italian past participle agreement, see Kayne (1985; 1989; 2009a).
[30] Although it does in French. For an interesting proposal on what the underlying parametric difference might be, see Déprez (1998).
[31] Non-discontinuous agreement of the sort found in Icelandic past tense forms may involve movement of Num past Pers.
[32] For a different view, see Cinque (2003; 2010).

is a not quite full relative clause; in particular the preposing to prenominal position strands the high Agr element, which remains postnominal.

In an asymmetric syntactic universe, the following should turn out to be correct (as seems to be the case):

> (36) No postnominal relatives ever have their subject determining agreement that precedes the 'head' noun.

In other words, there can be no mirror-image of the configuration that Kornfilt discusses for Sakha and Uigur, the reason being that the leftward (partial) relative clause movement that plays a role in Sakha and Uigur can have no rightward counterpart.

3.5. Serial verbs

According to Carstens (2002), serial verb constructions differ cross-linguistically with respect to the relative position of verb and argument, but are cross-linguistically constant with respect to the relative order of the verbs themselves with respect to one another. Put another way, the higher verb of a serial verb construction consistently precedes the lower one, contrary to what we are accustomed to seeing with other cases of higher and lower verbs. The usual case cross-linguistically seems to be that various orders are possible. For example, English and German differ (in embedded non-V-2 contexts) in that English has auxiliary-participle order where German has participle-auxiliary order:[33]

> (37) We believe that John has telephoned.
> (38) Wir glauben dass Hans telefoniert hat.

with the participle in German moving leftward past the auxiliary.

That serial verb sentences are cross-linguistically uniform in verb order must mean that for some reason (to be elucidated) the lower verb in such sentences is not able to undergo movement of the sort available in German in (38), or any other comparable movement. The fact that it is the lower verb that invariably follows the higher one in serial verb sentences will then directly reflect the antisymmetric fact that the complement of the higher verb must follow that higher verb. In effect, serial verbs, because they disallow verb-movement of a certain sort, provide a transparent window on the relation between word order and hierarchical structure.[34]

3.6. Coordination

A similarly transparent window seems to be provided by a certain type of coordination, as Zwart (2009) shows. According to Zwart, if one looks cross-linguistically at NP/DP-coordination counterparts of English *and*, and if one limits oneself to coordinations in which *and* appears only once, one finds that *and* and its counterparts invariably occur between the two conjuncts:

> (39) a. NP and NP
> b. *and NP NP[35]
> c. *NP NP and[36]

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[33] As discussed by Zwart (1996; 2007) and others, when there are more than two verbs, there are more than two possible orders cross-linguistically, in a way that is not expected from the perspective of the (vast oversimplification hidden behind the) 'head-final language' vs. 'head-initial language' distinction (cf. Travis (1989), as well as Kroch's (2001, 706) observation that most languages are actually inconsistent in head-directionality, and Julien (2002; 2003)). A case in point is (4) above, in which the order of verbs in German is not simply the reverse of the English order.

[34] For related discussion, see Kandybowicz and Baker (2003).

[35] Zwart cites Haspelmath (2008) for this observation.

[36] Here, as Zwart shows, one must be careful to distinguish *and* from *with*.

Zwart draws the reasonable conclusion that the limitation to one possible order in (39) must be reflecting absence of movement. In antisymmetric terms,[37] (39a) is telling us that *and* is a head, that the two conjuncts are specifier and complement of *and*, and that the order is as it is in (39a) because S-H-C order is the only order made available by the language faculty.

3.7. Forward vs. backward pronominalization

These old terms pick out configurations that are configurations of non-c-command:

> (40) The fact that John is here means that he's well again.
> (41) The fact that he's here means that John is well again.

Both (40) and (41) have the property that in them neither *John* nor *he* c-commands the other. Put another way, from a c-command perspective on pronoun and antecedent, (40) and (41) do not differ. They do, of course, differ in precedence.

