AP-Adjacency as a Precedence Constraint

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We explore whether the observation that AP-modifiers precede PPs in noun-initial DPs (Giurgea 2009, Adger 2013) requires a structural analysis. We suggest that a linear account is better suited to deal with data from head-final and head-medial languages, and in fact from noun-initial languages as well. Our analysis is based on a parallel with the syntax of objects, namely the fact that while SOV languages systematically allow scrambling, SVO languages tend to be subject to case adjacency. *Keywords*: AP-adjacency, PP-peripherality, concord, Case Adjacency

1. Precedence in grammar

Reference to dominance, precedence and labelling is necessary to describe constituent structures (see Partee et al. 1990). One would therefore expect that syntactic rules, which are defined over constituent structures, will be able to refer to all three basic notions. This was certainly a common assumption in early generative grammar, where even passive had a linear description:

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

It is not evident that a programme of research that rejects all reference to precedence can be successful, given a number of left-right asymmetries that have been observed. For example,

leftward movement is known to be less restricted in various ways than rightward movement (early references are Ross 1967, Bach 1971 and Perlmutter 1983). 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 syntactic rules 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 clear that Kayne's Antisymmetry programme faces a number of serious problems. 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. This is not a problem in itself, but as it turns out the structure that must 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 for (see Abels and Neeleman 2012 for discussion).

In our view, the hypothesis that syntactic rules refer exclusively to relations of dominance and labelling has reached its limits. It is undisputable 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 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 is that in languages where the noun precedes an adjectival modifier and some other

category, the adjective systematically comes first. We will refer to this phenomenon as AP-adjacency.

Giurgea (2009), who is primarily interested in the distribution of complements of nouns vis-à-vis AP-modifiers, states the generalization as follows (formulation slightly adjusted):

(2) In languages with postnominal adjectives, APs, with the exception of heavy APs, precede complements. Heavy APs may either precede or follow, depending on their weight and on the language. (Giurgea 2009:276)

Adger (2013), who is primarily interested in the syntax and semantics of PPs, refers to the same phenomenon as 'PP-peripherality'. His claim is that when an AP and a PP-complement appear in the same noun phrase, the PP must be peripheral. This of course implies that in noun-initial structures, AP must precede PP.[1]

(3) When (intersective) AP modifiers and PP 'complements' both occur on one side of N inside a noun phrase, the PP is separated from the N by the AP. (Adger 2013:93)

Both Adger's and Giurgea's formulations of the generalization contain a restriction to complements. However, AP-adjacency can also be observed in structures containing two modifiers, one of which is adjectival and the other is not. Below we illustrate this using Spanish, Arabic and Welsh examples of nouns modified by both an AP and a PP:[2]

(4) el cuadro <falso> del siglo XV <??falso> Spanish
the picture fake of-the century XV fake
'the fake picture from the fifteenth century'

(5) as-suura <l-muqallada> min al-qarn al-xamis-ʕashar <*al-muqallada> Arabic
the-picture the-fake from the-century the-fifteenth the-fake

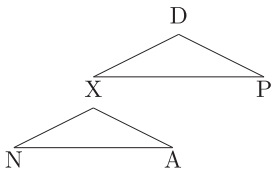
(6) y llun <ffug> o'r 15fed ganrif <*ffug> Welsh
the picture fake from-the 15th century fake

[1] The category that must be adjacent to the noun is always an AP, but the category that must be peripheral is not necessarily a PP. We therefore use the term 'AP-adjacency', rather than 'PP-peripherality'.
[2] Spanish allows APs following a PP in specific circumstances discussed in sections 2.3 and 6.

In this paper we will focus on the ordering of adjectival and non-adjectival modifiers, but most of our data can be replicated with non-adjectival complements (compare Van Riemsdijk 1992).

One way of accounting for AP-adjacency is by designating for the adjective a structural position in the noun phrase closer to the head than the position(s) open to other categories. This is the line that Adger takes. He assumes that the noun forms a constituent (X in (7)) with adjectival modifiers to the exclusion of PP-complements and modifiers:

(7)



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

The alternative is to adopt a linear condition that has the consequence that APs must precede PPs (at least in head-initial languages). This is what Giurgea proposes, and what will argue for below.[3] Although an analysis along these lines may seem unappealing if one is inclined to consider linear constraints with suspicion, we will demonstrate that it captures a number of observations that are problematic for a structural account along the lines of (7). These are partly related to a difference between Adger's and Giurgea's generalizations. Giurgea's, but not Adger's, is limited to structures in which the noun precedes both the AP and the non-adjectival category. This suggests that there may be no AP-adjacency in noun-final structures, which would be problematic for the structural account.

The paper is organised as follows. We first show – in section 2 – that a structural account of AP-adjacency is too rigid: it turns out that there are structures where an AP is structurally separated from the noun by other material. We then show – in section 3 – that there is a parallel pattern in the verbal domain, which can be understood in terms of a linear condition akin to the

[3] Giurgea's (2009) account is more radical than the one we will develop here, particularly because it allows for crossing tree branches. For example, a tree structure [[N PP] AP] can be linearized as N-AP-PP (as a consequence of the 'light modifier parameter'; p.296ff). By contrast, our analysis will not rely on (or permit) crossing branches. Divergence in this fundamental matter makes direct comparison of the two proposals a complicated affair, and something we cannot undertake here for reasons of space.

traditional notion of case adjacency (which has the effect that no constituent can intervene between a verb and a case-marked object that follows it). In section 4, we show that this analysis can be extended to the nominal domain, where it provides an account of AP-adjacency that avoids the problems faced by the structural account in (7). In sections 5 and 6 we discuss further parallels and differences between the nominal and verbal domain having to do with stacked adjectives. We conclude – in section 7 – with a brief 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 might 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. We argue in this section that these are 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. Languages that have head-final noun phrases often 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.[4]

We will illustrate this using five languages: Korean, Finnish, Japanese, 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

[4] Below, we return to the question of why AP-XP-N is a marked order in some languages, suggesting an analysis in terms of parsing.

consulted did not seem to have a very clear preference for one order over the other in examples like the following:

(8) <mutjin> migook-eseo-on <mutjin> sunsengneem Korean

*handsome America-from-*LNK *handsome teacher*

'(a/the) handsome teacher from America'

Note that Korean has a linker *-on* that must be used if a PP is to be merged within a nominal projection (this linker has several variants). The categorial status of *-on* phrases is not entirely clear, but one possibility, explored in Philip (2013), is that linkers do not have categorial features (see also the discussion of Hungarian below). Consequently, category is inherited from the node with which the linker combines.

The interpretation of examples like (8) suggests that the constituent further to the left c-commands the one further to the right. Thus, the PP-AP-N order would naturally be used when there are multiple handsome teachers, and we are trying to identify the one from America, while the AP-PP-N order could be used if there are multiple American teachers, and we are trying to identify the handsome one. As we will see, this is the pattern we find in all head-final noun phrases.

The word order alternation found in Korean is replicated in Finnish. Both orders in (9) are both fully grammatical. The only difference seems to be that in Finnish the constituent translated as *from the fifteenth 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*, which shows the same distribution, is an underived adjective and must therefore project an AP.)

(9) <väärennetty/feikki> 1400-luvu-n <väärennetty/feikki> kuva Finnish

forged/fake *1400-century-*GEN *forged/fake* *picture*

'a/the fake picture from the fifteenth century'

Interpretation again suggests that the constituent further to the left c-commands the constituent further to the right. Thus, the DP-AP-N order refers to a fake picture produced in the fifteenth century, while the AP-DP-N order refers to a fake purported to be a fifteenth century picture.[5]

In Japanese, the neutral word order appears to be PP-AP-N, but the order AP-PP-N is grammatical as well and, as noted by Whitman 1981 and Tsujioka 2013, is naturally used in contexts where the AP has an identifying function, much as in Korean. Thus, if there are several bunches of flowers from Hanako in the room, we could identify a specific one by using the AP-PP-N order, as expected if order of attachment corresponds with order of interpretation.

(10) <akai> Hanako-kara-no <akai> hanataba Japanese

red Hanako-from-LNK red bunch.of.flowers

'a/the red bunch of flowers from Hanako'

The word order variation found in (10) with so-called *-i* adjectives extends to *-na* adjectives, as (11) demonstrates.

(11) <kakkitekina> kono mondai-no <kakkitekina> kaiketsusaku Japanese

revolutionary this problem-LNK revolutionary solution

'a/the revolutionary solution for this problem'

So, although AP-PP-N may not be the neutral word order, it is clear that Japanese allows structures in which an AP is not adjacent to the noun.

Like Japanese and Korean, Mandarin requires that a linker accompany non-adjectival modifiers in the noun phrase. In addition, the language requires that AP-modifiers have a linker. The only exception is when APs are adjacent to N – omission of the linker is allowed in that case.[6] However that may be, there is no very clear preference for any particular word order in the

[5] These readings are easy to tell apart on the assumption that the picture is not painted by the person claimed to be its creator. The scopal relation *fake* >> *from the fifteenth century* allows the actual creator of the picture to be a nonfifteenth-century forger. The scopal relation *from the fifteenth century* >> *fake* implies that the object in question is really from the fifteenth century, which in turn implies that its creator must be a fifteenth-century forger.

