AP-adjacency as a Precedence Constraint

Zoë Belk and Ad Neeleman (UCL)

1. Precedence in grammar

Any constituent structure can be described using statements about dominance, precedence and labelling (see Partee et al. 1990). One would therefore expect that syntactic rules are formulated in terms of these three basic notions. This was certainly the case in early versions of generative grammar, where even transformational rules like passive had a linear description:

(1) *Passive*
Structural Description: X 1 2 3 Y
Structural Change: X 3 *be* 2-*ed by* 1 Y (See Chomsky 1957)

However, since the early 1980s, there has been an attempt in syntactic theory to abandon rules that have a linear component in favour of rules that only refer to dominance and labelling. Part of the motivation for this trend is the pervasive necessity of reference to structure in the description of linguistic phenomena. For example, if passive is formulated as in (1), one could imagine a 'reverse passive', a process that suppresses an internal argument and subsequently demotes subject to object. On the modern movement-based account of passive, this kind of process cannot exist since it would require downward movement from the subject position to the object position (while regular passive relies on upward movement from object to subject position). Of course, the requirement that movement be upward is a structural requirement.

It is not evident that a programme of research that rejects reference to precedence can be successful, in view of a number of left-right asymmetries that have been observed. For example, leftward movements seem to be less restricted in various ways than rightward movements. On the face of it, this suggests that – in addition to familiar structural conditions like c-command – movement chains may be subject to linear conditions that favour orders in which a trace is preceded by its antecedent.

A comprehensive attempt to reconcile left-right asymmetries of this type with the idea that syntax cannot refer to linear order is presented in Kayne 1994. Kayne proposes that linear order is fully determined by dominance and labelling relations, so that beyond the basic ordering algorithm any rule that appears to be sensitive to precedence is guaranteed to allow a reformulation in terms of structure.

In recent years, it has become apparent that Kayne's Antisymmetry programme faces a number of serious problems. In essence, it does not deliver what it was designed to. First, there are troubling technical difficulties (Sternefeld 1994, Chametzky 2000, Guimaraes 2008). Second, as Ackema and Neeleman (2002) and Abels and Neeleman (2009) demonstrate, LCA-based analyses are almost always variants of traditional analyses: the representations they assign to a given string are for the most part isomorphic in terms of gross constituency to traditional non-LCA-compatible representations. Third, the structure that needs to be added in order to make traditional syntactic representations LCA-compatible requires assumptions that lead to empirical problems elsewhere, and – most seriously in the

present context – make it impossible to capture the linear asymmetries that the LCA was designed to capture (see Abels and Neeleman 2012).

In our view, the hypothesis that syntax can refer to relations of dominance and labelling only has reached its limits. What has become apparent is that syntactic dependencies like movement are always conditioned by structure, but it is much less clear that there are no additional linear conditions that the syntax is subject to. This is an empirical issue that requires re-evaluation.

In this paper, we want to look at a set of data for which structural accounts have been proposed but which in our view can be analysed more insightfully in terms of a linear condition. The central observation, which was discussed in some detail by Adger (2013), has to do with word order in the noun phrase. In languages where the noun precedes adjectival modifiers and prepositional phrases, it turns out that adjectives systematically precede the PPs. Below we give examples illustrating this from Spanish, Arabic and Welsh.

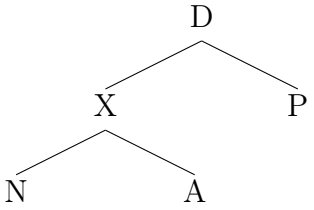
(2) a. el cuadro falso del siglo XV Spanish
the picture fake of-the century XV
'the fake picture from the 15th century'
b. *el cuadro del siglo XV falso
the picture of-the century XV fake

(3) a. as-suura l-muqallada min al-qarn al-xamis-ʕashar Arabic
the-picture the-fake from the-century the-fifteenth
b. *as-suura min al-qarn al-xamis-ʕashar al-muqallada
the-picture from the-century the-fifteenth the-fake

(4) a. y llun ffug o'r 15fed ganrif Welsh
the picture fake from-the 15th century
b. *y llun o'r 15fed ganrif ffug
the picture from-the 15th century fake

We will refer to this phenomenon as AP-adjacency. [1] One way of accounting for this kind of phenomenon is by designating for the adjective a structural position in the noun phrase close to the head. Adger, for example, assumes that the noun forms a constituent (X in (5)) with adjectival modifiers to the exclusion of PP-complements and modifiers:

(5)



The observed linear order now follows from the ban on crossing branches.

The obvious alternative is to adopt a linear condition that has the consequence that APs must precede PPs. Although this approach looks less attractive if one is inclined to consider linear

[1] Adger (2013) refers to the same phenomenon as PP-peripherality. The reason that we do not use this term is

constraints with suspicion, we will demonstrate that it captures a number of observations that are problematic for a structural account along the lines of (5).

The paper is organised as follows. We first show – in section 2 – that a structural account of AP-adjacency faces typological problems involving word order contrasts between head-initial and head-final languages, as well as the structure of noun phrases in head-medial and head-final languages. We then show – in section 3 – that there is a parallel problem in the verbal domain, which can be solved by assuming that there is a linear condition akin to the traditional notion of case adjacency that requires that no constituent intervene between verb and case-marked object. In section 4, we show that this analysis can be extended straightforwardly to the nominal domain, where it provides an account of AP-adjacency that avoids the problems faced by the structural account in (5). In sections 5 and 6 we discuss related parallels and differences between the nominal and verbal domain having to do with stacked adjectives. We conclude – in section 7 – with a discussion of the theoretical implications of our proposal.

2. Against the structural account

The structural account of AP-adjacency relies on the assumption that it is a universal property of the syntax that nouns combine with adjectival modifiers before they combine with other kinds of phrases. If this property were not universal, we would expect head-initial languages that do not display the property of AP-adjacency, contrary to fact. But the assumption that APs must universally merge with the noun before other material of course makes additional predictions about constituency and word order in languages with head-final and head-medial noun phrases. These turn out to be incorrect.

2.1 Head-final languages

The prediction for head-final noun phrases is that the only order permitted should be XP-AP-N. The facts are different, however. As far as we know, most languages that have head-final noun phrases show variation in the order of prepositional phrases and adjectival modifiers. In some languages, speakers feel that the order in which the adjective is adjacent to the noun is the neutral order, but the alternative order in which an XP intervenes is grammatical as well.

We will illustrate this using six languages: Korean, Finnish, Japanese, Turkish, Hungarian and Mandarin Chinese. Korean presents the simplest possible case. Two orders are allowed; the adjective is clearly recognizable as such, as is the postpositional phrase. Native speakers we have consulted did not seem to have a very clear preference for one order over the other:

(6) a. hakkyoe itneun yeppen sunsengneem — Korean
school in pretty teacher
'a pretty teacher at school'
b. yeppen hakkyoe itneun sunsengneem
pretty school in teacher

The word order alternation found in Korean is replicated in Finnish. The examples in (7a–b) are both fully grammatical. The only difference seems to be that in these examples the constituent corresponding to the English PP *from the 15th century* is realised as a genitive DP. Like Korean, Finnish seems to allow this kind of word order alternation quite freely, without either order being more marked than the other. (Please note that the most common Finnish word for 'fake' (*väärennetty*) is participial in form, and may therefore not be adjectival.

However, *feikki* and *epäaito*, which show the same distribution, are underived adjectives and must therefore project an AP.)

(7) a. 1400-luvu-n väärennetty/feikki/epäaito kuva Finnish
1400-century-GEN forged/fake/non-authentic picture
b. väärennetty/feikki/epäaito 1400-luvu-n kuva
forged/fake/non-authentic 1400-century-GEN picture

The Finnish data suggest that the constituent further to the left c-commands the constituent further to the right. This is because the former takes scope over the latter. Thus (7a) refers to a fake picture produced in the 15th century, while (7b) refers to a fake picture that is purported to be from the 15th century. This is the pattern we expect for all head-final noun phrases and, as we will see, it is the pattern we find.

Japanese has a linker, *-no*, that must be used if a PP is to be merged within a nominal projection. The categorial status of *-no* phrases is not entirely clear, but one possibility explored in Philip (2013) is that linkers do not have categorial features themselves. Consequently, category is inherited from the node with which the linker combines. However that may be, there can be little doubt that categories translated as adjectives are indeed adjectives. With this in mind, consider the examples in (8).

(8) a. Hanako-kara-no akai hanataba Japanese
Hanako-from-LNK red bunch.of.flowers
b. akai Hanako-kara-no hanataba
red Hanako-from-LNK bunch.of.flowers

It appears that the neutral word order is PP-AP-N, but the order AP-PP-N is grammatical as well, and naturally used in contexts where the AP has an identifying function. For example, if there are several bunches of flowers from Hanako in the room, we could identify a specific one by using the order in (8b). This is entirely parallel to what happens in English in examples like *The red big car*, which is not the neutral order, but can be used nonetheless in contexts where there are several big cars to choose from. So, although AP-PP-N is not the neutral word order, it is clear that Japanese violates AP-adjacency.

In English, the order preference observed for simple intersective adjectives like *big* and *red* is not found with certain non-intersective adjectives. For example, *the alleged American spy* exists alongside *the American alleged spy*. Presumably the lack of an ordering preference in this case has its origin in the fact that the two orders yield different interpretations. An alleged American spy is someone who is alleged to be an American spy (i.e. typically someone who would spy for the American government), but an American alleged spy is someone from America who is alleged to spy for some unspecified government.

It turns out that exactly the same effect can be observed in Japanese examples like (9). That is, the ordering preference observed in (8) disappears when the adjective used is *alleged*. Under a construal identical to *The American alleged spy*, (9b) is the only possible ordering. The reverse ordering seen in (9a) corresponds to the meaning of the English *the alleged American spy*.

(9) a. Amerika-kara-no utagawashii supai Japanese
America-from-LNK alleged spy

b. utagawashii Amerika-kara-no supai
alleged America-from-LNK spy

These data are of course a further illustration of the predicted left-to-right scope profile of head-final noun phrases.

Like Japanese, Mandarin requires that modifiers in the noun phrase be accompanied by a linker (with the exception of APs adjacent to N, which allow omission of the linker). However, unlike in Japanese, there is no very clear preference for one word order over another. Both examples in (10) are fully acceptable.

(10) a. lái zì 15 shì jì de jiǎ de huà
from 15 century LNK fake LNK painting
b. jiǎ de lái zì 15 shì jì de huà
fake LNK from 15 century LNK painting

As expected, (10a) corresponds to a fake picture produced in the 15th century and (10b) refers to a fake picture purported to be from the 15th century.

Like Japanese, Turkish prefers orders in which the AP is closest to the noun, but the alternative order in (11b) is grammatical as well (though not a neutral order). Note that Turkish uses a case-marked DP to express *from the 15th century*, much like Finnish.

(11) a. onbeşinci yüzyil-dan sahte resim Turkish
15th century-ABL fake picture
b. ?sahte onbeşinci yüzyil-dan resim
fake 15th century-ABL picture

The final language we consider is Hungarian. In Hungarian, APs can be freely separated from the noun by expressions corresponding to *from the 15th century*. There is a morphological complication, however. The *-i* ending is traditionally seen not as a linker, but as a derivational morpheme that derives adjectives from other categories. If so, we are dealing with a sequence of two adjectives, which would undermine the relevance of the grammaticality of (12b). However, the evidence for this traditional view is not conclusive. For example, DPs that have undergone 'adjectivalization' can be used as arguments, for example, as opposed to genuine adjectives.

(12) a. a tizenötödik szazad-i hamis festmény Hungarian
the 15th century-I fake picture
b. a hamis tizenötödik szazad-i festmény
the fake 15th century-I picture

Although there are some minor complications, the data in the languages discussed above seem to be counterexamples to the claim that adjectival phrases form a constituent with the noun to the exclusion of prepositional phrases (or their equivalents in languages with a rich case system). That structural account leads to the expectation that the AP-PP-N order is ungrammatical, while in fact it is either fully acceptable, or acceptable as a marked order. Thus AP-adjacency seems to be an absolute requirement in noun-initial languages, but does not seem to carry over to noun-final languages.