English gives the impression that in such non-c-command configurations anything goes, since both (40) and (41) are possible in English. This impression fed into Lasnik's (1976) claim that pronouns could freely take antecedents subject only to conditions B and C of the binding theory.[38] Under that view of Lasnik's, the precedence distinction that holds in pairs like (40) and (41) should be irrelevant.

But English is not representative. Michel DeGraff (p.c.) tells me that in Haitian creole 'backward pronominalization' of the sort seen in (41) is systematically impossible.[39] Huang (1982) said that Chinese has much less backward pronominalization than English. Craig (1977, 150) in her grammar of Jacaltec says that Jacaltec has no backward pronominalization at all. Allan et al.'s (1995, 473) grammar of Danish says that Danish has either none or at least much less backward pronominalization than English (cf. Thráinsson et al. (2004, 331) on Faroese). Jayaseelan (1991, 76) says for Malayalam that for some speakers of Malayalam there is no backward pronominalization.

In other words, various languages completely or partially prohibit backward (as opposed to forward) pronominalization, in contrast to English. I don't know of any languages, though, that completely or partially prohibit forward (as opposed to backward) pronominalization in a parallel fashion.

There thus seems to be an asymmetry concerning antecedent-pronoun relations in contexts of non-c-command, of a sort that would be unexpected in a symmetric syntactic universe.[40] This cross-linguistic asymmetry has to do with precedence. To the extent that the backward vs. forward pronominalization question is one of (narrow) syntax, precedence must be part of (narrow) syntax, in a sense to be made precise.

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[37] Cf. *AS*, chap. 7. Munn (1993) had *and* and the following NP as head and complement, but did not take the preceding NP to be the specifier.

[38] Lasnik took these conditions to be primitives. Kayne (2002) argues that they're not, and, in a way that subsumes O'Neil (1995; 1997) and Hornstein (1999), that pronouns in fact never take antecedents 'freely' (cf. also Collins and Postal (2010)). (The proposal in Kayne (2002) when applied to PRO would have PRO being the double of its antecedent, in a way that makes Landau's (2003) criticism of Hornstein not carry over.)

[39] From the perspective of Kayne (2002), the absence of backwards pronominalization in Haitian might perhaps be related to its lacking heavy-NP shift (cf. Dejean (1993)) and/or to its lacking CLRD (and/or to its lacking Q-float).

Lasnik's (1976) approach to pronominalization led to the expectation that there should not be languages like Haitian creole at all.

[40] In Kayne (2002), I took the pronoun in (41) to be related to its antecedent under 'reconstruction' (without c-command being necessary, only precedence), the idea being that an antecedent must always precede a corresponding pronoun at some point in the derivation (cf. in part Belletti and Rizzi (1988)). This reconstruction approach to (41) is independent, strictly speaking, of the use of sideward movement in Kayne (2002); on sideward movement, see Bobaljik and Brown (1997) and Nunes (2001).

4. A more derivational antisymmetry

4.1. Desiderata

Taking all of the preceding discussion to have reinforced the correctness of antisymmetry, we can now ask specifically why it is that our faculty of language FL has the property of being antisymmetric and why it does not make any use at all of directionality parameters, which after all had seemed to be a perfectly reasonable subtype of parameter. *AS* in effect took the absence of directionality parameters to be axiomatic, via the LCA. There was no attempt made there to ask or answer the question, why should FL contain anything like the LCA?

Moreover, the LCA, while sufficient (in conjunction with a certain definition of c-command) to exclude the orders S-C-H, C-S-H, H-S-C and H-C-S, could not by itself tell us why FL has as its unique order S-H-C, rather than the mirror image order C-H-S. An attempt was made in *AS* in chapter 5 using time slots and an abstract node A, but was not entirely satisfactory, in particular because it did not tightly tie the S-H-C vs. C-H-S question to other aspects of syntax.

I would like now to try to provide a deeper account of antisymmetry in general and simultaneously of the S-H-C vs. C-H-S question than I was able to achieve in *AS*. This newer account will at the same time attempt to transpose the LCA-based ideas into the more derivational framework of Chomsky (1995) and later work. This will require transposing into a derivational framework the LCA idea that precedence is an integral part of syntax (as is suggested for independent reasons by the backward vs. forward pronominalization discussion of the previous section of this paper).