[6] There are at least two accounts of the distribution of *-de*. One is that adjectives carrying *-de* are reduced relatives, while adjectives without this particle involve regular attribution (see Sproat and Shih 1988, 1991, among others). This analysis has been shown to be problematic by Paul (2005, 2010) (see also section 2.3 below). A well-known alternative is to treat structures without *-de* as A-N compounds or structures akin to such compounds. Again, Paul

presence of the linker. Both orders in (12) are fully acceptable. As expected, the VP-AP-N order corresponds to a fake picture produced in the fifteenth century and the AP-VP-N order refers to a fake picture purported to be from the fifteenth century.

(12) <jia de> lai zi 15 shi ji de <jia de> hua Mandarin

fake LNK come from 15 century LNK fake LNK painting

'a/the fake picture from the fifteenth century'

In (12), the non-adjectival category is presumably verbal, given that its head, *lai*, is a verb. However, the same variation in word order can be observed with PP-modifiers:

(13) <jiu de> zhuozi shang de <jiu de> shu Mandarin

old LNK desk on LNK old LNK book

'a/the old book on the desk'

The fifth language we consider is Hungarian. In Hungarian, APs can be freely separated from the noun by expressions corresponding to *from the fifteenth century*, as (14) illustrates. Interpretation varies with word order in the expected way.

(14) a <hamis> tizenötödik szazad-i <hamis> festmény Hungarian

the fake fifteenth century-LNK fake picture

'the fake picture from the fifteenth century'

Note that the non-adjectival modifier in (14) is a nominal phrase, but it can also be a PP, as the example below illustrates (but note that the status of Hungarian postpositions is a matter of debate; see Asbury 2008 for relevant discussion and references):

(15) a <vaskos> polc mögött-i <vaskos> könyv Hungarian

the thick shelf behind-LNK thick book

'the thick book behind the shelf'

There is a potential morphological complication in Hungarian. The *-i* ending present in (14) and

(2005) argues against this. In this case, the argumentation seems less convincing to us (see Yang 2005 for some relevant discussion). We would therefore be inclined to accept an account in terms of compounding for the time being. Another possibility would be to model the analysis of *-de* omission on the phenomenon of accusative case drop as found in Japanese and Korean – however, it would take us too far to explore this option here.

(15) is traditionally seen not as a linker, but as a morpheme that derives adjectives from other categories. If so, we are dealing with sequences of two adjectives in the examples above, which would undermine the relevance of the grammaticality of the AP-XP-N order. However, the evidence for this traditional view is weak. For example, unlike genuine adjectives, postpositional phrases that have undergone 'adjectivalization' (Szabolcsi 1994) cannot be used as predicates in copula constructions (see (16)). Similarly, they also do not permit suffixation with the Hungarian counterpart of *un-*, again in contrast to genuine adjectives (see (17)).

(16) a könyv a polc mögött(*-i) van. Hungarian

The book the shelf behind-LNK COP

(17) a. boldog-talan b. *a polc mögött-it-len Hungarian

happy-NEG *the shelf behind-LNK-NEG*

'unhappy' intended: 'not behind the shelf'

In sum, 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). Such a structural account leads to the expectation that the AP-XP-N orders are ungrammatical, while in fact they are either fully acceptable, or acceptable but somewhat marked. Thus, while AP-adjacency seems to be a feature of noun-initial languages, it does not carry over to noun-final languages.

One way to save the structural account of AP-adjacency is to make use of Cinque's (2010) proposal that some apparent adjectives are in reality reduced relatives. Given the prominence of this proposal in the literature, we will discuss it at some length in section 2.3 below.

Another option would be to argue that the template in (7) holds of the underlying structure, but not of the surface structure. This would imply that in AP-XP-N order 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-XP-AP order). In order to address this problem, one might rely on the general asymmetry between rightward and leftward movements. 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 – at least 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-XP under the same subtle information-structural requirements that permit the order AP-XP-N in head-final languages. However, such a movement process is simply not attested, as far as we can tell. Some head-initial languages do allow prenominal modifiers, 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 would be needed to generate the AP-XP-N orders found in head-final languages.[7]

We close this section with a brief discussion of an interesting independent factor that may affect word order in the DP: the parsing of adjectival modifiers. Consider the strings in (18a) and (18b), which are mirror images. Both are supposed to be the terminal yield of a noun phrase (headed by N_2) that contains an XP which in turn contains a second noun phrase (headed by N_1) When the parser encounters N_1 in (18a), there is an immediate and unique attachment site for AP, namely as a modifier of N_1. However, when the parser encounters AP in (18b), there are two potential attachment sites, namely as a modifier of N_1 or as a modifier of N_2.

(18) a. $AP\text{-}N_1\text{-}X\text{-}N_2$ b. $N_2\text{-}X\text{-}N_1\text{-}AP$

The implication is that there is strong pressure in head-final languages to attach AP to N_1, but only a weak pressure to do so in head-initial languages. Consequently, if the adjective is in fact a

[7] In French, for example, deviations from neutral adjective order used in the context of focus involve a reordering of 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.

modifier of N_2, this will cause a garden path effect in (18a), while the effect in (18b) should be much milder (if it is there at all).

Of course, this goes against the generalization we have proposed – that separation of AP and N is more common in head-final languages. Therefore, if that generalization is correct, it must have an explanation in grammar (rather than parsing), as we will indeed argue.

Nonetheless, the asymmetry in the parsing of (18a) and (18b) may affect word order. Suppose that a head-final language allows extraposition of XP. Then one might expect a contrast between a structure in which AP modifies N_2 (which would freely alternate between the extraposition and non-extraposition orders; see (19)), and a structure in which AP modifies N_1. In the latter, the extraposition order avoids the garden path effect that is present in the non-extraposition order (marked by '☠'), as shown in (20):[8]

(19) a. [[[AP N_1] X] N_2] b. [N_2 [[AP N_1] X]]

(20) a. ☠[AP [[N_1 X] N_2] b. [AP [N_2 [N_1 X]]]

This effect can be observed in Turkish, where it seems quite strong. When an adjective modifies N_2, extraposition is optional (this is not demonstrated here). When it modifies N_1 and scopes under XP (in the examples below an ablative phrase), again extraposition is optional.

(21) <onbeşinci yüzyil-dan> [sahte resim] <onbeşinci yüzyil-dan> Turkish

fifteenth century-ABL fake picture fifteenth century-ABL

'a fake picture from the fifteenth century' (from the fifteenth century > fake)

However, when the adjective modifies N_1 and scopes over XP, extraposition is near-obligatory:

(22) [sahte [<☠onbeşinci yüzyil-dan> resim <onbeşinci yüzyil-dan>] Turkish

fake fifteenth century-ABL picture fifteenth century-ABL

'a fake picture from the fifteenth century' (fake > from the fifteenth century)

[8] There is a precedent in the literature for the idea that extraposition can be obligatory where it avoids garden path effects. Grant (2013) argues convincingly that, while extraposition of *than*-clauses in comparatives is generally optional in English, it is forced in examples like (i), as (ia) gives rise to a strong garden path effect.

(i) a. ☠More women [than men ate cheese] ate meat.
b. More women ate meat [than men ate cheese].

Of course, this explanation presupposes that initial attachment of AP is not influenced by factors such a knowledge of the world. Otherwise, 'fake' in (22a) would never be considered to be a possible modifier of 'fifteenth century' in the first place. This, however, is not surprising on the traditional assumption that online semantic composition is dependent on surface syntax (see Chow and Phillips 2013 for recent discussion).

We are not sure how common the Turkish pattern is cross-linguistically. This is a matter that requires further research. However, should the data indeed yield to an analysis in terms of parsing, we may have an explanation for an observation alluded to several times above. Notice that the Turkish strategy of avoiding garden path effects is not available in strictly head-final languages like Korean and Japanese. In these languages, strings like (18a) cause garden path effects, too, but there is no straightforward alternative structure for the targeted semantics. We speculate that this garden path effect is the source of the sense in some speakers that the order in (18a) is marked, compared to N_1-X-AP-N_2.

2.2 Head-medial languages

The structural account of AP-adjacency in (7) makes a further prediction for head-medial languages like English. It predicts that a string like *the fake picture from the fifteenth 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 fifteenth century* has the two readings familiar from the previous section: either the picture is a fake produced in the fifteenth century, or the picture is purported to be from the fifteenth century, even though it has been produced more recently. As we have seen, this kind of scope alternation coincides with an alternation word order, and hence c-command relations, in head-final languages. The null hypothesis is that this link between structure and interpretation also exists in languages in which nouns surface between APs and PPs, such as English (and Turkish in extraposition structures):

(23) [the [<fake> [<fake> picture] from the fifteenth century]]]

(from the 15th century > fake; fake > from the 15th century)

One might hypothesize 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 ambiguity observed in (23) persists even if *fake* is preceded by a regular intersective adjective like *beautiful*:

(24) [the beautiful [<fake> [[<fake> picture] from the fifteenth century]]

(from the 15th century > fake; fake > from the 15th century)

The fact that the substring following *beautiful* allows the reading *from the fifteenth century* > *fake* suggests that the PP can c-command the AP; the availability of the inverse reading, *fake* > *from the fifteenth century*, suggests that AP can c-command the PP. 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 (23) 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 a structure in which the adjective forms a constituent with the noun (as in (23a)), while the grammaticality of the second example requires an alternative structure in which the noun merges with the PP first (as in (23b)).[9]

(25) a. The [fake picture]$_i$ from the fifteenth century and the one$_i$ from the eighteenth century.

b. The fake [picture from the fifteenth century]$_i$ and the real one$_i$.

