

AP Adjacency as a Precedence Constraint

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Attributive APs precede certain other categories (PPs, genitive DPs, and so on), when the noun precedes both (Giurgea 2009, Adger 2012). This observation may suggest an analysis in terms of X-bar-style ‘structural layering’. However, such an account faces several problems: (i) in languages with PP-AP-N order, scrambling of the AP is permitted, (ii) in languages with AP-N-PP order or PP-N-AP order, there is evidence that the AP can c-command the PP, as well as the other way around, and (iii) in languages with N-AP-PP order, the AP can take scope over the PP, as well as the other way around, arguably as a consequence of a structural ambiguity. We therefore develop an alternative analysis based on a striking parallel between the syntax of attributive APs and that of objects: while OV languages systematically allow adverbs to intervene between object and verb, VO languages tend to require verb-object-adverb order. This aspect of verbal syntax is familiar and can be captured in terms of a well-known linear constraint: Case Adjacency (Stowell 1981; Janke and Neeleman 2012). We propose that this constraint has a nominal counterpart that ensures N-AP adjacency in noun-initial structures. Thus, this instance of NP/VP parallelism has its source in parallel constraints, rather than parallel structural layers.

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1. Parallels between nominal and verbal structures

Similarities between nominal and verbal grammar have been a theme in generative research since at least Lees 1960. Lees observed that clauses like *the army destroyed the city* and nominalizations like *the army’s destruction of the city* display certain syntactic and semantic parallels. For example, the event denoting word is preceded in both structures by an agentive phrase and followed by a patient. Moreover, both structures seem to allow passivization (as in *the city was destroyed by the army* and *the city’s destruction by the army*).

Perhaps the most influential account of such parallels is given in Chomsky 1970. In this paper, Chomsky introduces X-bar theory, an abstract system of projection that applies to both

verbs and nouns. X-bar theory defines positions relative to the projecting head that are associated with specific grammatical functions. The syntactic and semantic parallels between nominal and verbal projections can then be captured if we assume (simplifying matters considerably) that agents are specifiers in the schema in (1a), while patients are complements (compare (1b,c)).

- (1) a. [_{XP} *Specifier* [_{X'} X *Complement*]]
 b. [_{VP} [the army]_{V'} destroyed_V [the city]]]
 c. [_{NP} [the army's]_{N'} destruction_N [of the city]]]

Although details have changed, the core idea behind Chomsky's proposal has endured. Many linguists would accept that parallels between the nominal and verbal extended projection originate in a shared abstract layering of structure, where specific layers are associated with specific grammatical functions. What has changed is the nature of the layers: functional projections have in many cases replaced X'-levels.

In this paper we will explore a potential parallel between nominal and verbal structures that does not easily lend itself to an account based on shared abstract layering. The parallel involves an asymmetry between head-initial and head-final structures. It is well known that within the clause OV languages consistently allow object and verb to be separated, while VO languages typically require verb and object to be adjacent:

(2)

	<i>Head-final</i>	<i>Head-initial</i>
<i>Straight order</i>	AdvP DP V	V DP AdvP
<i>Scrambled order</i>	DP AdvP V	*V AdvP DP

We believe that a similar pattern can be observed in the extended nominal projection. In head-final languages, adjectival modifiers may be separated from the noun by other material (such as PPs or genitive DPs), but in N-initial languages, adjectives must immediately follow the noun:

(3)

	<i>Head-final</i>	<i>Head-initial</i>
<i>Straight order</i>	XP AP N	N AP XP
<i>Scrambled order</i>	AP XP N	*N XP AP

There are two reasons why this parallel – if real – cannot be analyzed in terms of shared abstract layering. First, DP objects are very different animals from AP modifiers. However, the idea of shared abstract layering only makes sense if the elements hosted by a specific layer have similar grammatical functions.

Second, an account based on structural layers would not predict an asymmetry between pre- and post-head order. On the contrary, variation in order under a constant hierarchy leads to the expectation that admissible post-head orders will mirror admissible pre-head orders, as shown in (4) (where *b* is a head and *XP* and *YP* are constituents in its extended projection). Therefore, there is either one head-final order too many or one head-initial order too few in (2) and (3).