The structure of the argument will be to first show that FL has H-C order and not C-H order. The second step will be to show that S (specifier) must be on the opposite side of H from C. From those two conclusions, S-H-C will follow.

4.2. Precedence is part of syntax

Let me adopt an alternative to standard Merge that is mentioned but not pursued in Chomsky (2008), namely that Merge should always be taken to form the ordered pair <X,Y>,[41] rather than the set {X,Y}. As Chomsky notes, part of the issue is whether linear order/precedence plays a role in the mapping to C-I; in this regard the earlier discussion of section 3.7 concerning backward vs. forward pronominalization increases the plausibility that precedence does play a role in that mapping.

Having Merge create <X,Y>, with X then taken to temporally precede Y, involves greater complexity for Merge itself, as Chomsky points out. On the other hand, Spellout will no longer have the burden of specifying precedence relations, which will already have been established by Merge.

If Merge creates ordered pairs, then in the case of the merger of a head and its complement (i.e. of a head and the first phrase it is merged with), there is a priori the choice between <H,C> and <C,H>, with <H,C> corresponding to 'head precedes complement' and <C,H> corresponding to 'complement precedes head'.

4.3. Probes precede goals

Let me focus initially on cases of internal merge, where H acts as a probe relative to some goal contained within C. The question is how the probe-goal relation interacts with precedence, if precedence is part of (narrow) syntax. Assuming precedence is part of syntax, a reasonable view is that a probe, in searching a domain for its goal, must search either from left-to-right (if the probe is initial, as in H-C) or from right-to-left (if the probe is final, as in C-H). Put another way, the search starts with

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[41] Cf. also Zwart (2003; to appear). The idea that Merge always produces an ordered pair is to be kept distinct from the proposal in Chomsky (2004) (which I am not adopting) that pair-Merge is appropriate for adjunction and set-Merge for specifiers and complements.

Chomsky's (1995, 204) discussion of the adjunct/complement distinction and reconstruction effects rests on the assumption that nouns like *claim* can take sentential complements, which is denied by Hale and Keyser (2002) and Kayne (2009b).

On sentential adjuncts, see Larson (1988; 1990), Cinque (1999; 2006) and Schweikert (2005).

the probe and then moves on in a direction determined by H-C vs. C-H until it reaches the goal.[42] If H-C, the search starts at the beginning, in precedence terms. If C-H, then the search starts at the end.

The picture of search presented so far has been left-right symmetric. To distinguish H-C from C-H we need to induce an asymmetry. Let me propose:[43]

(42) Probe-goal search shares the directionality of parsing and of production.

Both parsing and production show a beginning vs. end asymmetry. The hearer hears the beginning of the sentence first and the end last. The speaker produces the beginning of the sentence first and the end last. Using the terms left and right in a familiar way, this amounts to observing that both parsing and production proceed from left to right.[44] Given (42), we therefore reach:[45]

(43) Probe-goal search proceeds from left to right.

despite the fact that probe-goal search is not literally temporal in the way that parsing and production are. In effect, if (42) and (43) are correct, FL has incorporated an abstract counterpart of temporality.

This addresses a point raised by Chomsky (1995, 221), who says "If humans could communicate by telepathy, there would be no need for a phonological component, at least for the purposes of communication; and the same extends to the use of language generally. These requirements might turn out to be critical factors in determining the inner nature of C_{HL} in some deep sense, or they might turn out to be "extraneous" to it, inducing departures from "perfection" that are satisfied in an optimal way." If (42) and (43) are correct, then the phonological component has indeed determined "the inner nature of C_{HL} in some deep sense".

Given that the probe is the head and that the goal is contained within the complement, (43) is equivalent to:

(44) Head and complement are invariably merged as <H,C>.

That is, the head invariably precedes the complement.