One way to save the structural account of AP-adjacency in view of this observation is to assume that it holds of the underlying structure, though not the surface structure. This would imply that in the b-examples in (6)–(12) the adjectival phrase moves from its base position adjacent to the noun to a position further to the left. A proposal along these lines is unsatisfactory, however, because it begs the question of why there is no parallel rightward movement of adjectives in head-initial languages (which would lead to the unattested N-PP-AP order). In order to address this problem, one might rely on the general asymmetry between rightward and leftward movements. As observed by Ross (1967), Bach (1971) and Perlmutter (1983), rightward movement is much more restricted than leftward movement. But this is not good enough.

First, it has been observed in work on heavy NP shift that rightward movement of optional material is less problematic in terms of parsing than rightward movement of obligatory material (Staub et al. 2006; Wasow 1997a,b). Since adjectives are optional, there is no particular reason to think that they should not be able to undergo local rightward movement.

Second, allowing leftward movement of adjectives would predict that at least some head-initial languages permit the order AP-N-PP under the same subtle information-structural requirements that permit the order AP-PP-N in head-final languages. Such a movement process is simply not attested, as far as we can tell. Some head-initial languages do allow prenominal adjectives, but this is typically restricted to a specific class of adjectives and never seems to be the result of the kind of general process that is needed to generate the AP-PP-N order in head-final languages.[2]

2.2 Head-medial languages

The structural account of AP-adjacency in (5) makes a further prediction for head-medial languages like English. It predicts that a string like *the fake picture from the 15th century* must always be structured such that the adjective forms a constituent with the noun. However, there are reasons to believe that strings like this are structurally ambiguous. To begin with, *the fake picture from the 15th century* has the two readings familiar from the previous section: either the picture is a fake produced in the 15th century, or the picture is purported to be from the 15th century, even though it has been produced more recently. As we have seen, this kind of scope alternation coincides with an alternation in c-command relations in head-final languages. The null hypothesis is that the same is true of languages in which nouns surface between APs and PPs:

(13) a. [the [[fake picture] from the 15th century]]
(from the 15th century > fake)
b. [the [fake [picture from the 15th century]]]
(fake > from the 15th century)

One might think that scope-taking adjectives like *fake* have access to a special high position from which they can take scope over prepositional phrases, thus excluding them from the structural account of AP-adjacency. But this would be a self-defeating move, because the

[2] In French, for example, deviations from neutral adjective order used in the context of focus involve a reordering of the postnominal adjectives. Thus, *le piano noir antique* 'the piano black old' (the old black piano) is the neutral order, but if there are many old pianos to choose from, *le piano antique noir* 'the piano old black' may be used. The prenominal slot is reserved for a certain class of adjectives (e.g. *petit, grand,* etc.) and to achieve a certain poetic effect.

ambiguity observed in (13) persists even if *the fake picture from the 15th century* is preceded by a regular intersective adjective like *beautiful*:

(14) a. [the beautiful [[fake picture] from the 15th century]]
(from the 15th century > fake)
b. [the beautiful [fake [picture from the 15th century]]]
(fake > from the 15th century)

The fact that the substring following *beautiful* allows the reading *from the 15th century > fake* suggests that the structure in (14a) exists; the availability of the inverse reading, *fake > from the 15th century*, supports the existence of (14b). If the ambiguity is due to *fake* having access to a special high position, then *beautiful* (and all other adjectives that can precede *fake*) must also have access to such a position, in contradiction to the structural account of AP-adjacency.

Standard constituency tests confirm that the ambiguity of strings like those in (13) has a structural origin, in that the noun sometimes forms a constituent with the adjective, and sometimes with the PP. Consider *one*-substitution and coordination. In the pairs below, the grammaticality of the first example requires the structure in which the adjective forms a constituent with the noun (13a), but the grammaticality of the second example requires the alternative structure in which the noun first merges with the PP (13b).[3]

(15) a. The [fake picture]$_i$ from the 15th century and the one$_i$ from the 18th century.
b. The fake [picture from the 15th century]$_i$ and the real one$_i$.

(16) a. The [[[fake picture] and [real triptych]] from the 15th century].
b. The [fake [[picture from the 15th century] and [triptych from the 17th century]]].

Our expectation is that scopal interpretation varies with structure, so that the temporal PP takes scope over *fake* in (15a) and (16a), while *fake* takes scope over the temporal PP in (15b) and (16b). These are indeed the interpretations associated with these structures; the reverse scopal interpretations are not available.

We find exactly the same pattern in terms of constituency and scope in other head-medial languages like Swedish and Dutch (in the Dutch examples we use a different scope-taking adjective because the counterpart of *false* is subject to some idiosyncratic restrictions):

(17) a. den [falska bilden]$_1$ från 1400-talet och den e_1 från 1700-talet Swedish
the fake picture from 1400-century and the (one) from 1700-century
b. den falska [bilden från 1400-talet]$_1$ och den äkta e_1
the fake picture from 1400-century and the real (one)

(18) a. den [[[falska bilden] och [äkta triptyken]] från 1700-talet]
the fake picture and real triptych from 1700-century
b. den [falska [[bilden från 1400-talet] och [triptyken från 1700-talet]]]

[3] The example in (16a) could in principle be a case of right-node raising. However, it does not have the tell-tale intonation that right-node raising requires. Moreover, right-node raising does not give rise to wide scope of the right-peripheral constituent:

(i) Every man loves, and every woman hates, some present his mother gave to her.

the fake picture from 1400-century and triptych from 1700-century

(19) a. De [voormalige ambassadeur]$_1$ in Tokyo en die e_1 in Beijing Dutch
the former ambassador in Tokyo and that (one) in Beijing
b. de voormalige [ambassadeur in Tokyo]$_1$ en de huidige e_1
the former ambassador in Tokyo and the present (one)

(20) a. de [[[voormalige ambassadeur] en [huidige consul]] in Tokyo]
the former ambassador and current consul in Tokyo
b. de [voormalige [[ambassadeur in Tokyo] en [consul in Beijing]]][4]
the former ambassador in Tokyo and consul in Beijing

As before, a solution that proponents of a structural account of AP-adjacency could explore would rely on leftward movement of the adjective, creating structural ambiguity as a consequence of optionally raising the AP out of the AP-N complex to a position c-commanding the PP.

An approach along these lines is unsatisfactory because it reduces the testability of the proposal: whenever there is an order that does not fit the proposed hierarchy, a movement operation can be introduced.

In addition, it will not work for the coordination cases, at least not in languages with a sufficiently rich system of adjectival agreement. Where the adjective modifies the coordination or two N-PP units, we would predict concord with the coordination as a whole (possibly mediated by rules of resolution in case the conjuncts have some conflicting features). Thus, in the Slovenian example in (21a) only the use of a dual form of the adjective guarantees that both the bull and the calf are brown. The movement account would rely on across-the-board movement of the adjective. The trouble is that a dual form of the adjective is not grammatical in either of the purported underlying positions (compare (21b)).[5]

(21) a. [rjava [[bik iz Bitenj] in [tele iz Kranja]]] Slovenian
brown-DU.MSC bull.MSC from Bitnje and calf.NEUT from Kranj
b. [[[rjav bik] in [rjavo tele]] iz Bitenj]
brown.MSC bull.MSC and brown-NEUT calf.NEUT from Bitnje

In sum, even though the structural account of AP-adjacency requires that the noun and adjective always form a constituent, there is strong evidence from noun-medial languages that this is incorrect.

2.3 Summary

Below we summarize our findings for the language types discussed so far.

GENERALIZATION A:
In noun-initial languages, APs must be closer to the noun than other material.

[4] The example in (20b) must refer to a single individual who was formerly both an ambassador in Tokyo and a consul in Beijing.
[5] Proponents of the structural account of AP-adjacency could of course assume that the morphological form of the adjective is determined after movement. However, this begs the question of what evidence remains for the purported underlying position. This hypothetical position does not matter for semantics, it does not determine the morphological form of the adjective and it is obviously phonologically null.

GENERALIZATION B:
In languages with the order AP-N-PP, there are two possible structures: one in which the noun is merged with the AP first, and another where it is merged with the PP first. Scopal interpretation coincides with c-command relations in these structures.

GENERALIZATION C:
i. In noun-final languages, there is variation in word order. All such languages have PP-AP-N as an unmarked order, and all such languages allow AP-PP-N as an alternative order. In some, this alternative order is marked, while in others it is not.
ii. The PP-AP-N order is interpreted with the PP taking scope over the AP and N, while the AP-PP-N order is interpreted with the AP taking scope over PP and N.

The data in head-final and head-medial languages is as expected if there is no restriction on the order of merger of APs and PPs, and if scopal interpretation is determined by syntactic structure. What is remarkable is that this simple analysis does not extend to head-initial languages, where the word order seems to suggest that there is only a single order of merger. In subsequent sections, we will argue that there is actually nothing remarkable about the structure of noun-initial languages, but that there is a linear constraint that bans separation of nouns and adjectival phrases.

3. A parallel: Case adjacency

The case of AP-adjacency has an interesting parallel in the verbal domain. An observation that has been central to much work in English syntax is that a verb and its object cannot be separated by adverbial material:

(22) a. John read the letter slowly.
b. *John read slowly the letter.

The English pattern can be observed in several other languages, including the Scandinavian languages, Bantu languages and Chinese. It is not easy to prove that it is a universal, because in a number of languages the verb moves out of VP. Thus, in French, the order V-Adv-DP is grammatical as a consequence of the verb moving across adverbials to a position relatively high in the clause (see Emonds 1978 and Pollock 1989). Another factor that may obscure the picture is the phenomenon of general free word order, which can be observed in some languages and may be associated with rich case or agreement systems. Nonetheless, it seems that, where we can control for these factors, the pattern that emerges resembles what we find in English. In Icelandic, for example, verb movement may lead to separation of object and verb, but when we use a structure containing an auxiliary, we find the expected pattern (see Vikner 1994):

(23) a. Jón hefur lesið bækurnar rækilega Icelandic
John has read the-books thoroughly
b. *Jón hefur lesið rækilega bækurnar
John has read thoroughly the-books

This is reminiscent of Generalization A, if DP is taken to correspond to AP.

GENERALIZATION A':

In verb-initial VPs, DPs must be closer to the verb than other material.

There is a classical structural account of this generalization, according to which the verb and its object form a core constituent excluding all adverbials. This idea goes back to Chomsky (1965), and was later recast in terms of the sisterhood condition on internal theta-role assignment (Chomsky 1986). The best-known alternative explanation of Generalization A' relies on a linear constraint known as case adjacency (Stowell 1981). Case adjacency requires that no category intervene between the verb and a complement dependent on it for case.

One advantage of case adjacency is that it explains the fact that complements that do not require case (PPs and CPs) can be separated from the verb, as (24) illustrates.

(24) a. John looked pensively at the telegram.
b. John said hesitantly that he should probably leave.

The parallel between case adjacency and AP-adjacency becomes stronger when we consider head-final languages. It has been observed, for example by Corver and van Riemsdijk (1997), that OV languages systematically allow intervention of material between the object and the verb, the most common case being intervention of adverbials (a phenomenon often referred to as 'scrambling'). In Dutch, for example, the examples in (25) are both grammatical. The extensive literature on scrambling has established that the object in structures like (25b) is in an A-position (for discussion of the syntactic properties of Dutch scrambling, see Vanden Wyngaerd 1989, Zwart 1993 and Neeleman 1994).

(25) a. Jan heeft langzaam de brief gelezen. Dutch
John has *slowly the letter read.*
'John has slowly read the letter.'
b. Jan heeft de brief langzaam gelezen
John has *the letter slowly read.*

This is reminiscent of the first part Generalization C, if DP is again taken to correspond with AP:

GENERALIZATION C':
i. In verb-final languages, there is variation in word order. All such languages have XP-DP-V as an unmarked order, and all such languages allow DP-XP-V as an alternative order.

As expected, scope corresponds to word order in the OV languages. Thus the example in (26a) expresses that what was quick was John's reading of the three letters, while in (26b), the reading of each individual letter was quick, although the reading of all three letters might have taken a long time.