[9] The example in (26a) might be a case of right-node raising (the same is true of (28a) and (30a). 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.

However that may be, the examples crucial to the argument are (26b), (28b) and (30b), as these show that APs can be structurally higher than PPs.

(26) a. The [[[fake picture] and [real triptych]] from the fifteenth century].

b. The [fake [[picture from the fifteenth century] and [triptych from the eighteenth century]]].

In these examples, scopal interpretation varies with structure. The temporal PP takes scope over *fake* in (25a) and (26a), while *fake* takes scope over the temporal PP in (25b) and (26b).

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):

(27) 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)

(28) a. den [[[falska bilden] och [äkta triptyken]] från 1700-talet] Swedish

the fake picture and real triptych from 1700-century

b. den [falska [[bilden från 1400-talet] och [triptyken från 1700-talet]]]

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

(29) 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)

(30) a. de [[[voormalige ambassadeur] en [huidige consul]] in Tokyo] Dutch

the former ambassador and current consul in Tokyo

b. de [voormalige [[ambassadeur in Tokyo] en [consul in Beijing]]]

the former ambassador in Tokyo and consul in Beijing

As before, a structural account of AP-adjacency could be reconciled with the data if we allow optional leftward movement of the adjective to a position c-commanding the PP. However, an

approach along these lines will not work for the coordination cases, at least not in languages with a sufficiently rich system of adjectival agreement. Where the adjective modifies a combination of two N-PP conjuncts, a base-generation analysis predicts concord with the coordination as a whole (possibly mediated by rules of resolution in case the conjuncts have conflicting features). This prediction is correct: in the Slovenian example in (31a) only the use of a dual form of the adjective guarantees that both the bull and the calf are brown. The movement account would have to rely on across-the-board movement of the adjective. The trouble with this is that a dual form of the adjective is not grammatical in either of the purported underlying positions (compare (31b)).

(31) a. [rjava [[bik iz Bitenj] in [tele iz Kranja]]] Slovenian

brown-DU.MSC bull.MSC from Bitnje and calf.NEUT from Kranj

'the brown bull from Bitnje and calf from Kranj'

b. [[[rjav bik] in [rjavo tele]] iz Bitenj]

brown.MSC bull.MSC and brown-NEUT calf.NEUT from Bitnje

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

2.3 Two sources of adjectives

The problems for a structural account of AP-adjacency identified in the previous two sections could be solved if we adopt Cinque's (2010) claim that apparently attributive APs can in fact be reduced relative clauses. Cinque makes this claim against the background of the hypothesis that attributive APs are part of a strict adjectival sequence. Certain classes of adjectives must c-command certain other classes of adjectives. There is, for example, a contrast between the two noun phrases in (32), captured by the assumption that *big* is higher on the adjectival hierarchy than *red*.

(32) a. The big_A red_A bus b. *The red_A big_A bus

However, in the right context, reordering is possible. Suppose we are talking about different big

buses. We may then identify a specific big bus by using the order (and focus) in (33). This should be impossible if *red* is an adjective and if adjectives come in a strict hierarchy. Cinque's solution to this puzzle is to say that *red* in (33) is a reduced relative clause, and that reduced relatives are not part of the adjectival functional sequence.[10]

(33) The RED_{RR} big_{A} bus

If this analysis is correct, one could try to apply it to AP-XP-N orders and to the problematic noun-medial structure [AP [N XP]]. Regular APs would have to be structurally closer to the noun than XPs, but reduced relatives could appear in a higher position:

(34) a. $[\text{AP}_{\text{RR}}$ [XP [AP N]]]

b. $[\text{AP}_{\text{RR}}$ [[AP N] XP]]

We will now discuss Cinque's proposal in the light of data from Dutch. Our conclusion (based on independently motivated criteria) will be that Dutch does not allow prenominal reduced relatives. Yet, it allows reordering of APs, and it allows prenominal APs to c-command postnominal PPs. This casts doubt on the validity of Cinque's proposal and on its effectiveness in explaining counterexamples to AP-adjacency.

In Dutch, there are various ways to tell attributive adjectives and reduced relatives apart. What the data suggest is that the former are prenominal and the latter postnominal.[11] First, APs can be head-final or head-initial when used in predication structures (see (35a)) or postnominally (see (35b)), but prenominal APs must meet the head-final filter (see (35c)).[12]

(35) a. Dit huis is [<voor gehandicapten> ongeschikt <voor gehandicapten>]. Dutch

this house is for handicapped.people unsuitable for handicapped.people

[10] In order to explain the marked status of *the red big bus*, one might be inclined to assume that there is a preference for direct modification over the use of reduced relatives. However, Williams (2013) shows that this is not altogether trivial. The example he uses to illustrate this is *the third ball as green as that one*. While *third* can be a direct modifier, *as green as that one* must be a reduced relative, given its postnominal position. This means that there should be a preference for *as green as that one* to scope over *third*. The reverse is true. This implies that, on Cinque's assumptions, here there is a preference to analyze *third* as a reduced relative.

[11] All postnominal adjectives are somewhat marked in Dutch. For reasons unclear to us, they need to meet some kind of heaviness requirement, which is why additional material is added to the examples below.

[12] Although we do not have the space to demonstrate this, quite a few of the contrasts discussed in this section could be explained if prenominal adjectives are APs, while predicates that form reduced relative clauses are contained in a larger constituent.

b. ʔelk huis [<voor gehandicapten> ongeschikt <voor gehandicapten>]

every house for handicapped.people unsuitable for handicapped.people

c. elk [<voor gehandicapten> ongeschikt <*voor gehandicapten>] huis

every for handicapped.people unsuitable for handicapped.people house

Secondly, adjectives remain uninflected in predication structures and when they are postnominal, but a declensional schwa is required prenominally (subject to a complicated set of rules; see Kester 1996):

(36) a. Deze villa is ongeschikt(*-e) voor gehandicapten. Dutch

this villa is unsuitable-DECL for handicapped.people

b. ʔelke villa [ongeschikt(*-e) voor gehandicapten]

every villa unsuitable-DECL for handicapped.people

c. elke [voor gehandicapten ongeschikt*(-e)] villa

every for handicapped people unsuitable-DECL villa

Thirdly, Dutch has two types of superlatives. One is introduced by the neuter determiner *het*, while the other lacks this element. *Het*-superlatives are not tolerated prenominally, but are required or preferred in predication structures and postnominally:

(37) a. Jan is [waarschijnlijk *(het) snelst op zo'n soort parcours] Dutch

John is probably DET fastest on such.a type course

b. ʔde marathonloper [waarschijnlijk *(het) snelst op zo'n soort parcours]

the marathon-runner probably DET fastest on such.a type course

c. de [op zo'n soort parcours waarschijnlijkst (*het) snelst-e] marathonloper

the on such.a type course probably DET fastest-DECL marathon-runner

Finally, non-predicative adjectives are allowed prenominally, but not tolerated postnominally or in predication structures.

(38) a. *Deze ambassadeur is [volgens Jan voormalig]. Dutch

this ambassador is according.to John former

b. *elke ambassadeur [volgens Jan voormalig]

every ambassador according.to John former

c. elke [volgens Jan voormalig-e] ambassadeur

*every according.to John former-*DECL *ambassador*

The adjective in (38) is non-intersective, but there are also intersective adjectives that cannot be used as predicates or postnominal modifiers; these typically refer to materials:

(39) a. Het huis is [voor het grootse deel van steen/*stenen]. Dutch

*the house is for the biggest part of stone/stone-*EN

b. ?elk huis [voor het grootste deel van steen/*stenen]

*every house for the biggest part of stone/stone-*EN

c. elke [voor het grootste deel stenen /*van steen] huis

*every for the biggest part stone-*EN*/of stone house*

We may conclude that Cinque (2010) is right in that there are two ways in which APs can modify nouns, by attribution and by predication in a reduced relative clause. However, the distribution of the reduced relatives seems to match that of regular relatives in Dutch: they must be postnominal. Prenominal adjectives appear to be systematically attributive by the criteria discussed above.[13]

[13] One might be inclined to discard the evidence presented here on the grounds that verbal modifiers in prenominal position behave like prenominal adjectives. In Dutch, for example, there are cases like *de te gane weg* 'the to go-DECL way' (the way that people must take) and *een graag geziene gast* 'an eagerly seen-DECL guest' (a guest that people like to see). As these examples show, prenominal verbal modifiers are marked with the declensional schwa also found with attributive adjectives (modulo some phonological restrictions). In addition, they behave like attributive adjectives in that they are subject to the head-final filter: *een door mij graag geziene gast* 'a by me eagerly seen-DECL guest' (a guest that I like to see); **een graag geziene door mij gast* 'an eagerly seen-DECL by me guest'. On the assumption that verbal modifiers must be reduced relative clauses, the relevant properties of prenominal adjectives can no longer reflect their status as attributive modifiers.

But this assumption, though common, is not necessarily true. First, rigid links between category (here: A versus V) and function (here: attribution vs predication) are rare and hard to explain. Second, if we assume that verbal constituents can be used attributively, the observed parallels are much easier to capture than if attributive APs directly modify NP, while verbal modifiers are structurally and semantically different.