- (4) a. $[_{\text{Layer-2}} \text{XP} [_{\text{Layer-1}} \text{YP h}]$
 b. $[_{\text{Layer-2}} [_{\text{Layer-1}} \text{h YP}] \text{XP}]$

We will develop an alternative explanation of the pattern in (2) that crucially presupposes that grammatical constraints may mention linear order. In particular, we adopt a version of Case Adjacency (from Janke and Neeleman 2012) that is asymmetrical in that it allows adverbial intervention in head-final, but not head-initial languages. Once this is in place, we argue that a similar constraint forces AP adjacency in head-initial structures. The constraint in question does not mention case, but rather the functional head that makes it possible for an AP to be used as a modifier of a noun (JOIN; see Partee 1986 and Truswell 2004). So, in order to account for (2) and (3) we do make use of an abstract schema that applies to both nominal and verbal projection. However, the schema in question does not define structural layers, but rather provides a template for linear constraints that demand proximity of certain morphological elements to the lexical head.

The paper is organized as follows. In section 2 we establish the pattern in (3) and show that it cannot be captured using designated structural layers in which AP and XP are attached. In section 3 we outline in what ways the pattern in (3) resembles the better-known pattern of Case Adjacency and scrambling found in the verbal domain. In section 4 we introduce the new linear

constraint that regulates the distribution of AP modifiers within the noun phrase. We provide additional evidence for the linear nature of this new constraint in section 5 on the basis of some surprising Spanish data. Section 6 contains some concluding remarks on the status of linear constraints.

2. AP adjacency

2.1 Introduction

We use the term AP adjacency to refer to the generalization that in languages with noun-adjective order, adjectival modifiers precede certain other post-nominal categories. This is not our observation. Giurgea (2009), who explores the distribution of complements of nouns vis-à-vis AP modifiers, states it as in (5), basing himself on data from various Celtic, Romance and Semitic languages:

- (5) 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; formulation slightly adjusted)

Adger (2012), who explores the syntax and semantics of PP complements to nouns, refers to the same phenomenon as ‘PP peripherality’. His claim, based on data from Hawaiian as well as from the language families studied by Giurgea, 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

- (6) 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 2012:93)

Notice that while Giurgea’s generalization expresses an asymmetry between languages with NA and AN order, Adger’s generalization treats the two on a par.

Both Adger’s and Giurgea’s generalizations are restricted 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

- (7) el cuadro <falso> del siglo XV <??falso> Spanish
 the picture fake of-the century XV fake
 ‘the fake picture from the fifteenth century’
- (8) as-suura <l-muqallada> min al-qarn al-xamis-ʕashar <*al-muqallada> Arabic
 the-picture the-fake from the-century the-fifteenth the-fake
- (9) y llun <ffug> o’r 15fed ganrif <*ffug> Welsh
 the picture fake from-the 15th century fake

For now, we will treat AP adjacency as surface-true, although we will argue later on that there are specific circumstances in which it can be violated.

One way of accounting for AP adjacency is to make use of structural layers. In particular, one could argue that adjectives occupy designated positions structurally closer to the noun than the positions open to other categories, as in (10). (The nature of the layers in (10) need not concern us here, but see Adger 2012 for a specific proposal.)

- (10) a. [_{Layer-2} [_{Layer-1} N AP] XP]
 b. *[[N XP] AP]

On the assumption that linear order within each layer can vary across languages, two typological predictions are made. First, in noun-final languages, the only permitted linearization should be XP-AP-N (compare (11)). Second, the assumption that XP universally occupies a structurally higher position than AP implies that in noun-medial languages XP should take scope over AP and that AP and N should behave like a constituent. (compare (12) and (13)).

- (11) a. [_{Layer-2} XP [_{Layer-1} AP N]]
 b. *[AP [XP N]]

- (12) a. [_{Layer-2} [_{Layer-1} AP N] XP]
 b. *[AP [N XP]]

- (13) a. [_{Layer-2} XP [_{Layer-1} N AP]]
 b. *[[XP N] AP]

We will argue in this section that both predictions are incorrect (that is, the data are in line with Giurgea’s generalization, rather than Adger’s). Of course, this does not directly falsify the proposal in (10). However, there is a clear risk that the additional assumptions needed to generate [AP [XP N]], [AP [N XP]] and [[XP N] AP] will also permit the unattested N-XP-AP order. If so, the proposal in (10) will no longer account for the data that motivated it in the first place.