We have thus concluded the first stage of the argument leading to S-H-C, namely that FL countenances only H-C (and never C-H). The argument has rested on the incorporation of precedence (back) into derivational syntax,[46] and specifically on the proposal in (42) that syntactic computation mimics the left-right asymmetry of parsing/production.

This conclusion sheds light on the absence of directionality parameters, for the specific case of head and complement. For there to have existed a directionality parameter affecting the relative order of H and C, there would have had to be parameterization stated in terms of the direction of probe-goal search. Such parameterization, though, could have no natural place at all in an FL for which (42) holds.

4.4. External merge

The discussion of the preceding section focussed on H-C structures involved in internal merge, in which H probes into C in search of a goal. It was proposed that H-C order is the only order made

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[42] This left-right (or right-left) view of probing is compatible with the idea that the probe might skip stretches of material, e.g. previously spelled out lower specifiers.

[43] A different kind of link between antisymmetry and parsing (though not production) was proposed in Abels and Neeleman (2006).

[44] There is no implication here that in parsing and production one cannot also 'think ahead'. The crucial point is that there is no reasonable sense in which parsing and production can be taken to go from right to left, i.e. from end to beginning.

  Ultimately, we will have to clearly delineate the limits of cotemporal phenomena such as intonation and (syntactically relevant) tone.

[45] I have followed the standard assumption that there is an intrinsic asymmetry between probe and goal and that search begins with the probe.

[46] Precedence was taken to be part of syntax in the era of phrase-structure rules. The separation of precedence from syntax, which I am taking to have been a mistake, had its origins in Chomsky's (1970) X-bar theory.

available by FL and that the choice of H-C order was, via (42)/(43), intimately connected to the status of H as probe. What happens, though, in cases in which <H,C> is not involved in internal merge, i.e. cases in which the subsequently added specifier arises through external merge rather than through internal merge? If in such cases of external merge H does not act as a probe, then (42)/(43) would not be relevant, and it would seem as if no particular relative order would be imposed on H and C, in a way that would be appear to be incompatible with antisymmetry.

Two partially overlapping proposals exist in the literature that might eliminate this potential problem. One goes back to Chomsky (1995, 337) and in a more general fashion Moro (2000), and says that lack of fixed order is allowed as long as one of the two elements in question is subsequently moved. From their perspective, H and C need to be ordered relative to one another only if neither moves. If one of them moves (or if both move, separately), then the question of order internal to the original constituent created by merging H and C doesn't arise, assuming order not to be part of narrow syntax. Their proposal cannot readily be melded with the preceding discussion, however, if precedence is part of narrow syntax and imposed by Merge.

The second proposal I have in mind is made by Holmberg (2000, 137), following Svenonius (1994). It has in common with the Chomsky/Moro proposal the (potential) use of head movement. More specifically, the Holmberg/Svenonius idea is that a selection relation between H and C must be mediated by movement, even in cases of external merge. The head will have an uninterpretable selection feature that, even in the absence of internal merge of a specifier, will act as a probe triggering either feature movement or head movement.[47]

If H is a probe in all cases in which it merges with C, then (42)/(43) is relevant to all pairings of H and C and will impose <H,C> order even in cases not involving internal merge to specifier position.

4.5. Specifiers precede probes/heads

Let us again focus on internal merge and for the purposes of this section on the subcase in which one phrase is internally merged to another (as opposed to head movement):

(45) [$_C$...S...]

Here, a phrase S (about to become a specifier of H) is contained in a larger phrase C. A lexical item H (which may be a functional head) is merged from the numeration:

(46) H [$_C$...S...]

S moves from within its complement C to become the specifier of H:

(47) S H [$_C$...S̶...]

This movement is keyed to some property or properties of H.

It might still at first glance and once clearly did seem reasonable to think of H as having an additional property of the sort:

(48) Spell out the specifier S of H to the left/right of the phrase headed by H that S is merging with.

The parametric option 'left' in (48) would match (47); the option 'right' would match:

(49) H [$_C$...S̶...] S

(By the result of the preceding section, H must be to the left of C, as indicated.)