In addition, verbal modifiers in prenominal position can be coordinated with non-predicative attributive APs:

(i) a. In de etalage stond een [[hardhouten] en
*In the window.display stood.*SG *a hardwood-*EN *and*
[door de vorige eigenaar goed onderhouden]] tafel.
by the previous owner well maintained table
'A hardwood table well maintained by the previous owner was displayed in the window.'

Crucially, this characteristic of prenominal adjectives obtains even in structures that violate Cinque's (2010) adjectival hierarchy, which means that an analysis of adjectival reordering based on an extended distribution of reduced relatives cannot work.[14]

First, head-finality in prenominal adjectives is still required under adjectival reordering:[15]

(40) a. de heel grote [op z'n kinderen jaloerse] man Dutch

a very big-DECL of his children jealous-DECL man

b. de [<op z'n kinderen> jaloerse <*op z'n kinderen>] heel grote man

a of his children jealous-DECL of his children very big-DECL man

Secondly, declension is still required:

(41) a. de grote geel*(-e) auto b. de geel*(-e) grote auto Dutch

the big-DECL yellow-DECL car the yellow-DECL big-DECL car

Thirdly, *het*-superlatives are still not tolerated. We demonstrate this using reordering of numerals and superlatives, on the assumption that the superlative semantics would by default be represented below the numeral:

(42) a. de drie op zo'n soort parcours snelst-e athleten Dutch

the three on such.a type course fastest-DECL athletes

b. de op zo'n soort parcours (*het) snelst-e drie athleten

the on such.a type course DET fastest-DECL three athletes

Finally, non-predicative adjectives are still tolerated under reordering:

---

b. Er bleek een [[voormalige] en [door mij al lang vergeten]] vriend op de stoep te staan.
there turned.out.SG a former and by me already long forgotten friend on the stoop to stand
'A former friend I had forgotten about a long time ago turned out to be standing in front of the door.'

If conjuncts must be alike in function, data of this kind demonstrate that verbal modifiers can be attributive. This conclusion could be circumvented if the examples in (i) involved coordination of NPs, with elision of the head of the first conjunct. But notice that the verbs in (i) show singular agreement. Uncontroversial examples of NP coordination trigger plural agreement, even if elision takes place:

(ii) Een [koffie *e*] en [thee kopje] stonden op tafel.
a coffee and tea cup-DIM stood on table
'a coffee and a tea cup were standing on the table'

[14] The details of the specific examples may be up for debate, as much depends on what is taken to be the neutral order. The crucial point, however, is that the characteristics we have associated with reduced relatives are *never* found with prenominal modifiers, no matter what word order alternations one considers.

[15] Panayidou (2014) shows that modifiers that are syntactically complex tend to be merged higher than syntactically simplex modifiers. For this reason, we use two complex modifiers in these examples.

(43) a. het grot-e stenen huis — Dutch
the big-DECL stone-EN house

b. het STENEN grot-e huis — Dutch
the stone-EN big-DECL house

In sum, there is no evidence that prenominal adjectival reordering has its source in APs that modify the noun through predication in a reduced relative clause (see also Williams 2013). This means that, at least in Dutch, there is no evidence for 'hidden' reduced relatives. There are reduced relatives, but, to repeat what we have said above, they have the same distribution as regular relatives: they must be postnominal.

We are now ready to return to the issue of AP-adjacency. The conclusion just reached implies that the problem for the structural account of AP-adjacency posed by noun-medial languages cannot be solved by appealing to prenominal reduced relatives. Consider the examples in (44), which illustrate the fact that AP-N-PP sequences have two structures in Dutch.

(44) a. de [[voormalig-e ambassadeur] in Londen] — Dutch
the former-DECL ambassado in London
'the former ambassador presently in London'

b. de [voormalig-e [ambassadeur in Londen]]
the former-DECL ambassador in London
'The former London ambassador'

(44b) refers to someone who used to be an ambassador in London, while (44a) refers to someone who used to be an ambassador and who is currently in London. If it were true that APs are strictly c-commanded by PPs, then the AP in (44b) must be a reduced relative clause. However, as we have just seen, reduced relatives in Dutch must follow the noun. If so, there is no escape from the conclusion that genuine APs can be generated in positions c-commanding PPs in noun-medial languages.

If we take as a working hypothesis that reduced relatives have the same distribution as regular relative clauses (see Williams 2013 for English), this argument carries over to English, Swedish and Slovenian. In all the examples below, the AP can take scope over the PP despite the

fact that it is not in a position where relative clauses are found.

(45) the [<alleged> [<alleged> spy] from America]

(46) den [<misstänkta> [<misstänkta> spion-en] från amerika] Swedish

the suspected suspected spy-DEF from America

(47) a. [[bivši veleposlanik (v Moski)] iz Londona] Slovenian

former ambassador in Moscow from London

b. [bivši [veleposlanik v Londonu]]

former ambassador in London

Note that the adjectives in (44)–(47) cannot be used as predicates. If one tries, the resulting sentence is either ungrammatical or the adjective does not retain the meaning it has when used attributively.[16] This is a widely accepted criterion to rule out an analysis of a given adjectival modifier as a reduced relative. (In order to appear in the predicate position in a reduced relative, an AP must obviously be a potential predicate.)

Our argumentation extends to those head-final languages that have postnominal relative clauses. Hungarian is a case in point. The alternation in (48) cannot be analyzed by saying that the adjective is a reduced relative when it precedes the PP, simply because Hungarian does not allow prenominal relatives.

(48) az <fő> emigráció mellett-i <fő> érv Hungarian

the main emigration next.to-LNK main argument

'the main argument for emigration'

Moreover, *fő* 'main' cannot be used as a predicate, which strengthens our conclusion that the AP-XP-N order exists independently of reduced relative clauses.

The same pattern is found in Finnish. In this language, relatives follow the noun, making it unlikely that the AP in (49) is a reduced relative when it precedes the participial modifier.

[16] *A suspected spy* need not refer to someone who is a spy, but *a spy that is suspected* does. We will treat *suspected* (or rather its correlate in Swedish and other languages) as an adjective on its non-intersective reading (following standard practice in the literature).

Moreover, *epäilty* 'suspected' is not intersective in (49), and in its non-intersective sense it cannot be used as a predicate.

(49) <epäilty> Yhdysvalloista tullut <epäilty> vakooja. Finnish

suspected USA-from come.PPT suspected spy

'a/the suspected spy from the USA'

Thus, in those languages where relative clauses do not appear on the same side of the noun as adjectival modifiers, it is unlikely that violations of AP-adjacency can be explained using an analysis that treats APs not adjacent to the noun as reduced relatives.

But that of course does not mean that in languages where adjectives and relative clauses appear on the same side of the noun, a Cinquean analysis to violations of AP-adjacency would be impossible. In fact, it seems a highly likely approach in certain cases. In Dutch, for example, PPs follow the noun, as do reduced relatives, and there is no fixed ordering between them:

(50) a. ʔelke vrouw [geschikt voor deze baan] [uit het Oosten van het land] Dutch

every woman suitable for this job from the east of the country

b. ʔelke vrouw [uit het Oosten van het land] [geschikt voor deze baan]

every woman from the east of the country suitable for this job

This observation extends to Spanish, which has both postnominal adjectives and postnominal relative clauses. In this language, N-XP-AP is allowed as a marked order. In structures of this type the AP behaves like a reduced relative, in that it must be focused and offset by a prosodic break (recall Giurgea's generalization in (2)):

(51) a. *un cuadro del siglo XV falso Spanish

a picture of-the century XV fake

b. un cuadro del siglo XV, FALSO

a picture of-the century XV, fake

Moreover, the AP must be predicative, again an indication that it is a potential reduced relative:

(52) a. un antiguo director de máster Spanish

a former director of master

'a former director of the Master's programme'

b. ?un director antiguo de máster

a director former of master

c. *un director de máster, ANTIGUO

a director of master, former (OK: antique/old-fashioned)

(53) a. un supuesto espía de Estados Unidos Spanish

a suspected spy of States United

'a suspected spy from the United States'

b. *?un espía supuesto de Estados Unidos

a spy suspected of States United

c. *un espía de Estados Unidos, SUPUESTO

a spy of States United, suspected

This suggests that examples like (51b) are not true counterexamples to AP-adjacency.

We finally consider whether an analysis in terms of reduced relatives could explain the acceptability of the AP-XP-N order in languages with prenominal relative clauses. Relevant languages are Korean, Japanese and Mandarin.