2.1 Head-final languages

Languages that have head-final noun phrases often show variation in the order of adjectival modifiers with respect to non-adjectival material. Speakers may feel that in the neutral word order the adjective is adjacent to the noun, but the alternative order, in which adjective and noun are separated, is grammatical as well.

We will illustrate this using five languages: Korean, Japanese, Mandarin Chinese, Finnish and Hungarian. Korean presents the simplest possible case. Two orders are allowed; the adjective is clearly recognizable as such, as is the postpositional phrase. Native speakers we have consulted did not seem to have a very clear preference for one order over the other in examples like the following:³

- (14) <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 still very much under discussion. We assume, following Philip (2013), that linkers are syntactically independent, semantically vacuous words that indicate a relationship between two items and that 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 (14) 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 same pattern is found in other languages with head-final noun phrases.

In Japanese, the neutral word order appears to be XP-AP-N, but the order AP-XP-N is grammatical as well. Whitman 1981 and Tsujioka 2013 note that it 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. This is expected if the order of attachment corresponds with the order of interpretation:

- (15) <akai> Hanako-kara-no <akai> hanataba Japanese
red Hanako-from-LNK red bunch.of.flowers
'a/the red bunch of flowers from Hanako'

Japanese adjectives come in distinct morphological classes: some end in *-i* (like *aka-i* in (15)); others in *-na* (like *kakkitekina-na* in (16)). This variation, whose significance remains a matter of debate, does not affect word order:

- (16) <kakkitekina> kono mondai-no <kakkitekina> kaiketsusaku Japanese
revolutionary this problem-LNK revolutionary solution
'a/the revolutionary solution for this problem'

So, although AP-XP-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.⁴ However that may be, there is no very clear preference for any particular word order in the presence of the linker. Both orders in (17) are fully acceptable. As expected, the VP-AP-N order refers to a fifteenth-century fake picture (a picture that comes from the fifteenth century and is fake in some unspecified way), while the AP-VP-N order corresponds to a fake fifteenth-century picture (that is, something that is not a fifteenth century picture – most typically a picture that pretends to be from the fifteenth century but really is not).⁵

- (17) <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 (17), 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:

- (18) <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 word order alternation found in Korean, Japanese and Mandarin is replicated in Finnish. Both orders in (19) are fully grammatical. The only difference seems to be that in Finnish the constituent translated as *from the fifteenth century* is realized as a genitive DP. Finnish allows this kind of word order alternation quite freely, apparently without either order being more marked than the other. (Please note that the most common Finnish word for ‘fake/forged’ (*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.)

- (19) <feikki> 1400-luvu-n <feikki> kuva Finnish
 fake 1400-century-GEN 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 fifteenth-century fake picture, while

the AP-DP-N order refers to a fake fifteenth-century picture.

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 (20) illustrates. Interpretation varies with word order in the expected way.

- (20) a <hamis> tizenötödik század-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 (20) is a nominal phrase, but it can also be a PP, as the example below illustrates (on the status of Hungarian postpositions, see Asbury 2008 and references cited there):

- (21) 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. We have taken the *-i* ending present in (20) and (21) to be a linker (following Kenesei 2005). However, traditionally it is seen as a morpheme that derives adjectives from other categories (see Szabolcsi's (1994) discussion of 'adjectivalization'). 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.

First, linkers attach to phrases while derivational affixes almost exclusively attach to words. The item in question attaches to phrases (the internal syntax of the NP in (20) and the PP in (21) are not affected by attachment of *-i*).