If antisymmetry is correct, FL does not provide such a choice. Only (47) is possible. The seemingly plausible option (49) is never possible.[48] Put another way, if antisymmetry is correct, then (48) is not part of the stock of FL parameters. Why, though, would FL have turned its back on the apparently straightforward (48)?

Parallel to the preceding two sections for the case of H-C, we need to keep in mind both specifiers arising from internal merge and specifiers arising from external merge. For internal merge, Abels and Neeleman (2006) have suggested taking what was a 'theorem' in *AS* to the effect that movement is always leftward and elevating it to an 'axiom'. Indeed, if movement is always leftward then any internally merged specifier will, given the extension condition, necessarily precede H-C, yielding S-H-C order. As part of their critique of Cinque (2005), Abels and Neeleman very specifically want to limit to internal merge the necessity for specifiers to be on the left, and propose allowing externally merged specifiers to be to the right (or to the left).

Since I feel that they have not made their case against Cinque, since I do not want to weaken antisymmetry to allow both left- and right-hand specifiers (even if limited to external merge) and since I would like not to take leftward movement as an axiom, but rather would like to derive the leftness of all specifiers from more general considerations, I will explore a different avenue, one that is more derivational than the one followed in *AS*, with the two having in common the use of an intermediate step in the derivation of S-H-C, to the effect that specifier and complement must be on opposite sides of the head.

Returning to (48) and to the question why FL has not made use of anything like it (assuming antisymmetry to be broadly correct), a conceivable answer might be that (48) would be too complex a parameter, by virtue of containing the term 'phrase headed by H that S is merging with'. This kind of answer would not be satisfactory, however, since we lack a clear metric for parametric complexity that would yield the desired result. Nonetheless I think that it is the term 'phrase headed by H that S is merging with' that is the key, although not in a way related to parametric complexity.

What I have in mind is to instead establish a link between the exclusion of (48) from FL and the existence of a certain lack of homogeneity in our present conception of Merge. In bare phrase structure, one speaks of first merge and second merge in lieu of complement and specifier. Neither terminology does justice to the fact that, while first merge/complement involves merger of a phrase with a head, second merge/specifier involves merger of a phrase with another phrase. (Put another way, classical Merge is not uniform in that first merge with a head involves formation of a set one of whose members is the head in question, whereas second merge involving a given head is merger with a set whose label is that head.)

This asymmetry between first and second merge is reduced somewhat by taking second merge (as in the transition from (46) to (47)) to depend on some property or properties of the head H. Yet the asymmetry remains.

4.6. Unfamiliar derivations

The idea that I would like to pursue is that it is at bottom the very fact that S in (47) is taken to merge with <H, C> (rather than with H) that gives the directionality parameter (48) its initial plausibility. Consequently, we can divest (48) of what plausibility it seemed to have, and thereby account for FL not countenancing it, if we are willing to take S in (47) to merge, not with <H, C>, but rather with H itself.

Taking S in (47) to merge with H itself would sharpen the sense in which heads are central to syntax, going back to Chomsky (1970). Every instance of Merge must directly involve a head, in the sense that (at least) one of the two syntactic objects merged must be a head. Merge never constructs a

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[48] Any apparently right-hand specifier must be a left-hand specifier whose left-hand status has been obscured by the (leftward) movement past it of the other visible pieces of the projection of which it is the specifier. One example from the sentential domain is Ordóñez (1998) on Spanish VOS sentences; for the DP domain, see, for example, Cinque (2005).

set consisting of two syntactic objects each of which is a phrase. From this perspective, (48) is not statable insofar as S(pecifier) is not actually merging with any phrase at all.

A way of executing this idea is as follows, with the key question remaining, why exactly is the directionality parameter (48) not countenanced by FL? Generalized pair-Merge is part of the answer, I think, but not the whole answer, since (48) could be recast in terms of ordered pairs. Thinking of the case in which the phrase S is, under standard conceptions, internally merged to the phrase {H,C} (where S originates within C), one could seemingly have a directionality parameter formulated as:

(50) Merge produces either <S,{H,C}> or <{H,C},S>.

in conflict with antisymmetry.