(26) a. Jan heeft snel drie brieven gelezen. Dutch
John has *quickly three letters read.*
'John has quickly read three letters.'

b. Jan heeft drie brieven snel gelezen
John has *three letters quickly read.*

These kinds of effects seem to be present in all OV languages, suggesting a parallel to the second part of Generalization C.[6]

> GENERALIZATION C':
> ii. The XP-DP-V order is interpreted with the XP taking scope over the DP and V, while the DP-XP-V order is interpreted with the DP taking scope over XP and V.

For whatever reason, there are no languages that require the verb to surface between DP and XP. This means that a full parallel to Generalization B cannot exist in the verbal domain. However, at least some head-final languages allow PPs (and other non-case marked categories) to follow the verb. In such structures, the PP may be in the scope of the DP or vice versa (see the Dutch examples in (27), where the PP is an idiom roughly meaning 'quickly'). It would take us too far afield to work out a full version of the parallel, but if the pattern in (27) extends to other 'verb-medial' structures, there is a reflex of Generalization B in the verbal domain after all.

(27) a. Jan heeft in sneltreinvaart drie boeken gelezen. Dutch
John has in fast-train-speed three books read
'John has read three books quickly.'
quickly > three books; *three books > quickly

b. Jan heeft drie boeken in sneltreinvaart gelezen.
John has three books in fast-train-speed read
*quickly > three books; three books > quickly

c. Jan heeft drie boeken gelezen in sneltreinvaart.
John has three books read in fast-train-speed
quickly > three books; three books > quickly

The correlation between the position of the head and the possibility of adverbial intervention does not follow in any obvious way from the structural account suggested for the English data in (22). If object and verb form a core constituent that excludes adverbials, then leftward movement of the object must account for the Dutch data. This raises the question why a rightward variant of this movement operation should not be available in English.

Note that English does have heavy-XP shift, but structures derived by this operation are different in their syntactic and interpretive properties from structures like (25b). Thus, if heavy-XP shift is analysed as movement of the heavy constituent, it must presumably land in an A'-position (see Rochemont and Culicover 1990).[7] Scrambled DPs, however, occupy an A-position (see Vanden Wyngaerd 1989 and much subsequent work). Moreover, scrambled DPs tend to be given (see Neeleman and van de Koot 2008), while there is no reason to think that heavy-XP shift is a means of marking givenness (quite the opposite). Heavy NP shift is

[6] An exception to this general pattern involves structures in which DP is contrastively focused. Under contrastive focus, the DP can take scope under the adverbial, presumably because it has been fronted through A'-movement.

[7] The core argument is that heavy-XP shift can license parasitic gaps (see Engdahl 1983). An alternative analysis would be to treat the relevant data as instances of right-node raising (see Postal 1993, 1994). However, Nissenbaum (2001) and Abels and Neeleman (2006) show that heavy-XP shift can license gaps even where right-node raising is not available.

therefore an unlikely rightward counterpart of scrambling (the phenomenon illustrated in (25b)).[8]

Thus, although a movement account of adverbial intervention is probably the standard view, it is fair to say that it does not provide an explanation of the very robust typological association between head finality and free word order, nor of the somewhat less robust association between head initiality and case adjacency.

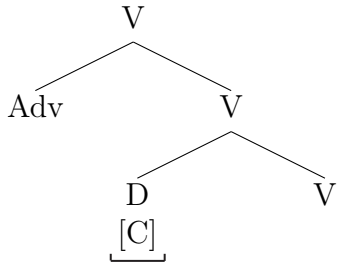
At first sight, a linear approach to case adjacency runs into exactly the same problems. Suppose that we require that a verb and any DP it case-marks must be adjacent. Then the English data in (22) and (24) fall out neatly, but the Dutch example in (25b) would still need to be derived by a movement operation that for mysterious reasons has no counterpart in English.

However, this difficulty can be side-stepped if the relevant constraint is formulated not in terms of adjacency, but in terms of precedence. The following formulation is based on a proposal in Janke and Neeleman (2012).

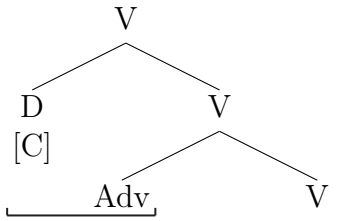
(28) *Case-First Constraint*
   a. The assignment domain of a case feature C in a DP-argument consists of that DP and any XP intervening between it and the verb.[9]
   b. No category lacking C can precede a category that carries C in C's assignment domain.

If we assume that objects can be structurally separated from the verb in all languages, the Dutch data are unsurprising. Both structures in (29) satisfy the Case-First Constraint, as in both the case-marked DP is left-most in its assignment domain (we have indicated the relevant domains below the trees).

(29) a.



b.

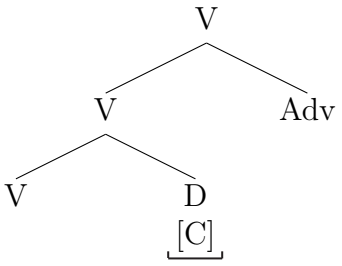


[8] Neeleman (1994) and Neeleman and Van de Koot (2008) make a distinction between 'neutral scrambling' or 'A-scrambling' and 'focus scrambling' or 'A'-scrambling'. The phenomenon illustrated in (25b) is A-scrambling; heavy-NP shift could be seen as a rightward counterpart of A'-scrambling.

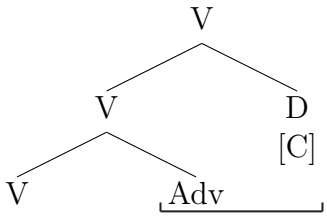
[9] The constraint is formulated in a way that restricts its application to case-marked objects. For a discussion of subjects, see section 6 below.

The situation is rather different in head-initial languages. The mirror image of (29a), which is given in (30a), is grammatical. However, the counterpart of (29b) is ruled out. On the traditional assumption that the case of an object is licensed by the verb, the assignment domain of the case feature [C] consists of DP (which carries it) and Adv (which intervenes between DP and the case licenser). In contrast to what the constraint requires, DP is not left-most in [C]'s assignment domain.

(30) a.

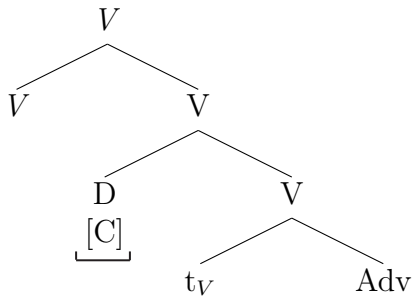


b. *



At first sight, this analysis seems to imply that whereas OV-languages allow two structures, namely (29a) and (29b), VO-languages allow only one, namely (30a). However, Janke and Neeleman (2012) argue that structures in danger of violating the Case-First Constraint can be rescued by a process of VP-shell formation. Suppose that the verb indeed merges first with an adverbial and subsequently with a case-marked object. If the object is linearized to the left of its verbal sister, and the verb undergoes a short leftward movement across it, the object ends up right-adjacent to the verb, in accordance with (28):

(31)



The picture that emerges, then, is the following. Abstracting away from verb movement, word order in VO-languages will generally be the mirror image of that in OV-languages. This can be seen in the case of adverbials, where English postverbal order mirrors Dutch preverbal order:

(32) a. Jan heeft [gisteren [prachtig gezongen]]. Dutch
John has *yesterday beautifully sung*
b. *Jan heeft [prachtig [gisteren gezongen]].
John has beautifully yesterday sung

(33) a. John [[sang beautifully] yesterday].

b. *John [[sang yesterday] beautifully].

However, if a category is merged prior to a case-marked object, an asymmetry emerges. Where in OV-languages the category in question will simply surface between object and the verb, the grammar of the VO-language will require VP shell formation, leading to a non-mirroring order and a descending structure, as in (31), rather than an ascending structure, as in (30b).

Object-oriented depictives can be used to construct an example of this effect. As is well known, depictives must be c-commanded by the DP they are associated with. An object-oriented depictive must therefore be merged with the verb before the object itself is merged. This explains why in Dutch they must follow the object:

(34) a. Jan heeft [de vis [rauw gegeten]]. Dutch
John has *the fish raw eaten*
b. *Jan heeft [rauw [de vis gegeten]].
John has raw the fish eaten

The English counterpart of (34a) cannot be (35a), because this structure violates the Case-First Constraint. VP-shell formation rescues the structure, but leads to a non-mirroring word order:

(35) a. *John [[ate raw] the fish].

b. John ate [the fish [t_V raw]].

Subject-oriented depictives do not have to be c-commanded by the object, although they must of course be c-commanded by the subject. This means that they can be accommodated by a simple ascending structure:[10]

(36) John [[ate the fish] drunk].

Three further facts follow. First, if a sentence contains both an object- and a subject-oriented secondary predicate, they come in this order (see (37)). Second, object-oriented secondary predicates cannot be stranded by VP-fronting, but subject-oriented secondary predicates can be (see (38)). This is because in (36), but not (35b), verb and object form a constituent. Third, an object-oriented secondary predicate can be preceded by an object-oriented floating quantifier, but a subject-oriented secondary predicate cannot (see (39)).

(37) a. ?John ate the fish raw drunk.
b. *John ate the fish drunk raw.

(38) a. John wanted to eat the fish no matter what, and eat the fish he did drunk.

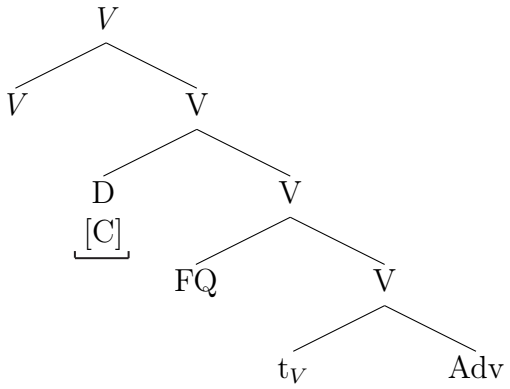
[10] The claim that object-oriented and subject-oriented depictives in English occupy different positions is of course not ours. It goes back to at least Williams (1980). Specific proposals that object-oriented depictives occupy the lowest position in a VP-shell structure can be found in Larson (1989) and Vanden Wyngaerd (1989). These authors thus also argue that English allows adverbials that structurally intervene between verb and object, but they do not provide an analysis of the correlation between headedness and scrambling/case adjacency.

b. *John wanted to eat the fish no matter what, and eat the fish he did raw.

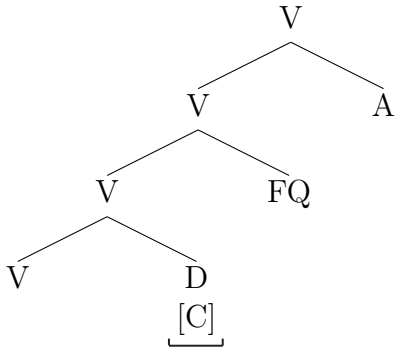
(39) a. *If John ate the fish at all, he ate the fish both drunk.
b. If John ate the fish at all, he ate the fish both raw.

The explanation of the observation in (39) is a little involved. Janke & Neeleman (2012) argue that floating quantifiers must be c-commanded by the DP they are interpretively linked to and – in English – precede the category they are attached to. According to these criteria, there is a position in a descending structure like (40a) that can host object-oriented floating quantifiers, but this is not the case in an ascending structure like (40b). For details, we must refer the reader to the original paper.

(40) a.



b. *



Further evidence for the existence of both ascending and descending structures in English comes from adverbial scope. As observed by Phillips (2003), an example like (41a) is ambiguous between a collective reading of *quickly* and a distributive reading. Given the analysis above, this can be explained because in the ascending structure the adverbial c-commands the indefinite, while in the descending structure the indefinite c-commands the adverbial. The predication, then, is that an adverbial stranded by VP-fronting can only get a collective reading. This is indeed the case; there is a strong tendency for *quickly* in (41b) to take scope over *three letters*.

(41) a. John read three letters quickly.
b. John wanted to read three letters, and read three letters he did quickly.