Second, it is typical for linkers to mark elements that are used attributively, but to the best of our knowledge suffixes that derive adjectives never specify their output as attributive or predicative. Phrases suffixed by *-i* can only be used attributively; predicative use is out:

reduced relatives are not part of the adjectival functional sequence.⁷

(25) The RED_{RR} big_A bus

One could try to extend this analysis to AP-XP-N orders. Regular APs would have to be structurally closer to the noun than other material, but reduced relatives could appear in a higher position:

(26) [AP_{RR} [XP [AP N]]]

Of course, this proposal would be empirically vacuous unless regular APs and reduced relative clauses can be distinguished. The main test that Cinque uses to do so is based on the assumption that non-predicative APs cannot function as reduced relative clauses. Therefore, if the proposal just outlined were correct, the word order variation observed in head-final languages should disappear when we consider non-predicative APs. However, in the languages we have considered, the distinction between predicative and non-predicative adjectives does not seem to have such distributional consequences.

Thus, in Korean, Japanese and Mandarin, the adjective in the AP-XP-N order can be non-predicative. None of the adjectives in (27)–(29) can be used in copula constructions or other structures requiring predication:⁸

(27) 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’

(28) 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’

(29) 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’

The same pattern is found in Finnish. The adjective *epäilty* ‘suspected’ has an intersective and a non-intersective reading. The non-intersective reading is incompatible with predication. This is the reading most prominent in (30), which confirms that we are not dealing with reduced relative clause.

(30) <epäilty> Yhdysvalloista tullut <epäilty> vakooja.

Finnish

suspected USA-from come.PPT suspected spy

‘a/the suspected spy from the USA’

In Hungarian, *fő* ‘main’ cannot be used as a predicate, but can be separated from the noun:

(31) az <fő> emigráció mellett-i <fő> érv

Hungarian

the main emigration next.to-LNK main argument

‘the main argument for emigration’

These data contrast with the situation in Spanish. In this language, N-XP-AP is allowed as a marked order, with the AP focused and offset by a prosodic break (recall Giurgea’s generalization in (5)):

(32) 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

However, this option is not open to non-predicative APs, which suggests that in Spanish extraposed adjectives are indeed reduced relative clauses:

(33) a. un antiguo director de máster Spanish

a former director of master

‘a former director of the Master’s program’

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)

We conclude that Cinque’s (2010) proposal that there are two sources for adjectives is correct, but cannot be used to reconcile a structural account of AP-adjacency with the data found in head-final languages.

Other attempts to reconcile word order freedom in head-final languages with the hypothesis of fixed structural layers could be based on movement of adjectival modifiers across other material. We will discuss this option at the end of the next subsection.

2.2 Head-medial languages

The structural account of AP-adjacency in (10) makes a further prediction for languages with AP-N-XP order, such as 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 in word order, and hence c-command relations, in

head-final languages. The null hypothesis is that such a link between structure and interpretation also exists in languages in which nouns surface between APs and PPs, such as English:⁹

(34) [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 (34) persists even if *fake* is preceded by a regular intersective adjective like *beautiful*:

(35) [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 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 (34) 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, while the grammaticality of the second example requires an alternative structure in which the noun merges with the PP first (compare (34)).¹⁰

(36) 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.

(37) 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 (36a) and (37a), while *fake* takes scope over the temporal PP in (36b) and (37b).

Again, we need to explore whether the structural ambiguity found in noun-medial languages like English could be due to a Cinquean analysis involving reduced relative clauses. The idea, familiar by now, would be that if the AP takes wide scope it is a reduced relative clause, while if it takes narrow scope it directly modifies the noun:

(38) [AP_{RR} [[AP N] XP]]

Recall that non-predicative adjectives cannot be used as reduced relatives. Therefore, an analysis along the lines of (38) predicts that the observed ambiguity will disappear when the AP is non-predicative, contrary to fact. Consider the DP in (39), which is ambiguous in a way that suggests that the AP could be merged higher or lower than the PP.

(39) a. The [[former spy] with a license to kill]

b. The [former [spy with a license to kill]]

If the AP is merged lower than the PP, the person described is someone who used to be a spy and who has retained her license to kill (for instance, she may now be a CIA assassin but no longer involved in espionage). If the AP is merged higher than the PP, the person described is someone who used to be a spy and had a license to kill in that capacity. The constituency tests mentioned above can be shown to remove ambiguity, as expected. Thus, the left conjunct in *the former spy with a license to kill and the current one* will be interpreted as someone who used to be a spy with a license to kill if the N-PP string serves as the antecedent for *one*. Data of this type make clear that a Cinquean gambit will fail.