The situation regarding any prosodic breaks that offset the AP in the AP-XP-N order is somewhat complicated. As explained above, this order can give rise to garden path effects if the XP is a postpositional phrase. Therefore, native speakers very much prefer a pause following the AP. However, there does not seem to be a requirement for focus or heaviness on the AP. In addition, the AP in the crucial order can be non-predicative, indicating that it need not be a reduced relative clause. We give relevant examples below (none of the adjectives in (54)–(56) can

be used in predicative structures):[17]

(54) a. <chudeon> nongchon-eseo-uy <chudoen> mukgeori Korean

main rural.areas-in-LNK main food

'the main food in rural areas'

b. <tto-dareun> hakkyo-eseo-uy <tto-dareun> chueuk

another school-in-LNK another memory

'another memory of school'

(55) a. <?omana> John-no seikou-no <omona> riyuu Japanese

main John-*LNK success-LNK main reason*

'the main reason for John's success'

b. <hurui> John-no <hurui> tomodati

long-time John-*LNK long-time friend*

'An old friend of John's'

(56) a. <dangqian de> lai zi yulun de <dangqian de> yali Mandarin

current LNK come from media LNK current LNK pressure

'the current pressure from the media'

b. <dangqian de> nongcun li de <dangqian de> wenti

current LNK countryside in LNK current LNK problem

'the current problem in the countryside'

We conclude that Cinque's (2010) proposal that there are two sources for adjectives is not sufficient to explain all counterexamples to the structural account of AP-adjacency. It remains the case that, while head-initial languages behave as predicted by this account, head-medial and head-final languages do not.

[17] The Japanese example in (55b) is from Tsujioka 2013:127. Tsujioka makes the point that *hurui* 'long-time' is non-predicative and that the AP-DP-N order can therefore not be the result of a rule that allow fronting of predicates.

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.

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 typically such languages allow AP-PP-N as an alternative order. In some, this alternative order is experienced as marked.

ii. The PP-AP-N order is interpreted with the PP taking scope over 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 in these languages.

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:

(57) John read <*slowly> the letter <slowly>.

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 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):

(58) Jón hefur lesið <*rækilega> bækurnar <rækilega> Icelandic

John has read thoroughly the-books thoroughly

This pattern 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 generalization A', 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 immediate 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 (59) illustrates.

(59) 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 (60) are both grammatical. The extensive literature on scrambling has established that in the DP-AdvP-V order the object occupies an A-position (for discussion of the syntactic properties of Dutch scrambling, see Vanden Wyngaerd 1989, Zwart 1993 and Neeleman 1994).

(60) Jan heeft <langzaam> de brief <langzaam> gelezen. Dutch

John has slowly the letter slowly read.

'John has slowly read the letter.'

This is reminiscent of the first part Generalization C, with DP taken to correspond to 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 AdvP-DP-V order in (61) expresses that what was quick was John's reading of the three letters, while in the DP-AdvP-V order the reading of each individual letter was quick, although the reading of all three letters might have taken a long time.

(61) Jan heeft <snel> drie brieven <snel> gelezen. Dutch

John has *quickly three letters quickly read.*

'John has read three letters quickly.'

These kinds of effects seem to be present in all OV languages, suggesting a parallel to the second part of Generalization C.[18]

[18] 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.

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, as show by the ambiguity of the Dutch example in (62), 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 (62) extends to other 'verb-medial' structures, there is a reflex of Generalization B in the verbal domain after all.

(62) Jan heeft drie boeken gelezen in sneltreinvaart. Dutch

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 (57). 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.

Of course, English does have heavy-XP shift, but structures derived by this operation are different in their syntactic and interpretive properties from structures like (60b). 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).[19] Scrambled DPs, however, occupy an A-position (see Vanden Wyngaerd 1989 and much subsequent work). Moreover, scrambled DPs tend to be

[19] 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 (2000) shows that heavy-XP shift can license gaps even where right-node raising is not available.

given, while there is no reason to think that heavy-XP shift is a means of marking givenness (quite the opposite). Heavy NP shift is therefore an unlikely rightward counterpart of scrambling (the phenomenon illustrated in (60b)).[20]

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 (57) and (59) fall out neatly, but the Dutch example in (60b) would still need to be derived by a movement operation that for mysterious reasons has no counterpart in English.

However, this difficulty can be avoided 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).

(63) *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.[21]

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 (64) 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).[22]

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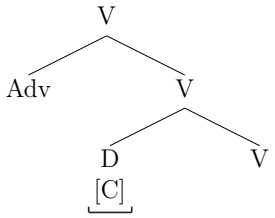
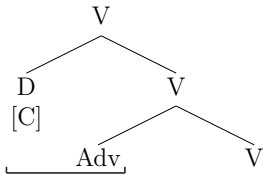
[20] Neeleman (1994) and Neeleman and Van de Koot (2008) make a distinction between 'neutral scrambling' or 'A-scrambling' and 'focus scrambling' or 'A'-scrambling'. The phenomenon illustrated in (60b) is A-scrambling; heavy-NP shift could be seen as a rightward counterpart of A'-scrambling.

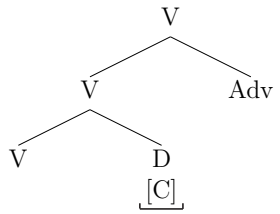
[21] The constraint is formulated in a way that restricts its application to case-marked objects. For a discussion of subjects, see section 6 below.

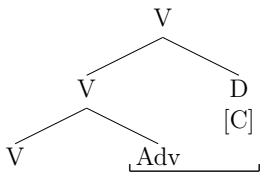
[22] We label trees here and below according to the conventions of bare phrase structure theory (see Chomsky 1995). In order to avoid confusion we will refer to maximal projections as XPs, rather than Xs in the text.

(64) a. 

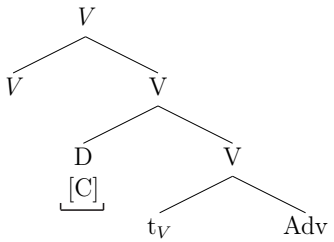
b. 

The situation is rather different in head-initial languages. The mirror image of (64a), which is given in (65a), is grammatical. However, the counterpart of (64b) 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 (63) requires, DP is not left-most in [C]'s assignment domain.

(65) a. 

b. * 

At first sight, this analysis seems to imply that whereas OV-languages allow two structures, namely (64a) and (64b), VO-languages allow only one, namely (65a). However, Janke and Neeleman (2012) argue that a process of VP-shell formation can rescue structures in danger of violating the Case-First Constraint. 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 (63):

(66) 

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:

(67) Jan heeft [<*prachtig> [gisteren [<prachtig> gezongen]]]. Dutch

John has *beautifully yesterday beautifully sung*

(68) John [[sang beautifully] 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 (66), rather than the ascending structure in (65b).

Object-oriented depictives can be used to illustrate 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 such depictives must follow the object:

(69) Jan heeft [<*rauw> [de vis [<rauw> gegeten]]. Dutch

John has *raw the fish raw eaten*

The English counterpart of (69a) cannot be (70a), because this representation violates the Case-First Constraint. VP-shell formation rescues the structure, but leads to a non-mirroring word order:

(70)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:[23]

(71) 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 (72a)). Second, object-oriented secondary

[23] 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.

predicates cannot be stranded by VP-fronting, but subject-oriented secondary predicates can be (see (72b)). This is because in (71), but not (70b), 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 (72c)).

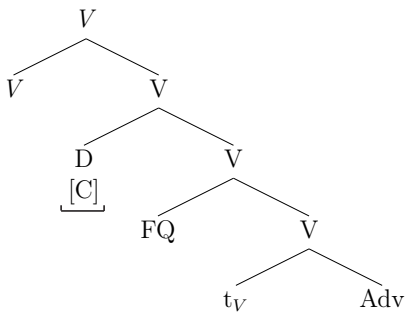
(72) a. ?John ate the fish <?raw> drunk <*raw>.

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

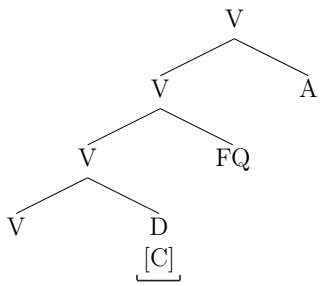
c. If John ate the fish at all, he ate the fish both raw/*drunk.

The explanation of the observation in (72c) is a little involved. Janke and 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 (73a) that can host object-oriented floating quantifiers, but this is not the case in an ascending structure like (73b). For details, we must refer the reader to the original paper.

(73) 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 (74a) 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 prediction, 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 (74b) to take scope over *three letters*.

(74) 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. However, the proposal sketched above differs from alternatives outlined in the literature in that it assumes that verb movement serves to create a representation in which a DP object is adjacent to the verb. This leads to the prediction that the verb cannot move across adverbials. Thus, examples like (75) are ruled out as a violation of the Case-First Constraint in (63).

(75) *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 (75).

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 elsewhere, evidence for structural ambiguity of the type found in English can be replicated in at least some other VO languages.

4. Extending the analysis to AP-adjacency

We believe that the Case-First Constraint as motivated above for the extended verbal projection has a parallel in the extended nominal projection (see Van Riemsdijk 1992 for related ideas). We will show that this parallel condition explains the data discussed in sections 1 and 2.

Recall that the order of adjectival and non-adjectival modifiers in head-final languages is much freer than in head-initial languages, where only one order is allowed (N-AP-XP). 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 adjectival and non-adjectival modifiers are merged with the noun is free in principle. However, the system is subject to the condition below:

(76) *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. It therefore relies on a notion of abstract concord, on a par with abstract case as employed in the verbal domain. The condition 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 AP must follow it immediately (we return to the structure of the N-AP-XP order below):

(77) a. N AP XP

b. *N XP AP

When the noun is final, however, there are two options. Either the noun and the AP are adjacent, or the AP 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:

(78) a. [XP [AP N]]

b. [AP [XP N]]

Thus, both head-final orders XP-AP-N and AP-XP-N are allowed by the Concord-First Constraint (Generalization C(i)), but the only noun-initial order allowed is N-AP-XP (Generalization A). 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 also explains the scope patterns observed above. In general, we expect scope to follow c-command relations. In noun-final languages, linear order reflects order of attachment: the first element combined with the noun will be adjacent to it, with subsequent additions further to the left. Thus, in the order XP-AP-N, the XP will c-command and therefore take scope over the AP, while in the AP-XP-N order, the AP will take scope over the XP (Generalization C(ii)).