That English has descending structures involving verb movement is hardly controversial. In fact, it has been the standard analysis for the double object construction ever since Larson 1988, and is widely assumed elsewhere. However, the proposal sketched above differs from alternatives outlined in the literature in that we assume that verb movement serves to create a

representation in which a DP object is adjacent to the verb. This leads to the prediction that even if the verb moves, it cannot move across adverbials, ruling out examples like (42) as a violation of the Case-First Constraint in (28).

(42) *John [ate [slowly [the fish [t_V raw]]]].

Alternative proposals, even if they require adjacency between the verb and its complement in the underlying structure, cannot explain the ungrammaticality of (42).

The data in this section suggest an extension of Generalization A':

> GENERALIZATION A':
> i. In verb-initial VPs, DP must be closer to the verb than other material.
> ii. The order V-DP-XP permits two structures: one in which the object is c-commanded by the material that follows it, and one in which the object c-commands the material that follows it.

Although not all tests available in English can be applied in other languages, evidence for structural ambiguity of the type found in English can be replicated in at least some other VO languages.

In the next section we explore whether there is a parallel to Generalization A' (ii) in the extended nominal projection.

4. Extending the analysis to AP-adjacency

We believe that the Case-First Constraint as motivated for the extended verbal projection in the previous section has a parallel in the extended nominal projection, and that this parallel condition explains the data discussed in sections 1 and 2. We showed there that the order of AP- and PP-modifiers in head-final languages is much freer than in head-initial languages, where only one order is allowed (N-AP-PP). In the same vein, OV-languages systematically allow scrambling, while VO-languages do not. This similarity is striking enough to justify exploring whether our analysis of case adjacency can be extended to nominal extended projections. We therefore propose that the order in which APs and PPs are merged with the noun is free in principle. However, the system is subject to the condition below:

(43) *Concord-First Constraint*
- a. The concord domain of a phi-feature set φ in an AP-modifier consists of that AP and any XP intervening between it and the noun.
- b. No category lacking φ can precede a category that carries φ in φ's concord domain.

This condition presupposes that adjectives universally agree with the noun in phi-features, even where this is not visible on the surface. This means we assume a notion of abstract concord on a par with abstract case as employed in the verbal domain. The condition in (43) then states that no adjective can be preceded by a non-agreeing (i.e. non-adjectival) XP in its concord domain. In practice, this means that when the noun is initial in the extended nominal projection, any agreeing XP must follow it immediately. When the noun is final, however, there are two options. Either the noun and the agreeing adjective are adjacent, or the agreeing adjective is separated from the noun by one or more categories that do not bear φ. In the first case, the Concord-First Constraint is satisfied trivially, as there is nothing in the concord

domain other than AP. In the second case, the concord domain contains multiple elements, but the AP is left-most, as required. Thus, the only noun-initial order allowed by the Concord-First Constraint is N-AP-PP (Generalization A), while both PP-AP-N and AP-PP-N are allowed as head-final orders (Generalization C(i)). This pattern of course mirrors the freer word order found in OV-languages, compared to the relatively fixed order of VO-languages.

The Concord-First Constraint can also explain the scope patterns observed in the languages discussed above. In general, we expect scope to follow c-command relations. When the AP c-commands the PP, it takes scope over the PP, and vice versa. In noun-medial languages like the English, Swedish and Dutch examples, APs precede and PPs follow the noun. This means that the order of merger can vary without this leading to potential clashes with the Concord-First Constraint. Indeed, scope in noun-medial languages varies without variation in word order (Generalization B).

In noun-final languages, however, the order of attachment is reflected in the linear order of the elements in the phrase. Barring movement, the first element combined with the noun will be closer to it, with subsequent additions further to the left. Thus, in the order PP-AP-N, the PP will c-command and therefore take scope over the PP, while in the AP-PP-N order, the PP will be in the scope of the PP (Generalization C(ii)).

One would expect that in noun-initial languages, the linear order of the elements in the phrase reflects the order of attachment, as is the case in the head-final languages (again, barring movement). However, due to the Concord-First Constraint, only one linear order is allowed, namely N-AP-PP. A naïve analysis would therefore assume that the PP always c-commands the AP and must therefore systematically take scope over it. (Indeed, this is the prediction made by a structural account of AP-adjacency.) However, this is not what the data show. In Welsh, for example, the N-AP-PP order is scopally ambiguous. The phrase in (44) can refer both to a fake picture that was made in the 15th century and to a later forgery attempting to replicate an earlier work.

(44) y llun ffug o'r 15fed ganrif — Welsh
the picture fake from-the 15th century
from the 15th century > fake; fake > from the 15th century

The same is true for the other noun-initial languages we have discussed. We illustrate this using Spanish and Arabic:

(45) a. el cuadro falso del siglo XV — Spanish
the *picture fake of-the century 15*
from the 15th century > fake; fake > from the 15th century

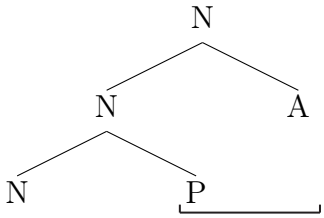
b. as-suura l-muqallada min al-qarn al-xamis-ʕashar — Arabic
the-picture the-fake from the-century the-fifteenth
from the 15th century > fake; fake > from the 15th century

The first reading in (44)-(45a,b) is trivial. But how can we explain the second reading?

In fact, if we take the parallel with the extended verbal projection seriously, nothing needs to be added to the theory. Just like Case-First Constraint could trigger the formation of a VP-shell structure, the Concord-First Constraint can trigger the formation of an NP-shell structure. Consider a situation in which a noun in a head-initial language merges with a PP

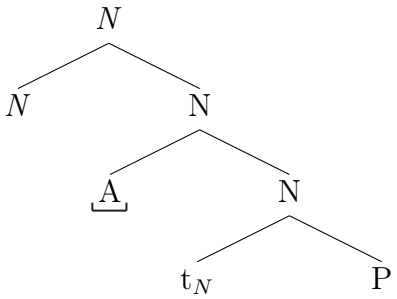
before it merges with an AP. The structure cannot surface as in (46), as that would violate the Concord-First Constraint (AP is preceded by PP in its concord domain).

(46) *



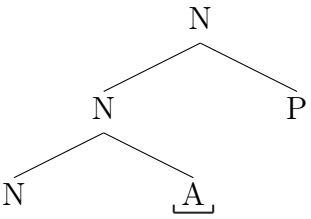
However, this order of merger can be maintained without violation of the Concord-First Constraint if the AP is generated to the left of the noun and the noun undergoes head movement. In (47), the AP is the only element in its concord domain.

(47)



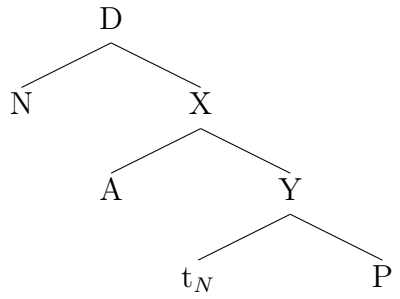
Notice that this representation has the same linear order as the ascending structure in (48) (which of course also satisfies the Concord-First Constraint). However, in (47) AP c-commands and therefore takes scope over PP, while in (48) PP c-commands and therefore takes scope over AP. In other words, the availability of NP-shell formation explains the scopal ambiguity of the examples in (44)-(45a,b).

(48)

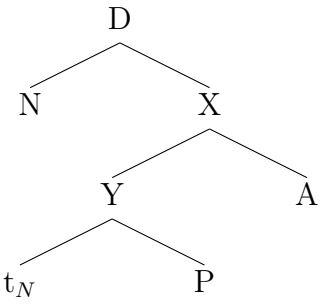


The scopal ambiguity of the N-AP-PP order has been observed by proponents of a structural account of AP-adjacency. Adger (2013), in particular, discusses this kind of ambiguity with adjectives like *other*, proposing that scope-taking adjectives may attach externally to the constituent containing the noun and any prepositional modifiers. The obvious problem with this, however, is that now the structural explanation of AP-adjacency no longer extends to scope-taking adjectives. If the tree in (49a) must be allowed in order to account for the wide-scope reading of scope-taking adjectives, there is no longer a structural account that excludes the tree in (49b) (which is simply a different linearization of the same hierarchy).

(49) a.



b. *



However, as a matter of fact, the ordering restrictions for scope-taking adjectives are no different from those observed with simple intersective adjectives (see (2)-(4)). Therefore, an additional linear constraint will have to be assumed in order to rule out the N-PP-AP order (where AP is a scope-taking adjective). This obviously undermines the structural account of AP-adjacency. This problem is compounded by the fact mentioned above (see (14)) that intersective adjectives can be attached external to scope-taking adjectives that outscope PPs.

The proposal that the N-AP-PP order is structurally ambiguous (allowing either (47) or (48)) makes a crucial prediction. The substring N-AP is a constituent in the structure in (48), but not in the structure in (47). This means that if N-AP passes a constituency test, it must be the case that PP c-commands AP, and consequently takes scope over it. There are two constituency tests that can be used to test this prediction: ellipsis and coordination.

The prediction appears to be correct. Consider the Spanish examples in (50). If in (50a) the elided nominal constituent in the right conjunct is to be interpreted as 'false picture', then in the left conjunct the PP must take scope over the AP. If in (50b) the PP applies to both nouns, it must be outside the scope of the AP in the right conjunct.

(50) a. el [cuadro falso]$_1$ del siglo XV y el e_1 del siglo XVIII Spanish
the picture fake of-the century 15 and the (one) of-the century 18
'the fake picture from the 15th century and the ~~fake picture~~
from the 18th century' (from the 15th century > fake)

b. el cuadro auténtico y el cuadro falso del siglo XV
the picture real and the picture false of-the century 15
'the real picture from the 15th century and the fake picture
from the 15th century' (from the 15th century > fake)

The fact that the reading in which the AP takes scope over the PP disappears in examples of this type strengthens our conclusion that this reading relies on the availability of the structure in (47). This structure is permissible on our account, as the AP in (47) satisfies the Concord-First Constraint. It is incompatible with a structural account of AP-adjacency, however, as N and AP do not form a constituent in (47).

Notice that the observations made for Spanish in (50a) carry over to Arabic and Welsh (we omit examples of coordination for reasons of space):

(51) a. as-suura l-muzayafa min al-qarn al-xamis-ʕashar Arabic
the-picture the-fake from the-century the-fifteenth
w al-waħda min al-qarn al-thamin-ʕashar
and the-one from the-century the-eighteenth
'the fake picture from the fifteenth century and the ~~fake picture~~
from the eighteenth century' (from the 15th century > fake)

b. y darlun ffug o'r 15fed ganrif a'r un o'r 18fed ganrif Welsh
the picture fake of-the 15th century and-the one of-the 18th century
'the fake picture from the 15th century and the ~~fake picture~~ from the 18th century (from the 15th century > fake)

In sum, a convincing case can be made for a linear account of AP-adjacency. Such an account fits the data better than a structural account and it has a precedent in Janke and Neeleman's (2012) analysis of the English VP.

5. Stacked Adjectives

We have so far looked at DPs containing just one adjective. But of course many languages allow stacking of adjectives. This fact gives rise to two issues that we discuss in this section.

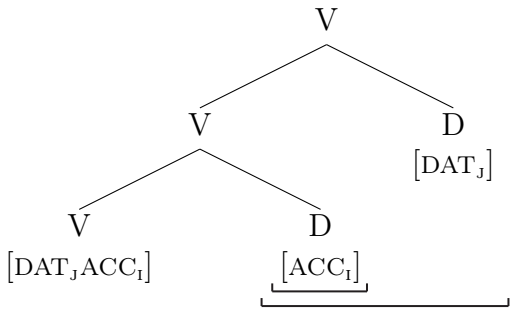
The first involves an apparent asymmetry between the nominal and verbal extended projections. We have drawn a parallel between case and concord (in the form of the Case-First and Concord-First Constraints). However, when it comes to stacking of DPs and APs there seems to be an unexpected difference between the two. It seems that merging two DPs with a verb in a head-initial language systematically requires VP-shell formation, but merging two adjectives with a noun in a noun-initial language does not require NP-shell formation.