What property of FL might make (50) (and (48)) unavailable? As I suggested in preliminary fashion earlier:

(51) The merger of two phrases is unavailable.

In which case, with S a phrase, neither (50) nor (48) is formulable. What this amounts to, in the case, say, of (47), repeated here:

(52) S H [$_C$...S̶...]

is the claim that when S is internally merged in (52), S is merged with the head H, rather than with the phrase <H,C>. The consequence is that, in such a derivation, H itself will have been merged both with C and (then) with S.

Taking Merge to always be pair-Merge interpreted as temporal precedence, and further taking Merge to necessarily involve (at least) one head,[49] as required by (51), leads to recasting (52) as (setting aside derivational steps leading to C):

(53) <S,H>, <H,C>

corresponding to the precedence relations given in:

(54) S H C

but without 'S H C' forming a standard constituent (though I return to this later).

Before pursuing further the question of constituency, let me note that (53) is less symmetrical that it looks. That is so, since displayed as it is (53) fails to show the derivational steps leading to it. Derivationally speaking, S and C remain sharply distinct. C, as the phrase merged first with H, is probed by H. S is the second phrase merged with H and is not probed by H.

4.7. Immediate precedence

Precedence in (53)/(54) can and should be understood as immediate precedence (henceforth i-precede(nce)). Thus <S,H> means that S i-precedes H and <H,C> means that H i-precedes C, with the transition from (53) to (54) now clearer. Let me now use the term p-merge as shorthand for 'pair-merge with i-precedence'.

I-precedence is of importance in that it leads to:

(55) H can be p-merged with at most two elements.

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[49] Departing from Zwart (2003; to appear), though remaining in agreement with him on generalized pair-Merge.

This holds since the (temporal) i-precedence we are interested in in syntax is a total ordering that has the property that if X i-precedes Z and Y i-precedes Z then X = Y. Similarly, if Z i-precedes X and Z i-precedes Y, then X = Y.

Given (55), i-precedence yields the property that if H is separately p-merged with each of two elements X and Y (as in (53)), then X cannot i-precede Y, nor can Y i-precede X. A syntactically more perspicuous rendering is:

(56) If H p-merges with X and also p-merges with Y, then X and Y must be on opposite sides of H.

From (55) follows in a natural way the restriction barring multiple specifiers argued for in *AS*. In effect, (53)/(54) corresponds to an ordinary instance of specifier-head-complement. By (55), nothing further can be p-merged with H. And by (51), there is no option of phrase-phrase merger. Put another way, Chomsky's (2008) point that "Without further stipulation, the number of specifiers is unlimited" does not hold, given (51), if i-precedence is associated with pair-merge.

From (56) it follows, more centrally to antisymmetry, that specifier and complement must invariably be on opposite sides of the head. If we now combine this conclusion that specifier and complement must invariably be on opposite sides of the head with our earlier conclusion (at the end of section 4.4, based on (42)/(43)) that FL consistently imposes H-C order, we reach the desired result:[50]

(57) FL consistently imposes S-H-C order.

Given that H-C order was argued to hold uniformly, i.e. independently of any internal vs. external merge distinction, (57) must, given (56), also hold uniformly, whether S is internally merged or externally merged.

If we return once again to the question why (48)/(50) is not a possible (directionality) parameter, the answer is again, as at the end of section 4.3 for H-C alone, that for there to exist a directionality parameter affecting the relative order of S and H and C, there would, given (56), have to be parameterization stated in terms of the direction of probe-goal search. Such parameterization, though, can have no natural place at all in an FL for which (42) holds.[51]

4.8. Constituency

Allowing (53), repeated here:

(58) <S,H>, <H,C>

raises (at least) three kinds of questions concerning constituent structure. One concerns the fact that 'S H' and 'H C' in (58) both end up looking like constituents. The second concerns the fact that 'S H C' in (58) looks as if it is not a constituent. A third question concerns the relation between (58) and trees, insofar as (58) does not map to a standard tree (H would have two mothers).