We find the same pattern of constituency and scope in other head-medial languages, such as Swedish and Dutch. For reasons of space, we will not demonstrate this here.

Basque represents a second type of noun-medial language: APs follow the noun, while other material precedes it. An account of AP adjacency that relies on structural layering would again

predict that in a string XP-N-AP the noun forms a constituent with the adjectival modifier to the exclusion of the prenominal XP. But the Basque data suggest that strings of this type are structurally ambiguous. First, both N-AP and XP-N may serve as antecedents in elision:

- (40) a. 15. mende-ko [koadro txiki]_i bat eta 16. mende-ko e_i bat. Basque
 15th century-GEN picture small one and 16th century-GEN one
 ‘one small picture from the 15th century and one small one from the 16th century’
- b. [15. mende-ko koadro]_i txiki bat eta e_i handi bat.
 15th century-GEN picture small one and big one
 ‘One small picture from the 15th century and one big one from the 15th century’

Second, the prenominal modifier may take scope over the AP, or the other way around, as the ambiguity of (41) shows. This suggests that the example can be structured in two ways, just like its English counterpart in (34). In addition to [GenP [N AP]], [[GenP N] AP] is a possible parse.

- (41) 15. mende-ko koadro faltsu bat Basque
 15th century-GEN picture fake one
 ‘One fake picture from the 15th century’
 (from the 15th century > fake; fake > from the 15th century)

As in English, it is not possible to analyze the structure in which the AP is attached higher than the XP as involving a reduced relative clause. Such an account would incorrectly predict that non-predicative adjectives are restricted to low positions. In fact, though, *ohi* ‘former’ must be able to c-command the genitive phrase in (42). The example can denote a former spy who now wears a red beret or someone who used to wear a red beret when they were a spy.

- (42) [[txapela gorri-dun [espioi <ohi>]] <ohi>]-a. Basque
 beret red-having spy former-DEF
 ‘The former spy with a red beret’

In sum, while a 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.

Can movement be used to save the hypothesis that APs are located in a designated structural layer below PPs, genitive DPs, and so on? Suppose that the templates in (10)-(13) hold of the underlying, but not the surface structure. If an AP ends up c-commanding some other constituent, this could then be the result of the AP moving away from the noun. In head-final languages, this optional movement would lead to variation in order (see (43a)). In languages with AP-N-XP order, it would be string-vacuous (see (43b)).

- (43) a. [PP [AP N]] → AP [PP [_{AP} N]]
 b. [[AP N] PP] → AP [[_{AP} N] PP]

In order to capture the key observation that in head-initial languages APs precede PPs, it would have to be assumed that the relevant movement has no rightward counterpart (see (44)). This may seem stipulative, but it would fit in with the general asymmetry between leftward and rightward movement: the latter seems more restricted in a number of ways.

- (44) [[N AP] PP] → *[[N _{AP}] PP] AP

We see three problems with this proposal. First, the structural ambiguity of XP-N-AP strings in Basque would seem to require rightward movement of APs after all:

- (45) [PP [N AP]] → [PP [N _{AP}]] AP

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 interpretive requirements that permit the order AP-XP-N in head-final languages. However, such a movement process is not attested, as far as we can tell:

- (46) [[N AP] PP] → *AP [[N _{AP}] PP]

Of course, some head-initial languages do allow APs to appear prenominal, 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.¹¹

Third, in structures in which the AP occupies a high position, there seems to be a systematic lack of evidence for it having a low origin. We can illustrate this using coordinate structures in

languages with a 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 (47a) 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 (47b)).

- (47) 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 other words, concord must be calculated on the basis of the surface representation. This is not problematic in itself, but it begs the question what evidence could be given for the trace in (43b). None, it seems to us.

2.3 Generalizations

Below we summarize our findings for the languages discussed above in the form of three generalizations. (Apparent exceptions to Generalization A are discussed in sections 4.3 and 5.)

GENERALIZATION A:

In N-AP-XP languages, reordering of AP and XP is prohibited.