We take a look at stacked DPs first. In English, and many other languages, a double object construction cannot exist without VP-shell formation. This is obvious from a number of well-known observations (see Larson 1988 in particular). We mention two of these here: (i) the indirect object must take scope over the direct object (see (52a)), and (ii) the V-DP_{IO} substring fails constituency tests like movement and ellipsis (see (52b,c)).

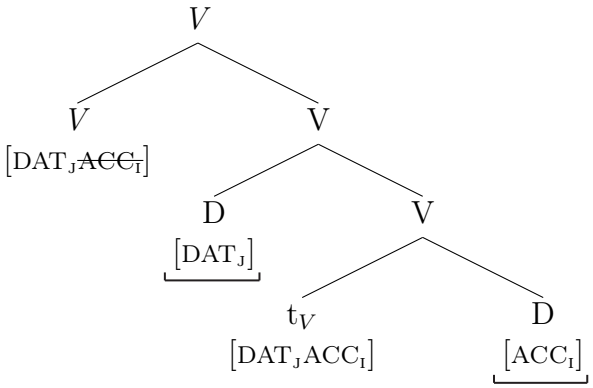
(52) a. John gave a student every book.
a student > every book; *every book > a student
b. *John wanted to give Mary something prickly and give Mary he did a woollen scarf.
c. *If John gave Mary anything prickly, he did a woollen sweater.

This is hardly surprising. On the assumption that both objects must satisfy the Case-First Constraint, an ascending VP-structure will be ruled out. This is because the dative DP in (53a) is preceded in its assignment domain by a category that carries a different set of case features. However, in a VP-shell structure, the dative DP is licensed by the verb, while the accusative DP is licensed by the verb's trace. Both are the only elements in their respective assignment domains (see (53b)).

(53) a. *



b.



Stacking of adjectives does not lead to formation of an NP-shell. A comparison of word order in English and French, for example, suggests that in a string N-A_1-A_2 in French, A_2 c-commands A_1. Crucial support for this this conclusion comes from the fact that the unmarked order of modifiers in French is the mirror image of the order found in English:

(54) a. the [old [black piano]]
a'. ?the black old piano
b. le [[piano noir] antique] French
the piano black old
b'. ?le piano antique noir
the piano old black

(55) a. the [average [white dog]]
a'. ?the white average dog
b. le [[chien blanc] moyen] French
the dog white average
b' ?le chien moyen blanc
the dog average white

If (54a) and (55a) have an ascending structure, A_2 in N-A_1-A_2 apparently does not violate the Concord-First Constraint, even though it is preceded by A_1 in its concord domain. Why should this be? What distinguishes these examples from (53a)?

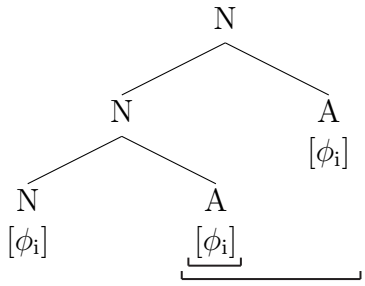
Our account is based on a key difference between case licensing and concord. Case licensing is a relationship in which there is a one-to-one correspondence between case features present in the verb and the arguments whose case is licensed. That is to say, if a verb licenses a particular case in a DP, it loses the capacity to license that case in other DPs. As a consequence, if multiple cases are licensed by the same verb, that verb must carry multiple

case features. It follows from this very old insight – inherent in the traditional notion of *case assignment* – that the two objects in a double object construction bear different case features.[11]

Concord, by contrast, is a simple agreement relation between a noun and an adjectival modifier. If there are multiple adjectival modifiers, these all agree with the same set of phi-features on the noun. On the assumption that agreement is an instance of feature identification (see Pollard and Sag 1994 and Brody 1997, among others), it follows that all adjectival modifiers carry instances of the same phi-feature set. (If the phi-features of A_1 are identical to the phi-features of N and the phi features of A_2 are identical to the phi-features of N, then by transitivity the phi-features of A_1 are identical to the phi-features of A_2.)

But this implies that the structure in (56), which we assumed for the French examples in (54b) and (55b), is grammatical. Admittedly, the concord domain of the higher of the two adjectives includes the lower adjective, which precedes it. However, as the phi-features sets of the two adjectives are instances of the same phi-feature set, this does not result in a violation of the Concord-First Constraint.

(56)



Stacking of adjectives raises a second issue, which again involves an asymmetry between noun-final and noun-initial structures. Not all languages have a fixed order of adjectives, but among those that do the position of the head seems to matter for the order selected. It has been observed (among others by Sproat and Shih 1991 and Cinque 2010) that where adjectives occur before the noun (as in English), only one order is permitted as the neutral order. We can represent this as A_1-A_2-A_3-N. As it turns out, there is no known N-final language in which adjectives come in the reverse order: the sequence *A_3-A_2-A_1-N is ungrammatical. We assume – following much of the literature – that this is due to a universal adjectival hierarchy that determines the sequence in which stacked adjectives are merged (all else being equal). Interestingly, when adjectives follow the noun two neutral orders are found. One possibility is that the adjectives come in the mirror image of the order found in English (N-A_3-A_2-A_1). Thus, the structure seems to go up following the noun. The second possibility is that the order of adjectives is identical to that in English (N-A_1-A_2-A_3). Thus the structure seems to go down following the noun. We have already seen that French is an example of the first type: its adjectival order mirrors that of English. Irish is a language with (at least some) descending adjectives, as the data below show.

(57) a. a [small [yellow ball]]
a'. ?a yellow small ball

[11] It is irrelevant that the case features in (53) are accusative and dative. Even if they were both accusative, they would count as different features, as a verb checking accusative twice must presumably be endowed with two accusative features.

b. liathróid bheag bhuí Irish
ball small yellow
b'. ?liathróid bhuí bheag
ball yellow small

(58) a. the [round [red plate]]
a'. ?the red round plate
b. pláta cruinn dearg Irish
plate round red
b'. ?pláta dearg cruinn
plate red round

For now, we will simplify the typological picture by assuming that in noun-initial languages all adjectives show up the order found in English or in its mirror image. In reality, languages can show mixed orders, an issue that we will consider below.

The observations above are reminiscent of a pattern described in Greenberg's Universal 20 (see Greenberg 1963 and Cinque 2005, among others). Universal 20 is a generalization about neutral word order in the DP and reads as follows: "When any or all of the items (demonstrative, numeral, and descriptive adjective) precede the noun, they are always found in that order. If they follow, the order is either the same or its exact opposite." If we look only at purely head-initial and purely head-final languages, the following pattern is described (see Cinque 2005 for a description of all 24 logically possible orders of demonstrative, numeral, adjective and noun):

(59)

Dem Num A N	N A Num Dem
N Den Num A	*A Num Dem N

Ackema & Neeleman (2002) and Abels & Neeleman (2009, 2012) show that this pattern can be captured if phrase structure is symmetric, but movement of N universally leftward (Ackema and Neeleman restrict their discussion to (59); Abels and Neeleman discuss the full data pattern uncovered by Cinque (2005)):

(60) a. *Symmetric phrase structure*
(i) Universally, the noun combines with adjectives before numerals and with adjectives and numerals before demonstratives.
(ii) Languages can choose different linearizations of the output of merger.
b. *Asymmetric movement*
(i) At any point in the derivation, a language may choose to move a constituent containing the noun and attach it to the current root.
(ii) The moved constituent must precede its sister.

On these assumptions, Dem-Num-A-N and N-A-Num-Dem can be base-generated. N-Dem-Num-A can be derived by leftward movement, but A-Num-Dem-N, if it adheres to (60a), would require rightward movement, contra (60b.i):

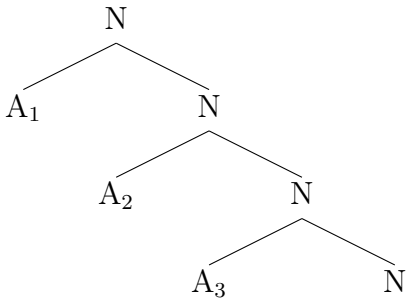
(61)

[Dem [Num [A N]]]	[[[N A] Num] Dem]
[N [Dem [Num [A t_N]]]]	*[[[[t_N A] Num] Dem] N]

This analysis carries over to the ordering of stacked adjectives. We will sketch a proposal below, but must leave two matters for future research: languages in which adjectives do not seem to be ordered with respect to each other, and languages that (typically under restricted circumstances) allow reordering of adjectives and nouns. Our proposal is that – abstracting away from these matters – there are two parameters at play, which regulate attachment and concord, respectively. One parameter determines whether the adjective is attached to the left or right of the category it modifies (compare (60a)); the other determines whether the licensing of concord is to the left or to the right.

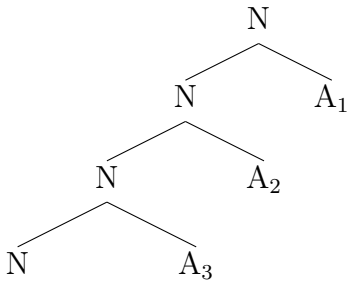
Given that each parameter has two settings, there are four cases to consider. If APs are attached to the left and licensing is leftward, the result will be a noun-final NP with descending APs, a state of affairs that characterizes all noun-final and noun-medial languages we have considered:

(62)



If APs are attached to the right and licensing is rightward, the result is a noun-initial NP with ascending adjectives (as found in Spanish and Italian):

(63)



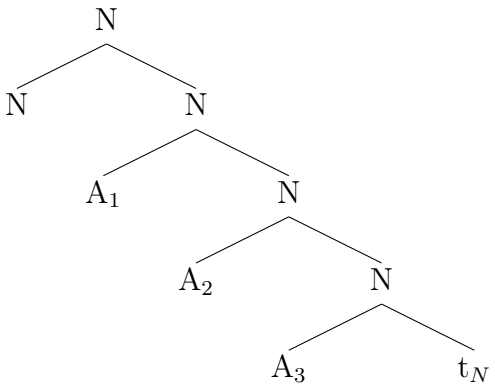
Note that in languages of this type merger of an XP prior to merger of an AP will trigger the formation of an NP-shell (see section 4). When this happens, the AP is attached on the 'wrong' side of the noun; that is, to the left rather than the right. This subsequently allows rightward licensing of concord. To rule in such twisted structures, we need to assume that the attachment parameter is subordinated to the licensing parameter (see Prince and Smolensky 2004 for extensive discussion of constraint subordination). In other words, the effects of the attachment parameter make themselves felt only in structures that adhere to the licensing parameter. We assume that this is a universal property of the system:

(64) Licensing >> Attachment

If APs are attached to the left and licensing is rightward, the noun will be required to move whenever it is modified by an AP – this is the only way to reconcile the requirements imposed by the attachment and licensing parameters. The consequence is automatic NP-shell

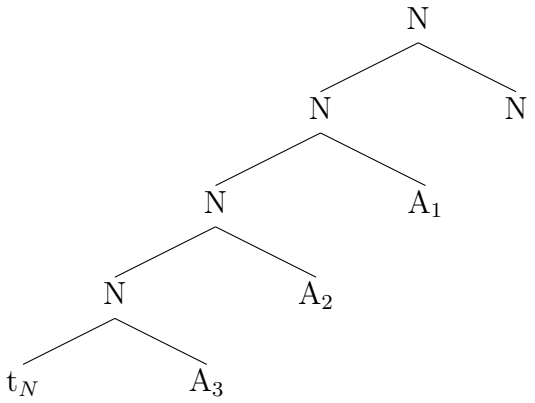
formation, resulting in noun-initial NPs with descending adjectives (as found in Irish and Welsh with adjectives of size, colour and provenance):[12]

(65)



Finally consider the case in which adjectives are attached to the right of the noun and licensing is leftward. The only way to meet the requirements imposed by this combination of parameter settings would be to move the noun rightward from a base position preceding all adjectives to a landing site following all adjectives. This would give rise to the unattested order A_3-A_2-A_1-N:

(66) *



However, as we have seen in our discussion of Universal 20, rightward noun movement is ruled out (compare (60b)). Structures of the type in (66) can therefore not exist.