Beginning with the first, we can note that the constituent status of 'H C' in (58) is unremarkable, since 'H C' there corresponds to a standard constituent (head + complement). On the other hand, the constituent status of 'S H' might appear to create a problem having to do with the potential movement of 'S H'. Notice, though, that this has been a long-standing question for 'H C', too, even though 'H C' is a standard constituent. A familiar view is that 'H C' cannot move because it is not a maximal projection. In a probe-goal framework, this amounts to saying that a probe can pick a head or the maximal projection of a head,[52] but not an intermediate-level projection. Restricting movement to heads and maximal projections would suffice to block movement of 'S H', given a suitable definition

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[50] Note that from the text perspective for an element to be in an i-precede relation does not imply that it must be pronounced.
[51] Nor is there any room for a (non)-configurationality parameter - cf. Legate (2003a, b).
[52] As part of 'pied-piping' - cf. Ross (1967) and Chomsky (1995, 262); I abstract away here from the difference between feature and lexical item. For recent discussion of pied-piping, see Cable (2010).

of maximal projection (which would in turn allow movement of 'S H C'), which could be, in the context of generalized p-merge:[53]

> (59) The maximal projection of a head H is the maximal set of ordered pairs each of which immediately contains H.

By earlier discussion, this maximal set will never have more than two members.

4.9. Speculations on trees

Trees are not primitives in a bare phrase structure derivational syntax. So one might think, since I have been attempting to achieve a deeper understanding of antisymmetry by integrating it more tightly into such a derivational syntax, that the tree question is of little interest. Yet the following may be a substantive restriction on derivational syntax:

> (60) Every syntactic object in every derivational stage[54] in a derivational syntax must be simply mappable to a tree.

The notion 'simply' would have to be made precise, but (60) might exclude (58) with the interpretation given in the first paragraph of the previous section.

Yet (58), together with (55) and (56), played a key role in deriving the prohibition against multiple specifiers and in deriving the fact that FL has the S-H-C property rather than the mirror-image *C-H-S property. Assuming (60) or something like it to be desirable, we have reached a paradox. Of course, one could take (60) itself to be paradoxical, especially if one took it to follow (in a way that would need to be made precise) from:

> (61) The correct derivational theory of FL must be simply mappable to a representational theory.

If (61) were true in a non-trivial way (that would depend on how 'simply' was defined), there would be a reason why it has been so difficult to find decisive evidence favoring a derivational over a representational theory or vice versa; (61) would be telling us that there is a level of abstraction (that we would need to find) at which the difference between derivational and representational collapses.

To make (58) compatible with (60)/(61), one could have it mapped to:

> (62) <S,H,C>

with an ordered triple replacing the two ordered pairs and then being mappable to a ternary-branching tree. This would lead to seeing my (1981a) arguments for binary branching to have two subcomponents, the first being the claim that syntax is n-ary branching with n having a single value, the second being that that value is 2. Mapping (58) to (62) would retain the first subcomponent and replace 2 by 3 in the second, arguably with no loss in restrictiveness.

This would imply that familiar relations like the binding of an anaphor by an antecedent could no longer be regulated by a tree-based notion of (asymmetric) c-command, but Chomsky (2008) had already suggested that c-command might well, in a derivational probe-goal framework, be dispensable with.

4.10. Further remarks on p-merge

Allowing (58), repeated again here:

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[53] This definition will also play a role in determing what is a possible antecedent.
[54] For precise definitions, see Collins and Stabler (2009).

(63) <S,H>, <H,C>

leads to questions concerning restrictiveness, especially if the speculations of the preceding section were to turn out not to be on the right track. If one can p-merge two separate phrases with a given head, as in (63), why not more than two? The answer to this question has already been given, in terms of the requirement that p-merge imply immediate precedence, combined with the fact that (in a total ordering of the temporal sort) a given head can enter into an immediate precedence relation with at most two elements. (This immediate precedence requirement will, in addition, block many other unwanted p-merges.)