In noun-medial languages like English, Swedish and Dutch, 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. In both structures, the AP is adjacent to the noun and therefore alone and thus left-most in its concord domain. Consequently, scope in noun-medial languages can vary without variation in word order (Generalization B):

(79) a. [[AP N] XP]

b. [AP [N XP]]

We now return to noun-initial languages. As we have seen, the Concord-First Constraint permits only one linear order, namely N-AP-XP. A naïve analysis would assume that the XP always c-commands the AP and must therefore systematically take scope over it. However, this is not what the data show. In Welsh, for example, the N-AP-PP order is scopally ambiguous. The phrase in (80) can refer both to a fake picture that was made in the fifteenth century and to a later forgery attempting to replicate an earlier work.

(80) 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:

(81) a. el cuadro falso del siglo XV Spanish

the picture fake of-the century XV

(from the 15th century > fake; fake > from the 15th century)

b. as-suura l-muqallada min al-qarn al-xamis-ʕashar Arabic

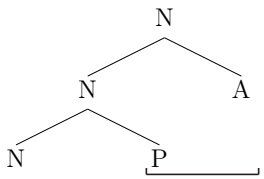
the-picture the-fake from the-century the-fifteenth

(from the 15th century > fake; fake > from the 15th century)

The first reading in (80), (81a) and (81b) is trivial. But how can we explain the second reading?

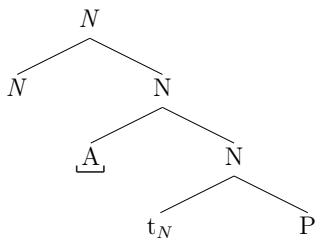
In fact, if we take the parallel with the extended verbal projection seriously, the explanation comes for free. Just like Case-First Constraint could trigger the formation of a VP-shell structure, the Concord-First Constraint can trigger the formation of an NP-shell structure. Consider a situation in which a noun in a head-initial language merges with a PP before it merges with an AP. The structure cannot surface as in (82), as that would violate the Concord-First Constraint.

(82) *



However, this order of merger can lead to a well-formed structure if the AP is left-attached and the noun undergoes head movement. In (83), the AP is the only element in its concord domain.

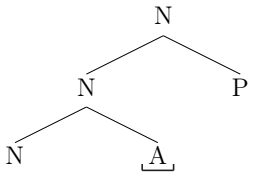
(83)



Notice that this representation has the same linear order as the ascending structure in (84) (which of course also satisfies the Concord-First Constraint). However, in (83) AP c-commands and therefore takes scope over PP, while in (84) PP c-commands and therefore takes scope over AP. In other words, the option of NP-shell formation explains the scopal ambiguity of the examples

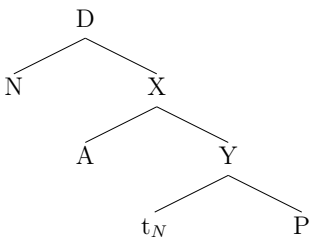
in (80), (81a) and (81b).

(84)

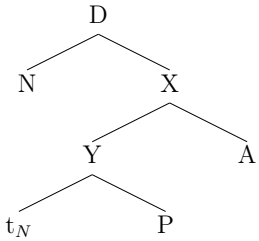


An analysis of the crucial data compatible with the structural account of AP-adjacency would be to allow scope-taking adjectives access to a position externally to the constituent containing the noun and any prepositional modifiers. Adger (2013) proposes an analysis of this type for adjectives like *other*. Extending this proposal to the counterparts of *fake* in Welsh, Spanish and Arabic is not a good idea, however. If the tree in (85a) is needed to account for the wide-scope reading of scope-taking adjectives, there is no longer a structural account that excludes the tree in (85b) (a different linearization of the same hierarchy).

(85) a.



b. *



The proposal that the N-AP-PP order is structurally ambiguous (allowing either (83) or (84)) makes a crucial prediction. The substring N-AP is a constituent in the structure in (84), but not in (83). 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 (86). If in (86a) 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 (86b) the PP applies to both nouns, it must be outside the scope of the AP in the right conjunct.

(86) a. el [cuadro falso]$_1$ del siglo XV y el e_1 del siglo XVIII Spanish

the picture fake of-the century XV and the (one) of-the century XVIII

'the fake picture from the fifteenth century and the ~~fake picture~~

from the eighteenth 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 XV

'the real picture from the fifteenth century and the fake picture

from the fifteenth 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 (83). This structure is permissible on our account, as the AP in (83) 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 (83).

The observations made for Spanish in (86a) carry over to Arabic and Welsh:

(87) 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 fifteenth century and the ~~fake picture~~ from the eighteenth 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. Stacking and its implications

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. We conclude by considering a further parallel between the nominal and verbal extended projections suggested by our findings.

5.1 Stacking of APs versus stacking of DPs

The first issue we need to consider 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, there seems to be an unexpected difference between DPs and APS. It seems that merging two DP-objects in a head-initial language systematically requires VP-shell formation, but merging two adjectives 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 and subsequent work). We mention two of these here: (i) the indirect object must take scope over the direct object (see (88a)), and (ii) the V-DP_{IO} substring fails constituency tests like movement and ellipsis (see (88b,c)).

(88) a. John gave a student every book.

a student > every book; *every book > a student

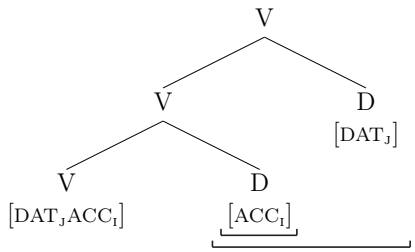
b. *John wanted to give Mary something prickly and give Mary he did a woollen scarf.

c. *If John gave Mary anything prickly, he did a woollen sweater.

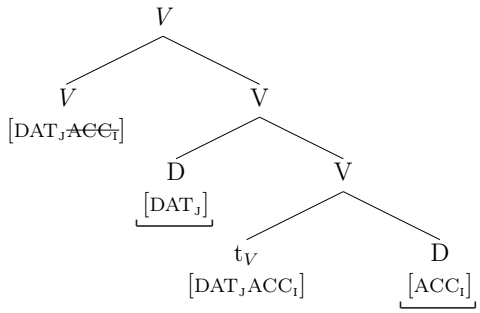
This is hardly surprising. On the assumption that both objects must satisfy the Case-First Constraint, an ascending VP-structure will be ruled out. This is because the dative DP in (89a) is preceded in its assignment domain by a category that carries a different set of case features.

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, and therefore satisfy the Case-First Constraint (see (89b)).

(89) a. *



b.



Stacking of adjectives does not necessarily lead to formation of an NP-shell. A comparison of word order in English and French, for example, suggests that in a string N-AP$_1$-AP$_2$ in French, AP$_2$ c-commands AP$_1$. 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:

(90) a. the [<old> [black [<?old> piano]]]

b. le [[piano <?antique>] noir] <antique> French

the piano old black old

(91) a. the [<average> [white [<?average> dog]]]

b. le [[[chien <?moyen>] blanc] <moyen>] French

the dog average white average

If the French examples indeed have an ascending structure, AP$_2$ in N-AP$_1$-AP$_2$ apparently does not violate the Concord-First Constraint, even though it is preceded by AP$_1$ in its concord domain. Why should this be? What distinguishes these examples from (89a)?

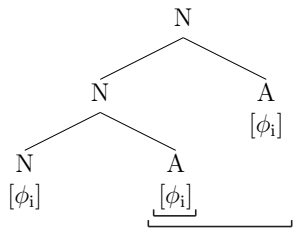
Our account is based on a key difference between case licensing and concord. Case licensing is a relationship in which there is a one-to-one correspondence between case features present in the verb and the arguments whose case is licensed. That is to say, if a verb licenses a particular case in a DP, 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.[24]

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 in 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 AP_1 are identical to the phi-features of N and the phi-features of AP_2 are identical to the phi-features of N, then by transitivity the phi-features of AP_1 are identical to the phi-features of AP_2.)

But this implies that the structure in (92), which we assumed for the French examples in (90b) and (91b), 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 identical, this does not result in a violation of the Concord-First Constraint: neither is preceded in its domain by a category lacking the relevant phi-feature set.

(92)



5.2 Ascending and descending post-nominal adjectives

Stacking of adjectives gives rise to a second issue, which involves a further 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. 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 AP_1-AP_2-AP_3-N. As it turns out, there is no known N-final language in which adjectives come in the

[24] The case features in (89) are accusative and dative. But even if they were both accusative, they would count as distinct, as a verb checking accusative twice must be endowed with two accusative features.

reverse order: the sequence *AP_3-AP_2-AP_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 by default.

Interestingly, when adjectives follow the noun, there is variation in the neutral order. One possibility is that the adjectives come in the mirror image of the order found in English (N-AP_3-AP_2-AP_1). Thus, the structure seems to ascend following the noun. The second possibility is that the order of adjectives is identical to that in English (N-AP_1-AP_2-AP_3). Thus, the structure seems to descend 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.