In sum, the pattern found in the case of adjectival stacking closely resembles the pattern described by Universal 20, and can be explained in very similar terms:[13]

---

[12] Notice that this analysis does not affect our account of Celtic. The language is still subject to the Concord-First Constraint (which rules out (i)). The scopal ambiguity of N-AP-PP strings in Celtic comes about through variable attachment of the PP (as in (ii)-(iv)).

(i) *[N [PP [t_N AP]]]
(ii) [N [[AP t_N] PP]]
(iii) [[[N [AP t_N]] PP]
(iv) [N [AP [t_N PP]]]

[13] The table is organized to mirror the one in (59). Note, however, that the concord parameter is not linked to the attachment parameter; it simply states that concord is leftward/rightward.

Strictly speaking, the combination of rightward attachment and leftward licensing can yield an output, given that the direction of licensing universally trumps the direction of merger (see (64)). One could simply base-generate

(67)

	Leftward attachment	Rightward attachment
Attachment direction = licensing direction	$A_1\ A_2\ A_3\ N$ (e.g. English)	$N\ A_3\ A_2\ A_1$ (e.g. Spanish)
Attachment direction ≠ licensing direction	$N\ A_3\ A_2\ A_1$ (e.g. Irish)	$*A_3\ A_2\ A_1\ N$ (not attested)

The analysis we have proposed for adjectival order in Romance versus Celtic is probably too simplistic. There is wide-spread agreement that Romance noun phrases by and large have a straightforward ascending structure, with the noun in the lowest position. Celtic noun phrases are generated through leftward movement of the noun across at least certain adjectives hosted by a descending structure. The adjectives in question specify size, colour and provenance (see Guilfoyle (1988:195) and Sproat & Shih (1991:586-587) for Irish, and Rouveret (1994:207-240) for Welsh). However, Willis (2006) notes that for other adjectives (*other*, quality and age), the order found in Welsh is the mirror image of the typical preverbal order. For such adjectives a Romance-style analysis is required: these adjectives are attached to the right of the noun in an ascending structure and licensed rightward (see (68)). Thus, what we have treated above as a single parameter governing the direction of attachment may actually be the combination of multiple parameters with a more limited empirical scope.

(68) [[[[N [SIZE [COLOUR [PROVENANCE t_N]]]] AGE] QUALITY] *other*]

The necessity of a decomposition of the proposed parameters into micro-parameters is of course underscored by the limited availability in Romance of prenominal adjectives.

However that may be, the structural relationship between the noun and any adjectives following it in Romance is very different from the structural relationship between noun and adjectives of size, colour and provenance in Celtic. Yet, both language families are subject to AP-adjacency. This is hard to understand on a structural account of the phenomenon, but follows straightforwardly from a linear condition like the Concord-First Constraint.

6. Back to VP

The leading idea of this paper is that there is a parallel between nominal and verbal structures that involves the licensing of agreeing adjectives and accusative objects. In the previous section, we have suggested that two (types of) directionality parameters must be distinguished in the nominal domain: one involving the linearization of merger and the other involving the linearization of licensing. If we take the parallel between nominal and verbal structure seriously, we would expect to find comparable parameters in the verbal extended projection.

We have seen examples of two types of structures, namely one in which an argument must precede the verb and case is licensed leftward (the Dutch VP) and one in which arguments are merged to the right of the verb and case is licensed rightward (the English VP). In the latter case, the order imposed by licensing can trump the order imposed by merger, giving rise to VP shells, in much the same way as we have seen for NP shells in the previous

adjectives to the left of the noun, even though this goes against the preferred order of merger. Notice, however, that this leads to a grammar that is indistinguishable from one in which licensing is leftward and adjectives must be merged to the left of the noun. Thus, this possibility does not extend the typology in the table.

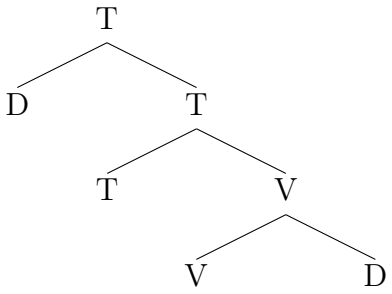
section. We do not expect to find structures in which case is licensed to the left while DPs are merged to the right. This combination of parameter settings generates a conflict that cannot be solved by movement on the assumption that in the VP, like in the noun phrase, rightward head movement is banned. This leaves us with one potential gap in the paradigm, namely structures in which an argument is merged to the left of the verbal projection, but must be licensed to the right:

(69)

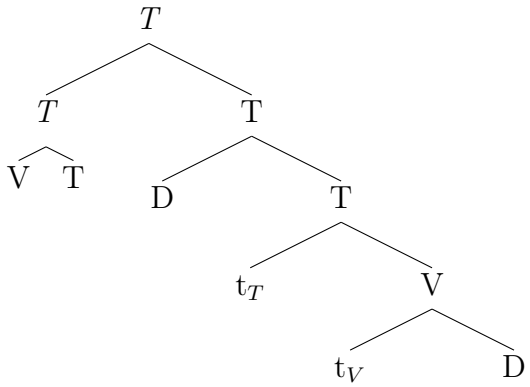
	Leftward attachment	Rightward attachment
Attachment direction = licensing direction	Dutch VP	English VP
Attachment direction ≠ licensing direction	?	*

We believe that this gap is filled by at least some VSO languages. Suppose that the grammar of VSO languages is largely similar to the grammar of English except that the licensing of nominative case falls under the same system as the licensing of accusative case; that is, nominative is licensed by the verb to its right. Therefore an underlying structure like (70) cannot surface as is without violating the requirement that nominative be licensed. This problem can be solved by performing exactly the same movement that English uses to license the case of objects merged with the verb after merger of some other category.

(70)



(71)

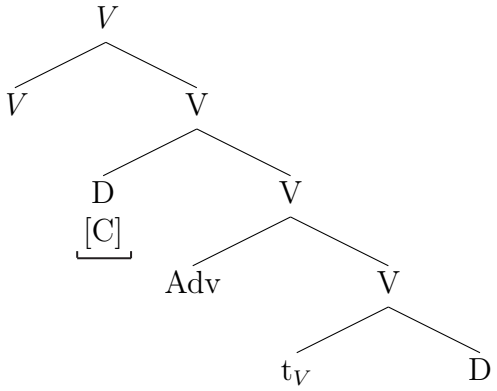


An analysis along these lines has been proposed for Welsh by Sproat (1985).

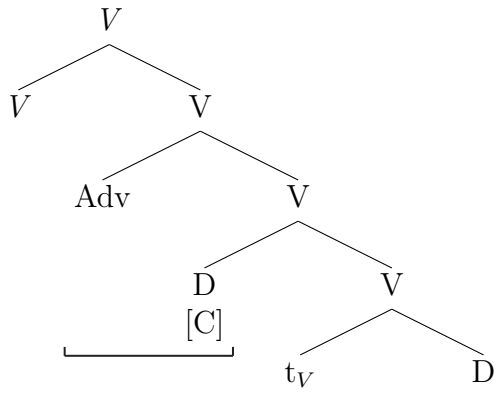
An immediate advantage of this line of analysis is that it explains why no adverbial material can intervene between the verb and a nominative DP in VSO languages like Irish or Welsh. The subject in such languages will have to meet the Case-First Constraint in (28), much like objects in English. This means that the nominative argument has to be left-most in its

assignment domain, as in (72). The alternative structure in (73) is ruled out because the assignment domain includes an adverbial that precedes the subject.

(72)



(73) *



Indeed, intervention of adverbials is ruled out in Irish, Scottish Gaelic (Adger 1997), Arabic (Benmamoun 1996) and Welsh (Borsley, Tallerman and Willis 2007).[14]

(74) a. Deireann siad i gcónai paidir trioh am luí — Irish
say-HAB they always prayer before the bedtime
'They always say prayer before bedtime.'

a'. *Deireann i gcónai siad paidir trioh am luí
say-HAB always they prayer before the bedtime

b. *Dh'fhàg, tha mi cinnteach, Dàihbhidh an dè — Scottish Gaelic
left-PAST, be-PRES I sure, David yesterday
'David, I'm sure, has left.'

b'. Dh'fhàg Dàihbhidh, tha mi cinnteach, an dè
left-PAST David, be-PRES I sure, yesterday

c. *kataba haadaa s-sabaaħ-a r-rajul-u r-risaalat-a — Arabic
wrote this the-morning-ACC the-man-NOM the-letter-ACC
'The man wrote the letter this morning.'

c'. kataba r-rajul-u r-risaalat-a haadaa s-sabaaħ-a
wrote the-man-NOM the-letter-ACC this the-morning-ACC

d. *Mae wastad Dafydd yn yfed coffi. — Welsh
be-PRES.3SG always Dafydd PROG *drink.INF coffee*
David always drinks coffee.'

[14] Welsh allows some indefinite subjects to be preceded by adverbials. On the proposed analysis, this will require the postulation of an associated null expletive.

d. Mae Dafydd wastad yn yfed coffi.
be-PRES.3SG Dafydd always PROG drink.INF coffee

A further prediction is that where nominative case can be licensed by a head other than V, the verb will remain in situ, leading to SVO word order. Under these circumstances, verb movement will be blocked by economy considerations. This prediction is borne out. Arabic, for example, has two constructions in which nominative case is licensed by an external head. One involves a case marking complementizer, *ʔinna*, and the other complements of verbs like *think*. In both constructions, the embedded verb fails to be fronted.

(75) a. ʔinna salimat-an fataħ-at al-baab-a bi-l-miftaaħ-i Arabic
that salima-ACC open-3SG.FEM the-door-ACC with-the-key
'that Salima opens the door with the key.'
b. ħasib-tu salimat-an fataħ-at al-baab-a bi-l-miftaaħ-i
thought-I salima-ACC open-3SG.FEM the-door-ACC with-the-key
'I thought Salima opened the door with the key.'

The same point can be illustrated in Celtic if we consider verbs taking infinitival complements with an overt subject.

(76) a. Bha Dàibhidh a' bhualadh a' chait Scottish Gaelic
Be-PAST David SIMP strike-VN the cat-GEN
'David struck the cat.'
b. Y mae Siôn wedi gweld draig Welsh
PRT be-3SG.PRES John PERF see dragon
'John has seen the dragon.'

In fact, the data in (75) and (76) are illustrative of Greenberg's Universal 6, according to which all languages with dominant VSO order have SVO as an alternative or as the only alternative basic order (Greenberg 1963: 79).

If, on the strength of these predictions, one were to accept an analysis of VSO languages as involving rightward licensing of nominative case by the verb, the question mark in the table in (69) can be replaced by 'Celtic and Arabic subjects'. If so, there is a full parallel between possible nominal and verbal structures (in terms of the parameter space introduced in the previous section).

7. Spanish revisited

The best possible evidence for any linear constraint consists of data showing that it can be satisfied by different structures that have the same terminal yield. We have made an argument along these lines: in head-initial languages, both ascending and descending structures satisfy the Concord-First Constraint as long as any APs precedes any other material. In this section we will add to this argument. We will show that under very exceptional circumstances an underlying structure N-PP-AP can be reconciled with the Concord-First Constraint through extraposition of the PP. If our argument stands up to scrutiny, this would be a third way of generating the required terminal yield (N-AP-PP).

It is our impression that VP/NP-shell formation is the default repair strategy for potential violations of the Case-First and Concord-First Constraints. On the assumption that traces do

not count for these conditions, extraposition of potentially offending material would be another option. We are not sure why this option is used rarely if at all. One possibility is that, while A'-movement typically requires an interpretive license, head movement does not feed semantics or pragmatics and is therefore employed to generate 'neutral' word order. This would mesh well with the accounts of Universal 20 and its exceptions in Cinque 2005 and Abels & Neeleman 2012. On both accounts, neutral word order in the noun phrase can be delivered by movement of the head (possibly accompanied by pied-piped material), but not by phrasal movement of DemP, NumP or AP (see the discussion surrounding (60b)).