Left open, however, is the question of:

(64) <H_2, S>, <S, H_1>

Could a specifier merged with one head subsequently be merged with a higher head? Immediate precedence would be satisfied. On the other hand, (60) would not be. This seems clear if we expand (64) to:

(65) <H_2, S>, <S, H_1>, <H_1, C>

for which ternary branching does not suffice for compatibility with (60). An alternative would be to mimic the mapping from (58) to (62) by mapping (65) to:

(66) <H_2, S, H_1, C>

corresponding to a tree with four branches at the highest level (there is additional branching within S and within C). This would be at the cost of giving up the idea that branching is n-ary with n restricted to a single value. (Alternatively, one could consider giving up (60) (though not necessarily (61)), i.e. abandoning the relevance of trees entirely, in which case (64)/(65) would become more plausible.)

A theoretical question is whether a theory that allows (63) would be expected to also allow (64)/(65).[55] The answer would be no if the double appearance of H in (63) were necessarily the side effect of a single application of the probe-goal mechanism,[56] which (64) could not be.

A more empirical question is whether or not there are clues to the possible existence of (64) in one syntactic phenomenon or another. The answer is maybe. Insofar as (64) establishes a p-merge relation between a higher head and the specifier of the next lower head, (64) reminds us of various ECM-type phenomena, as well as of Stowell's (1981) discussion of contrasts such as:

(67) Any question about how he could have made such a mistake must be taken seriously.
(68) *?Any question about in what sense he could have made such a mistake must be taken seriously.

In addition, (64) is reminiscent of the phenomenon of 'escape hatches', going back to Chomsky (1973; 1986) and found in Chomsky (2008), in part in terms of the PIC. Pursuing the question whether (64) is what in fact underlies the relative centrality of such head-lower Spec relations is beyond the scope of this paper.

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[55] I'm setting aside the question whether (65), if valid, is the only option, or is one of two options, the other being:
 i) <H_2, {<S, H_1>, <H_1, C>}
Note that (i) illustrates the more general fact that p-merge merges a head and a (non-singleton) set. For a proposal about first steps of derivations, see Kayne (2008).
[56] Cf. Chomsky (1995, 233). Taking the double appearance of H in (63) to necessarily reflect a single application of the probe-goal mechanism might provide a handle on the question why (51) should hold.

5. Conclusion

In answer to one aspect of the 'why'-question in the title of this paper, there are no directionality parameters simply because the evidence against them coming from cross-linguistic gaps of all sorts is substantial.

I have given a split answer to the other aspect of the title question, which asks why it is that FL is antisymmetric to begin with. There is no C-H order, only H-C order, primarily because of (42) and (43), repeated here:

(69) Probe-goal search shares the directionality of parsing and of production.
(70) Probe-goal search proceeds from left to right.

There is no H-C-S order, only S-H-C order, primarily because of (51), namely:

(71) The merger of two phrases is unavailable.

combined with the fact that Merge imposes an immediate precedence relation.

This paper can also be read as a subcase of a type of question that we need to keep asking. Why are certain readily imaginable parameters not found in syntax?[57]

The more derivational approach to antisymmetry that I have argued for in this paper has in common with *AS* that it prohibits certain apparently (but if I'm right, mistakenly) plausible kinds of syntactic analyses, such as those involving right-adjunction or right-hand specifiers or left-hand complements. In so doing, antisymmetry will necessarily have widespread effects even in areas of syntax that have not played a role in the original arguments for it. Any compositional semantics closely tracking syntax will correspondingly be affected by antisymmetry.

Many of the empirical arguments for antisymmetry involve parametric variation and thereby illustrate how parametric variation can indirectly serve as a window on the principles of FL.[58]

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[57] Rizzi (2010) has an interesting proposal characterizing existing parameters.

[58] This point is orthogonal to the question whether some particular property of FL can or cannot ultimately be traced back to FL-external factors as in Chomsky (2004).

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