GENERALIZATION B:

In AP-N-XP and XP-N-AP languages, there are two possible structures: one in which the noun is merged with the AP first, and another in which the noun is merged with the XP 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 XP-AP-N as an unmarked order. Typically such languages allow AP-XP-N as an alternative order. In some, this alternative order is experienced as marked.
- ii. The XP-AP-N order is interpreted with the XP taking scope over AP and N, while the AP-XP-N order is interpreted with the AP taking scope over XP and N.

The data in head-final and head-medial languages is as expected if (i) there is no restriction on the order of merger of APs and PPs, genitive DPs, etc., and (ii) scopal interpretation is determined by syntactic structure. What is to be explained is why 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. We will argue that there is actually nothing special about the *structure* of noun-initial languages. Instead, they are subject to a constraint that bans linear separation of nouns and adjectival phrases.

3. Case Adjacency and VP-shell formation

AP adjacency has an interesting parallel in the verbal domain. As is well known, a verb and a DP object in English cannot be separated by adverbial material:

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

The English pattern can be observed in several other VO languages, including the Scandinavian languages, Bantu, Chinese, Celtic and Arabic (see also Neeleman 2015). 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). Nonetheless, there is evidence for verb-object adjacency even in French. The order of adverbials sandwiched between object and verb follows Cinque's (1999) adverbial hierarchy, suggesting that the first adverb c-commands the second. Adverbials that follow the object, however, come in reverse order, suggesting right-to-left c-command (in both examples in (49) the order of adverbs

is fixed; see Abeillé and Godard 2003:3 and Jones 1996:7, the sources of these data).

- (49) a. Jean fait [souvent [vite [_V son travail]]]. French
 John does often quickly his work
 ‘John often does his work quickly.’
- b. Ce garçon mangeait [[[_V une pizza] lentement] hier].
 this boy ate a pizza slowly yesterday

If right-adjoined adverbs could intervene between the trace of the verb and the object, it would be impossible to capture this pattern. So, verb-object adjacency must hold.

In Slovenian, too, adverbs that separate verb and object surface in scopal order. In neither (50a) nor (50b) can ‘slowly’ precede ‘yesterday’ (unless it is contrastively focused). This again suggests that the separation in (50b) is due to verb movement:

- (50) a. Janez je [včera] [počasi [prebral pismo]]. Slovenian
 John has yesterday slowly read letter
 ‘John has read the letter slowly yesterday.’
- b. ?Janez je [prebral [včera] [počasi [_V pismo]]].
 John has read yesterday slowly letter

In other VO languages the option of verb-object separation disappears when verb movement is controlled for. In Icelandic clauses containing an auxiliary, for example, the main verb remains in situ, so that the effects of Case Adjacency can be observed on the surface (see Vikner 1994):

- (51) Jón hefur lesið <*rækilega> bækurnar <rækilega> Icelandic
 John has read thoroughly the-books thoroughly

The overall pattern is reminiscent of Generalization A, if DP is taken to correspond to AP:¹²

GENERALIZATION A’:

In V-DP-AdvP languages, reordering of DP and AdvP is prohibited.

There is a classical account of Generalization A’ in terms of structural layering. Chomsky (1965) argues that the verb and its object form a core constituent to the exclusion of all adverbials. This

proposal was recast later 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, introduced by 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 (52) illustrates.

(52) 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 we refer to as 'scrambling').¹³ In Dutch, for example, the orders in (53) 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).

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

John has slowly the letter slowly read.

'John has slowly read the letter.'

These observations are 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 AdvP-DP-V as an unmarked order, and all such languages allow DP-AdvP-V as an alternative order.

As expected, scope corresponds to word order in the OV languages. Thus, the AdvP-DP-V order in (54) 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.

- (54) 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.¹⁴

GENERALIZATION C’:

- ii. The AdvP-DP-V order is interpreted with the AdvP taking scope over DP and V, while the DP-AdvP-V order is interpreted with the DP taking scope over AdvP and V.