However, there are circumstances in Spanish in which NP-shell formation is not an option, and under those circumstances extraposition can be used for repair. The crucial structure driving this process has to do with adjectival stacking. Consider the data in (77).

(77) a. una [[película antigüa] fantástica] Spanish
a film old fantastic
'a wonderful old movie' (fantastic > old)
b. una [[antigüa película] fantástica]
a old film fantastic
c. una [fantástica [película antigüa]]
a fantastic film old
d. *una [fantástica [antigüa película]]
a fantastic old film

Spanish allows adjectives to either follow or precede the noun. As (77d) shows, however, stacking is not possible with adjectives that are left-attached. That is, both *antigüa* 'old' and *fantástica* 'fantastic' may appear prenominally, but not at the same time. We attribute the ungrammaticality of (77d) to what Chomsky and Lasnik (1977) would have called a surface filter. It is formulated below:

(78) In the Spanish extended nominal projection, AP_1 may not c-command AP_2 if AP_1 precedes AP_2 in an uninterrupted adjectival sequence.

An adjectival sequence counts as uninterrupted if no overt material separates the adjectives. This is of course true of the sequence *fantástica antigüa* in (77d), with the consequence that *fantástica* may not c-command *antigüa*. However, in the structure at hand it must, in violation of (78).

Note that if the two APs are separated by overt lexical material, (78) allows left-to-right c-command. Thus, (77c) is grammatical on an interpretation in which *fantástica* takes scope over (and hence c-commands) *antigüa*, while the string in (77b) has a second interpretation in which *antigüa* takes scope over *fantástica*:

(79) una [antigüa [película fantástica]] Spanish
a old film fantastic
'an old fantasy movie.' (old > fantastic)

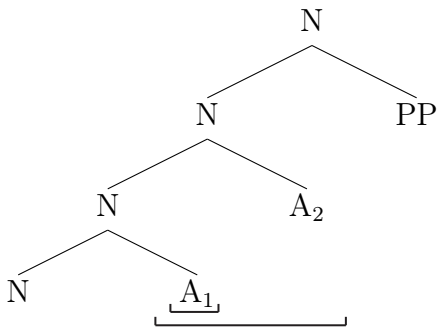
In both structures the noun interrupts the adjectival sequence.

As it stands, the condition in (78) is a language-specific stipulation that requires further scrutiny. It would take us too far afield to explore its status here. What is relevant in the

current context is that (78) interacts in interesting ways with the Concord-First Constraint. The structures involved contain two APs and a PP.

One obvious structure that can accommodate two APs and a PP is a simple ascending one (see (80)). This structure is appropriate when the PP takes scope over the two APs (or when there is no scopal interaction between the PP and the APs). Thus, it characterizes extended nominal projections like the one in (81).

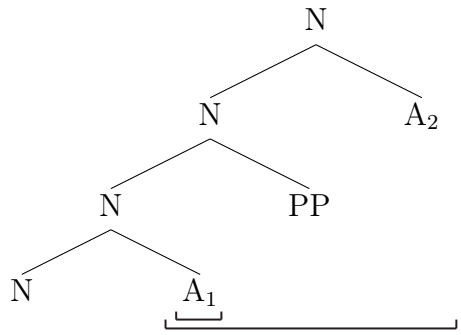
(80)



(81) una película antigüa fantástica de Buñuel Spanish
a film old fantastic of Buñuel
'a wonderful old movie by Beñuel' (fantastic > old)

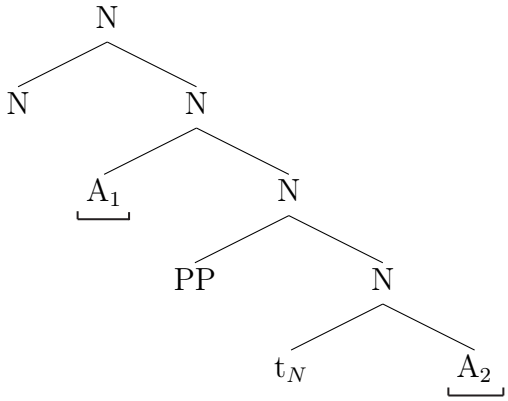
A more complex situation arises when the PP is merged following merger of one AP, but preceding merger of the other. In that case, an ascending structure cannot be built, as that would violate the Concord-First Constraint. In (82), the right-most AP is preceded in its concord domain by the PP.

(82) *



Hence, NP-shell formation is necessary. One relevant structure that satisfies the Concord-First Constraint and the condition in (78) is given in (83). Here, the left-most AP is licensed by the noun in its derived position, while the right-most AP is licensed by the nominal trace. As a consequence, neither AP is preceded by other material in its concord domain:

(83)



In (83), AP_1 precedes and c-commands AP_2. This does not violate the condition in (78), however, because the two APs are separated in the surface string by the PP. The prediction, then, is that the order N-AP_1-PP-AP_2 is grammatical in Spanish, as long as the first AP takes scope over the second. Such structures are indeed attested. (84) is an example (note that the example denotes a fake faultless painting, not a faultless fake).[15]

(84) un cuadro falso del siglo XV impecable Spanish
a painting fake of-the century 15 faultless
'a fake faultless painting from the fifteenth century' (fake > from 15th C. > faultless)

Two other candidate structures in which the PP is merged between the two APs violate (78).[16] In both (85a) and (85b), AP_1 c-commands AP_2 and AP_1 and AP_2 form an uninterrupted sequence.

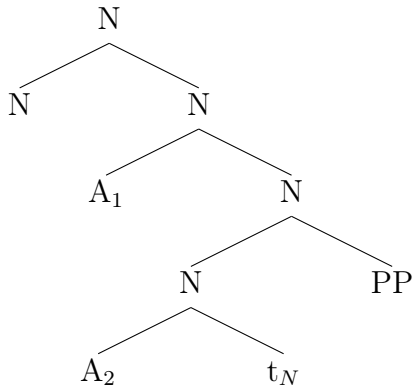
[15] Notice that the PP in (83) precedes its sister. This is not the normal situation in Spanish. It suggests that for PPs, too, there is an attachment requirement that can be overruled under specific circumstances. The crucial factor cannot be the licensing of the PP, as PPs do not partake in concord (or case assignment). Rather, in the structure at hand, it is the licensing required imposed on AP_2 that takes priority over the usual attachment direction for PPs.

The N-AP-PP-AP order is not found in Welsh. This can be understood if in this language PPs can never precede the node to which they are attached. This difference with Spanish underlines that there is a real need for serious research into ordering parameters of this type.

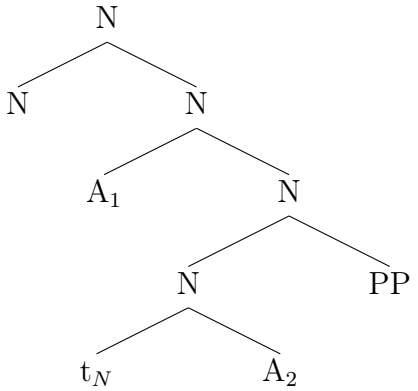
[16] There is an alternative noun-medial structure that is predicted to be grammatical:

(i) un [falso [[cuadro impecable] del siglo XV]]
a fake picture faultless of the century 15
'a fake faultless picture from the fifteenth century

(85) a. *

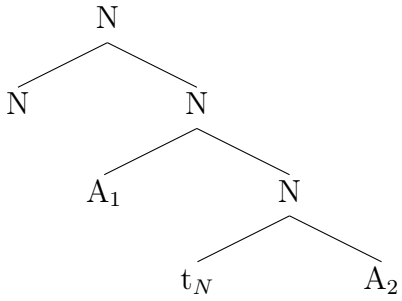


b. *



We therefore predict that in the post-nominal domain the order in (83)/(84) is the only one that permits left-to-right scope between the adjectives. We also predict that omission of the PP will result in the unavailability of left-to-right scope, as it would lead to a violation of the condition in (78):[17]

(86)



Both predictions are correct, as the data in (87) show. These examples are grammatical, but only on the reading in which the painting is a faultless fake. They cannot be used to refer to a fake faultless painting.

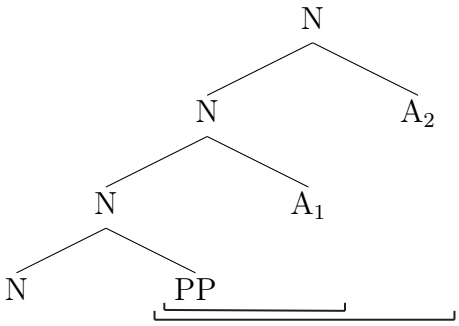
(87) a. *un cuadro falso impecable del siglo XV Spanish
a painting fake faultless of-the century 15
'a fake faultless painting from the fifteenth century' (fake > faultless)

b. *un cuadro falso impecable
a painting fake faultless
'a fake faultless painting' (fake > faultless)

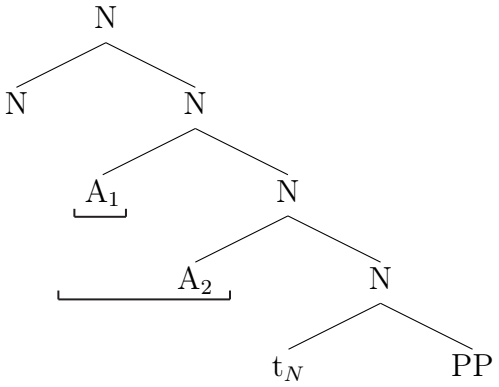
[17] The structure in (86) would presumably also violate economy (see Janke and Neeleman 2012).

We finally consider the case in which the PP merges before the two APs. In this case, it is not possible to generate a simple ascending structure, as both APs would violate the Concord-First Constraint (see (88a)). It is also not possible to generate an NP-shell structure. The two APs in (88b) form an uninterrupted adjectival sequence in which AP_1 c-commands AP_2, contra the condition in (78).

(88) a. *



b. *



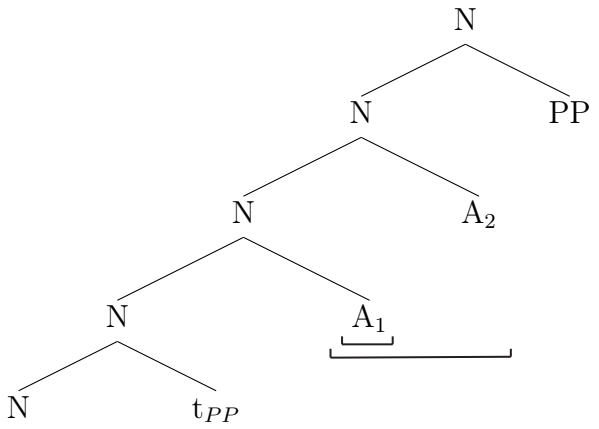
We can demonstrate that both structures are indeed ungrammatical if we consider the Spanish equivalent of *a beautiful fake painting from the fifteenth century* (where the painting pretends to be from the fifteenth century). The DPs below are not possible translations. (89a) is ungrammatical and (89b) has the wrong scope (fake > beautiful).

(89) a. *un cuadro del siglo XV falso precioso Spanish
a painting of-the century 15 fake beautiful (beautiful > fake > from the 15th C.)

b. *un cuadro precioso falso del siglo XV
a painting beautiful fake of-the century 15 (beautiful > fake > from the 15th C.)

The only noun-initial structure that gives rise to the intended interpretation and satisfies both the Concord-First Constraint and the condition in (78) is one in which the PP undergoes extraposition. In (90), the two APs satisfy the Concord-First Constraint (on the assumption that traces do not count), and in the adjectival sequence AP_2 c-commands AP_1 (as required by (78)). The target interpretation is recovered following reconstruction of the PP.

(90)



It is indeed the case that (91) is a possible translation of *a beautiful fake painting from the fifteenth century*.[18]

(91) un cuadro falso precioso del siglo XV Spanish
a painting fake beautiful of-the century 15 (beautiful > fake > from the 15th C.)