(93) a. a [<?yellow> [small [<yellow> ball]]]

b. liathróid <?bhuí> bheag <bhuí> Irish

ball yellow small yellow

(94)a. the [<?red> [round [<red> plate]]]

b. pláta <?dearg> cruinn <dearg> Irish

plate red round red

For now, we will simplify the typological picture considerably 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 briefly consider below.

As already discussed indetail by Cinque (2010), the observations above are reminiscent of a pattern described by Greenberg's Universal 20 (see Greenberg 1963:87 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 limit ourselves to purely head-initial and purely head-final languages, the following pattern emerges (see Cinque 2005 for a description of all 24 logically possible orders of

demonstrative, numeral, adjective and noun):

(95)

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

Ackema and Neeleman (2002) and Abels and 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 (95); Abels and Neeleman discuss the full set of data uncovered by Cinque (2005)):

(96) 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 the assumptions in (96), 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 (96a), would require rightward movement, contra (96b.i):

(97)

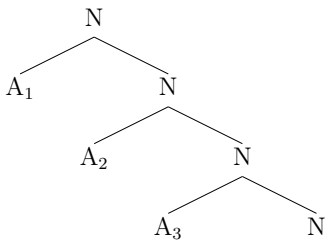
[Dem [Num [A N]]]	[[[N A] Num] Dem]
[N [Dem [Num [A t_N]]]]	*[[[[t_N A] Num] Dem] N]

This analysis of Universal 20 carries over to the ordering of stacked adjectives. We will sketch a proposal below, but must leave one matter for future research: languages that (typically under restricted circumstances) allow reordering of adjectives and nouns. Our proposal is that – abstracting away from these languages – 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 (96a)); the other determines whether the licensing of concord is to the left or to the right.

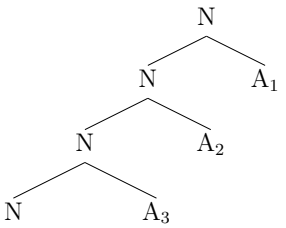
Given that each parameter has two settings, there are four cases to consider. If APs are attached to the left and licensing is leftward, the result will be a noun-final NP with descending APs, a state of affairs that characterizes all noun-final and noun-medial languages we have considered:

(98)



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):

(99)

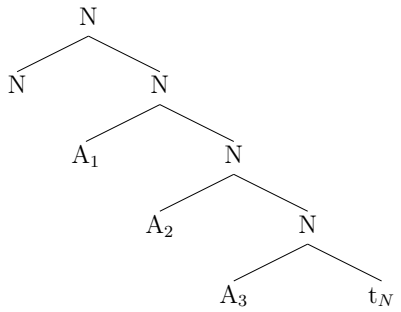


Note that in languages of this type merger of an XP prior to merger of an AP will trigger the formation of an NP-shell (see section 4). In NP-shell structures, the AP is attached on the 'wrong' side of the noun; that is, to the left rather than the right. This subsequently allows rightward licensing 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 universal:

(100) Licensing >> Attachment

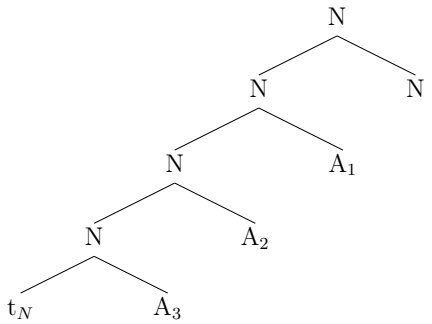
If APs are attached to the left and licensing is rightward, the noun will be required to move whenever it is modified by an AP – this is the only way to reconcile the requirements imposed by the attachment and licensing parameters. The consequence is automatic NP-shell formation, resulting in noun-initial NPs with descending adjectives (as found in Irish and Welsh with adjectives of size, colour and provenance):[25]

(101)



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 AP_3-AP_2-AP_1-N:

(102) *



However, as we have seen in our discussion of Universal 20, rightward noun movement is ruled out (compare (96b)). Structures of the type in (102) can therefore not exist.[26]

[25] 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 [AP t_N]]] (iii) [[[N [AP t_N]] PP]

(ii) [N [[AP t_N] PP]] (iv) [N [AP [t_N PP]]]

[26] 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 (100)). One could simply base-generate 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.

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:[27]

(103)

	Leftward attachment	Rightward attachment
Attachment direction = licensing direction	$AP_1\ AP_2\ AP_3\ N$ (e.g. English)	$N\ AP_3\ AP_2\ AP_1$ (e.g. Spanish)
Attachment direction ≠ licensing direction	$N\ AP_3\ AP_2\ AP_1$ (e.g. Irish)	$*AP_3\ AP_2\ AP_1\ N$ (not attested)

The analysis we have proposed for adjectival order in Romance versus Celtic is probably too simplistic. There is widespread 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 and 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 (104)). 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.

(104) [[[[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-

[27] The table is organized to mirror the one in (95). Note, however, that the concord parameter is not linked to the attachment parameter; it simply states that concord is leftward/rightward.

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.

5.3 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.

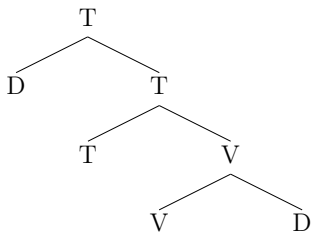
We have seen examples of two types of structures, namely one in which an argument must precede the verb and case is licensed leftward (the Dutch VP) and one in which arguments are merged to the right of the verb and case is licensed rightward (the English VP). In the latter case, the order imposed by 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 section (compare (100)). We do not expect to find structures in which case is licensed to the left while DPs are merged to the right (but see footnote 26). 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.[28] 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:

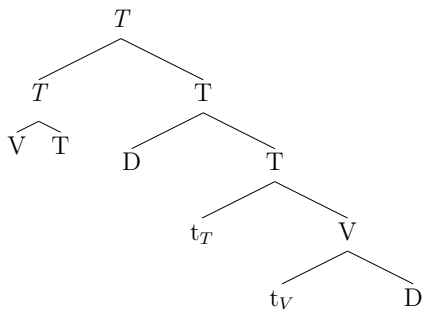
(105)

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

[28] This restriction must rule out non-string-vacuous rightward movement. String-vacuous rightward movement may still be permitted (see Van Riemsdijk 1998 and Ackema and Neeleman 2002). The same interpretation would presumably hold of the ban on rightward movement in the noun-phrase.

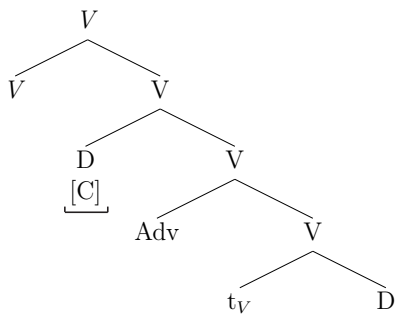
We believe that this gap is filled by at least some VSO languages. Suppose that the grammar of VSO languages is largely similar to the grammar of English except that the licensing of nominative case falls under the same system as the licensing of accusative case; that is, nominative is licensed by the verb (or possibly T) to its right. Therefore an underlying structure like (106a) 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 in VP-shell structures, as in (106b).

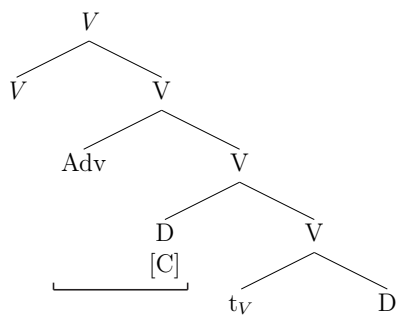
(106) a. 

b. 

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

An immediate advantage of this proposal 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 (63), much like objects in English. This means that the nominative argument has to be left-most in its assignment domain, as in (107a). The alternative structure in (107b) is ruled out because the assignment domain includes an adverbial that precedes the subject.

(107) a. 

b. * 

Indeed, intervention of adverbials is ruled out in Irish, Scottish Gaelic (Adger 1997), Arabic

(Benmamoun 1996) and Welsh (Borsley, Tallerman and Willis 2007).[29]

(108)a. Deireann *<i gcónai> siad <i gcónai> paidir trioh am luí Irish

say-HAB always they always prayer before the bedtime

'They always say prayer before bedtime.'

b. Dh'fhàg <*tha mi cinnteach> Dàihbhidh <tha mi cinnteach> an dè S. Gaelic

left-PAST be-PRES I sure, David be-PRES I sure yesterday

'David, I'm sure, has left.'

c. kataba <*haadaa s-sabaaħ-a> r-rajul-u <*haadaa s-sabaaħ-a> r-risaalat-a Arabic

wrote this the-morning-ACC the-man-NOM this the-morning-ACC the-letter-ACC

'The man wrote the letter this morning.'

d. Mae <*wastad> Dafydd <wastad> yn yfed coffi. Welsh

be-PRES.3SG always Dafydd always PROG *drink.INF coffee*

David always drinks coffee.'

A further prediction concerns situations in which nominative case can be licensed by a head other than V. Under these circumstances, verb movement will be blocked by economy considerations, which should lead to SVO word order. 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 remains in situ:

(109)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.'