As pointed out at the outset of this section, this is important, as it shows that for structures in danger of violating the Concord-First Constraint there are two repair strategies: NP-shell formation in the first instance and extraposition as a secondary option. The resulting structures are syntactically different, both from each other and from the ascending structure in (81). The only thing they have in common is their linear order. But this confirms that AP-adjacency is a phenomenon better explained by a linear than a structural constraint.

One may expect to find extraposition as a secondary repair strategy in the verbal extended projection as well, in case VP-shell formation is not available and the structure threatens to violate the Case-First Constraint. However, as we are not aware of a verbal counterpart to the condition in (78), we have not been able to build a convincing case and will have to leave this issue for future research.

8. Conclusion

There can be no doubt that syntax is to a large extent structure dependent. For example, all syntactic dependencies (movement, predication, binding, etc.) seem to be conditioned by c-command and certain other properties that Koster (1987) unites under the notion of the 'configurational matrix'. This paper contains two addenda to this widely accepted conclusion.

The first is that certain apparently syntactic phenomena are captured more successfully by linear constraints than by structural requirements. The cases we looked at are AP-adjacency in the extended nominal projection and case adjacency within VP. The data under consideration yield to generalizations in terms of linear order (the Concord-First and Case-

[18] There is an alternative noun-medial structure that is predicted to be grammatical:

(i) un [precioso [cuadro [falso [t_N del siglo XV]]]]
a *beautiful picture fake of-the century 15*
'a beautiful fake picture from the fifteenth century'

First Constraints), but fail to be captured by structural accounts. This is partly because such accounts unavoidably face counterexamples (for example in head-final languages), and partly because the set of relevant grammatical constructions is structurally heterogeneous.

The second addendum concerns the parallelism of the extended nominal and verbal projections. Since Chomsky 1970, NP/VP parallelism has been an important theme in generative research. Usually, this parallelism is implemented in terms of corresponding layers in the extended projections of nouns and verbs. The research reported here suggests a different kind of bond. Although there are more differences than similarities between nominal objects of verbs and adjectival modifiers of nouns, they are subject to a very similar constraint. This similarity is not likely to be a matter of structural layering, but of the linearization of elements that host certain features vis-à-vis the head that licenses those features.

Our two addenda underline the need for research into linear syntactic constraints, not instead of, but in addition to research into the structural constraints more familiar from the literature.

We conclude with a speculation. It has been assumed for a long time that the case-licensing properties of nouns are different from those of verbs. In Government and Binding Theory, this was expressed by saying that verbs (but not nouns) assign structural case. Thus, verbs (but not nouns) are able to select ECM-complements (now analysed in terms of raising to object) and complements of nouns in languages without morphological case must be accompanied by an adposition. The proposal outlined in previous sections might provide a handle on this contrast. Structural case is subject to the Case-First Constraint. Suppose that within an extended projection only one linearization condition of the type explored here can be operative. Then, it follows from the fact that the Concord-First Constraint exists that nouns cannot assign structural case. Whether this suggestion can be made to work is unclear at present, but it is an advantage of our proposal that it suggests this line of research to begin with.

27 August 2013

Acknowledgements

This paper has benefitted much from discussion with Klaus Abels, Jane Grimshaw and Jim McCloskey. Some of the questions raised here were explored during an MA course at UCL (Interfaces; 2012-2013); Natalia Cichosz provided invaluable help with keeping students' research projects on track. We are grateful to the MA students and to several native speakers and linguists for their help in sorting out various data issues. We would like to mention Hend Osman and Saleh Shaalan (Arabic); Shi Zeng and Zhe Zhou (Chinese); Dara Jokilehto (Finnish); András Bárány, Lilla Pintér and Kriszta Szendrői (Hungarian); Junko Shimoyama and Misako Tanaka (Japanese); Jung-Yoon Jang and Ji-Hye Kwon (Korean); Nadja Rajgelj (Slovenian); Javier Fernandez Sanchez and Nerea Madariaga Pisano (Spanish); Johannes Eriksson (Swedish); Tamer Akan and Balkız Öztürk (Turkish); Elen Robert and David Willis (Welsh).

References

Abels, Klaus, and Ad Neeleman. "Universal 20 without the LCA." University of Tromsø and University College London, 2006.

———. "Universal 20 without the LCA." In Merging Features: Computation, Interpretation, and Acquisition, edited by José M. Brucart, Anna Gavarro and Jaume Sola. 60–79. Oxford: Oxford University Press, 2009.

———. "Linear Asymmetries and the LCA." Syntax 15, no. 3 (2012): 25–74.

Ackema, Peter, and Ad Neeleman. "Effects of Short Term Storage in Processing Rightward Movement." In Storage and Computation in the Language Faculty, edited by Sieb Nooteboom, Fred Weerman and Frank Wijnen. 1–51. Dordrecht: Kluwer, 2002.

Adger, David. "VSO Order and Weak Pronouns in Goidelic Celtic." Canadian Journal of Linguistics. La revue canadienne de linguistique. 42, no. 1-2 (1997): 9.

———. A Syntax of Substance. Cambridge, MA: The MIT Press, 2013.

Bach, Emmon. "Questions." Linguistic Inquiry 2, no. 2 (1971): 153–66.

Benmamoun, Elabbas. "Agreement Asymmetries in the PF Interface." SOAS Working Papers in Linguistics 6 (1996): 106–28.

Borsley, Robert D., Maggie Tallerman, and David Willis. The Syntax of Welsh. Cambridge: Cambridge University Press, 2007.

Brody, Michael. "Perfect Chains." In Elements of Grammar, edited by Liliane M. V. Haegeman. 139–67. Amsterdam: Kluwer, 1997.

Chametzky, Robert. Phrase Structure: From GB to Minimalism. Malden, MA: Blackwell, 2000.

Chomsky, Noam. Syntactic Structures. 's-Gravenhage: Mouton, 1957.

———. Aspects of the Theory of Syntax. Cambridge: M.I.T. Press, 1965.

———. "Remarks on Nominalization." In English Transformational Grammar, edited by Jacobs and Rosenbaum. 184–221, 1970.

———. Barriers. Cambridge, MA: MIT Press, 1986.

Chomsky, Noam, and Howard Lasnik. "Filters and Control." Linguistic Inquiry 8 (1977): 425–504.

Cinque, Guglielmo. "Deriving Greenberg's Universal 20 and Its Exceptions." Linguistic Inquiry 36, no. 3 (2005): 315–32.

———. The Syntax of Adjectives: A Comparative Study. Cambridge, MA: MIT Press, 2010.

Corver, Norbert, and Henk van Riemsdijk. "The Position of the Head and the Domain of Scrambling." In Proceedings of Linguistics and Phonetics 1996, edited by Bohumil Palek, 57–90: Charles University Press, 1997.

Emonds, Joseph. "The Verbal Complex V'-V in French." Linguistic Inquiry (1978): 151-75.

Engdahl, Elisabet. "Parasitic Gaps." Linguistics and Philosophy 6, no. 1 (1983): 5–34.

Greenberg, Joseph H. "Some Universals of Grammar with Particular Reference to the Order of Meaningful Elements." In Universals of Human Language, edited by Joseph H. Greenberg. 73–113. Cambridge, MA: MIT Press, 1963.

Guilfoyle, Eithne. "Parameters and Functional Projection." Proceedings of NELS 19 (1988): 142–60.

Guimaraes, Maximiliano. "A Note on the Strong Generative Capacity of Standard Antisymmetry Theory." Snippets 18 (2008): 5–7.

Janke, Victoria, and Ad Neeleman. "Ascending and Descending VPs in English." Linguistic Inquiry 43, no. 2 (2012): 151–90.

Kayne, Richard S. The Antisymmetry of Syntax. Cambridge, MA: MIT Press, 1994.

Koster, Jan. Domains and Dynasties. Dordrecht: Foris, 1987.

Larson, Richard K. "On the Double Object Construction." Linguistic Inquiry 19, no. 3 (1988): 335-91.

———. "Light Predicate Raising." In Lexicon Project Working Papers 27, edited by Carol Tenny. Cambridge, MA: MIT, 1989.

Neeleman, Ad. "Complex Predicates." PhD diss., Utrecht University, 1994.

Neeleman, Ad, and Hans van de Koot. "Dutch Scrambling and the Nature of Discourse Templates." The Journal of Comparative Germanic Linguistics 11, no. 2 (2008): 137–89.

Nissenbaum, John. "Investigations of Covert Phrasal Movement." PhD diss., MIT, 2000.

Partee, Barbara, Alice G. B. ter Meulen, and Robert Eugene Wall. Mathematical Methods in Linguistics. Dordrecht; Boston: Kluwer Academic, 1990.

Perlmutter, David (editor). Studies in Relational Grammar. Vol. 1, Chicago: University of Chicago Press, 1983.

Philip, Joy. "(Dis)Harmony, the Head-Proximate Filter, and Linkers." Journal of Linguistics 49, no. 1 (2013): 165-213.

Phillips, Colin. "Linear Order and Constituency." Linguistic Inquiry 34 (2003): 37–90.

Pollard, Carl, and Ivan Sag. Head-Driven Phrase Structure Grammar. Chicago: University of Chicago Press, 1994.

Pollock, Jean-Yves. "Verb Movement, UG and the Structure of IP." Linguistic Inquiry 20 (1989): 365–424.

———. "Notes on Clause Structure." In Elements of Grammar, edited by Liliane M. V. Haegeman. 237-79. Dordrecht: Springer, 1997.

Postal, Paul. "Parasitic Gaps and the Across-the-Board Phenomenon." Linguistic Inquiry 24 (1993): 735–54.

———. "Parasitic and Pseudo-Parasitic Gaps." Linguistic Inquiry 25 (1994): 63–117.

Prince, Alan , and Paul Smolensky. Optimality Theory: Constraint Interaction in Generative Grammar. Malden, MA: Blackwell Publishers, 2004.

Rochemont, Michael, and Peter Culicover. English Focus Constructions and the Theory of Grammar. Cambridge: Cambridge University Press, 1990.

Ross, J.R. "Constraints on Variables in Syntax." PhD diss., MIT, 1967.

Rouveret, Alain. Le Syntaxe Du Gallois. Paris: Editions CNRS, 1994.

Sproat, Richard. "Welsh Syntax and VSO Structure." Natural Language & Linguistic Theory 3, no. 2 (1985): 173-216.

Sproat, Richard, and Chilin Shih. "The Cross-Linguistic Distribution of Adjective Ordering Restrictions." In Interdisciplinary Approaches to Language: Essays in Honor of S.-Y. Kuroda, edited by Carol Georgopoulos and Roberta Ishihara. 565–93. Dordrecht: Kluwer, 1991.

Staub, Adrian, Charles Clifton, and Lyn Frazier. "Heavy NP Shift is the Parser's Last Resort: Evidence from Eye Movements." Journal of Memory and Language 54 (2006): 389–406.

Sternefeld, Wolfgang. "Subjects, Adjuncts, and SOV-Order in Antisymmetric Syntax." Groninger Arbeiten zur Germanistischen Linguistik 37 (1994): 227–46.

Stowell, Tim. "Origins of Phrase Structure." PhD diss., MIT, 1981.

Vanden Wyngaerd, Guido. "Object Shift as an A-Movement Rule." MIT Working Papers in Linguistics 11 (1989): 256–71.

Vikner, Sten. "Scandinavian Object Shift and West Germanic Scrambling." In Studies on Scrambling: Movement and Non-Movement Approaches to Free Word-Order Phenomena, edited by Norbert Corver and Henk van Riemsdijk. 487–517. Berlin: Mouton de Gruyter, 1994.

Wasow, Thomas. "Remarks on Grammatical Weight." Language Variation and Change 9, no. 1 (1997): 81-105.

———. "End-Weight from the Speaker's Perspective." Journal of Psycholinguistic Research. 26, no. 3 (1997): 347.

Williams, Edwin. "Predication." Linguistic Inquiry 11, no. 1 (1980): 203–38.

Willis, David. "Against N-Raising and NP-Raising Analyses of Welsh Noun Phrases." Lingua 116 (2006): 1807–39.

Zwart, C. Jan-Wouter. "Dutch Syntax: A Minimalist Approach." PhD diss., University of Groningen, 1993.