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

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

(110)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 (109) and (110) 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 VSO languages indeed feature rightward licensing of nominative case by the verb, we can replace the question mark in (105) by 'Celtic and Arabic subjects'. On this analysis, there is a full parallel between possible nominal and verbal structures (in terms of the parameter space introduced in the previous section).

6. 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 already 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 precede 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 can 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 and 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 (96b)).

However, there are circumstances in Spanish in which NP-shell formation is not an option, and exactly under those circumstances extraposition can be used for repair. The crucial structure driving this process has to do with adjectival stacking. Consider (111).

(111)a. una [[película antigua] fantástica] Spanish

a film old fantastic

'a wonderful old movie' (fantastic > old)

b. una [[antigua película] fantástica]

a old film fantastic

c. una [fantástica [película antigua]]

a fantastic film old

d. *una [fantástica [antigua película]]

a fantastic old film

Spanish allows adjectives to either follow or precede the noun. As (111d) shows, however, stacking is not possible with adjectives that are left-attached. That is, both *antigua* 'old' and *fantástica* 'fantastic' may appear prenominally, but not simultaneously. We attribute the ungrammaticality of (111d) to what Chomsky and Lasnik (1977) would have called a surface filter. It is formulated below:

(112) 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 antigua* in (111d), with the consequence that *fantástica* may not c-command *antigua*. However, in the structure at hand it must, in violation of (112).

Note that if two APs are separated by overt lexical material, (112) allows left-to-right c-command. Thus, (111c) is grammatical on an interpretation in which *fantástica* takes scope over (and hence c-commands) *antigua*, while the string in (111b) permits a second structural parse in which *antigua* takes scope over *fantástica*:

(113) una [antigua [película fantástica]] Spanish

a old film fantastic

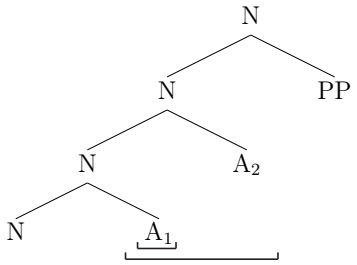
'an old fantasy movie' (old > fantastic)

In both structures the noun interrupts the adjectival sequence.

As it stands, the condition in (112) 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 (112) interacts in interesting ways with the Concord-First Constraint in structures that contain two APs and a PP.

One obvious structure that can accommodate two APs and a PP is a simple ascending one (see (114)). 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 (115).

(114)



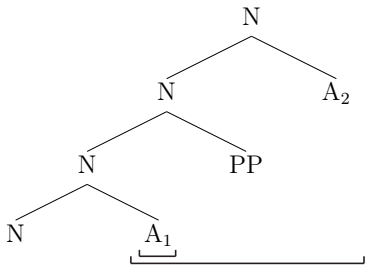
(115) una película antigua fantástica de Buñuel Spanish

a film old fantastic of Buñuel

'a wonderful old movie by Buñuel' (fantastic > old)

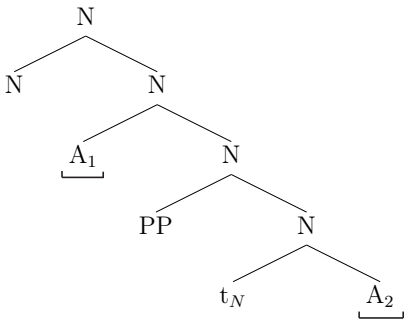
A more complex situation arises when the PP is merged following merger of one AP, but preceding merger of the other. In that case, an ascending structure cannot be built, as that would violate the Concord-First Constraint: in (116), the right-most AP is preceded in its concord domain by the PP.

(116) *



Hence, NP-shell formation is necessary. One relevant structure that satisfies the Concord-First Constraint and the condition in (112) is given in (117). 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:

(117)



In (117), AP_1 precedes and c-commands AP_2. This does not violate the condition in (112), 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. This is a fair description of the facts. The example (118) is grammatical

and it denotes a fake faultless painting, not a faultless fake.[30]

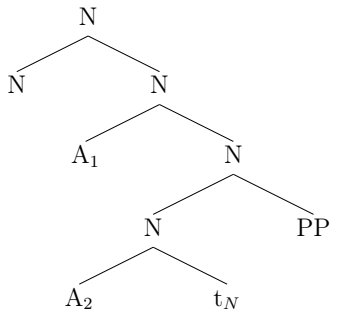
(118) un cuadro falso del siglo XV impecable Spanish

a painting fake of-the century XV faultless

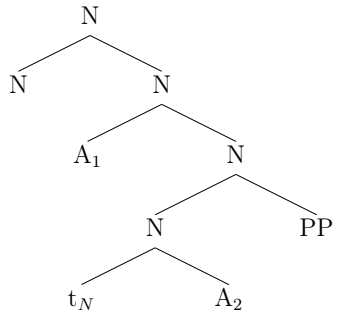
'a fake faultless painting from the fifteenth century' (fake > from 15th C. > faultless)

Two other candidate structures in which the PP is merged between the two APs violate (112).[31] In both (119a) and (119b), AP_1 c-commands AP_2 and AP_1 and AP_2 form an uninterrupted sequence.

(119) a. *

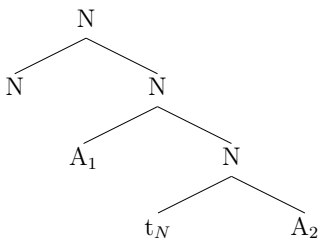


b. *



We therefore predict that in the post-nominal domain the order in (117)/(118) 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 (112) (the structure in (120) would presumably also violate economy; see Janke and Neeleman 2012):

(120)



Both predictions are correct, as the data in (121) show. These examples are grammatical, but

[30] Notice that the PP in (117) 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.

[31] 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 XV
'a fake faultless picture from the fifteenth century

only on the reading in which the painting is a faultless fake. They cannot be used to refer to a fake faultless painting.

(121)a. *un cuadro falso impecable del siglo XV Spanish

a painting fake faultless of-the century XV

'a fake faultless painting from the fifteenth century' (fake > faultless)

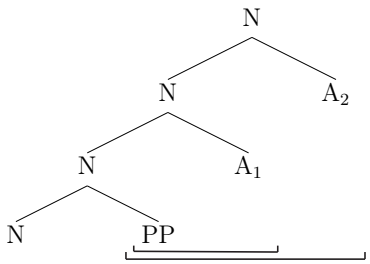
b. *un cuadro falso impecable

a painting fake faultless

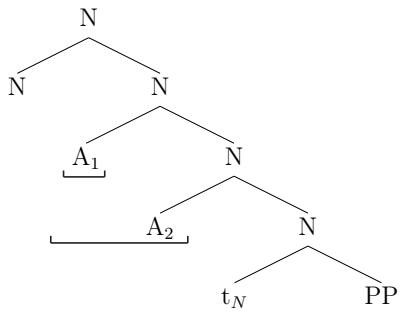
'a fake faultless painting' (fake > faultless)

We finally turn to the structure that provides an additional argument for the Concord-First Constraint. Here, the PP merges with the noun before the two APs. This order of merger does not permit a simple ascending structure, as both APs would violate the Concord-First Constraint (see (122a)). It is also not possible to generate an NP-shell structure. The two APs in (122b) form an uninterrupted adjectival sequence in which AP_1 c-commands AP_2, contra the condition in (112).

(122) 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 purports to be from the fifteenth century). The DPs below are not possible translations. (123a) is ungrammatical and (123b) has the wrong scope (namely: fake > beautiful).

(123)a. *un cuadro del siglo XV falso precioso Spanish

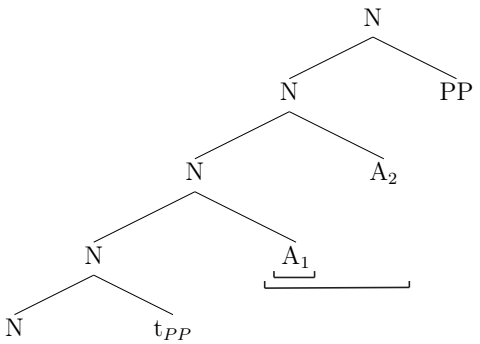
a painting of-the century XV fake beautiful (beautiful > fake > from the 15th c.)

b. *un cuadro precioso falso del siglo XV

a painting beautiful fake of-the century XV (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 (112) is one in which the PP undergoes extraposition. In (124), the two APs satisfy the Concord-First Constraint (on the assumption that traces do not count; compare Janke and Neeleman's (2012) discussion of 'collapsing shells'), and in the adjectival sequence AP_2 c-commands AP_1 (as required by (112)). The target interpretation can be recovered following reconstruction of the PP.

(124)



Indeed, (125) is a possible translation of *a beautiful fake painting from the fifteenth century.*[32]

(125) un cuadro falso precioso del siglo XV Spanish

a painting fake beautiful of-the century XV (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 (115). The only thing they have in common is their linear order. This of course 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

[32] 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 XV*
'a beautiful fake picture from the fifteenth century'

projection as well, in case VP-shell formation is not available. However, as we are not aware of a verbal counterpart to the condition in (112), we have not been able to build a convincing case and will have to leave this issue for future research.

7. 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-First Constraints), but do not easily yield to a structural account. 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 perhaps 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.

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