There are some languages in which the verb surfaces between objects and adverbials. In particular, several West-African languages have DP-V-AdvP order (see Koopman 1992 on Bambara; see also Dryer 2013). This suggests that there may be a parallel to Generalization B in the verbal domain. Unfortunately, we have not found descriptions of the relevant languages detailed enough to determine whether they display the kind of structural ambiguity found in the noun phrase. However, in at least some head-final languages PPs optionally follow the verb. Such extraposed PPs may be in the scope of DP objects or vice versa, as shown by the Dutch example in (55) (where the PP is an idiom meaning ‘quickly’).¹⁵ If the pattern in (55) extends to other verb-medial structures, there is a reflex of Generalization B in the verbal domain after all.

- (55) 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

(48). 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 (53b). If heavy-XP shift is analyzed as movement of the heavy constituent, it must presumably land in an A'-position (see Rochemont and Culicover 1990).¹⁶ However, scrambled DPs, as already mentioned, occupy an A-position. Moreover, they tend to be 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.¹⁷

So, 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 scrambling, 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 (48) and (52) fall out neatly, but the Dutch example in (53b) 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).

(56) *Case-First Constraint*

- a. The assignment domain of a case C in a DP-argument consists of that DP and any XP intervening between it and V.
- b. No category lacking C can precede a category that carries C in C's assignment domain.

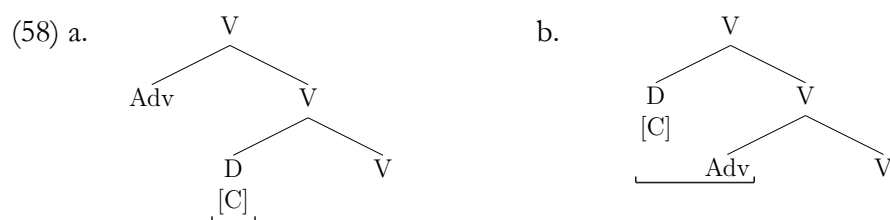
This constraint needs to be paired with a parameter that regulates the linear order of verb and

case-marked DP. The exact nature of this parameter is an intricate matter, but it will suffice here to state it in terms of the way case domains are constructed:¹⁸

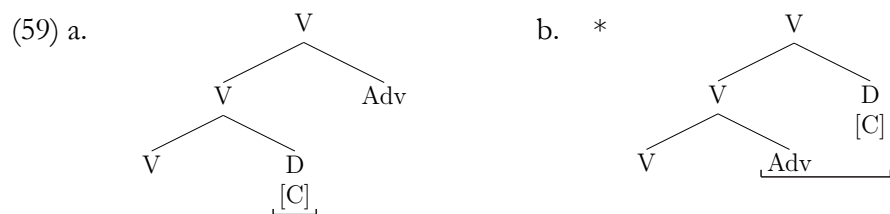
(57) *OV/VO Parameter*

Case domains are constructed with reference to a preceding/following V.

Object placement in OV languages like Dutch is a consequence of the setting of the OV/VO Parameter. If case domains are constructed with reference to a following V, case-marked DPs must appear to the left of the case-assigning head. Moreover, if we assume that objects can be structurally separated from the verb, the availability of scrambling in OV languages is unsurprising. Both structures in (58) satisfy the Case-First Constraint, as in both the case-marked DP is leftmost in its assignment domain (we have indicated the relevant domains below the trees).¹⁹

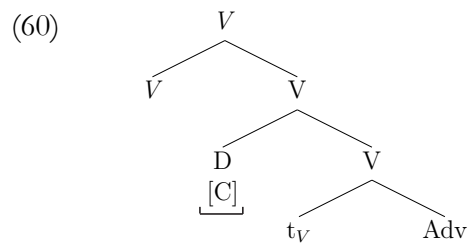


The situation is rather different in VO languages, where case domains are constructed with respect to a preceding verb. The counterpart of (58a), which is given in (59a), is grammatical. However, the counterpart of (58b) is ruled out. The assignment domain of the case feature [C] in (59b) consists of DP (which carries it) and Adv (which intervenes between DP and the case licensor). In contrast to what (56) requires, DP is not leftmost in [C]'s assignment domain.



At first sight, this analysis seems to imply that whereas OV languages allow two structures, namely (58a) and (58b), VO languages allow only one, namely (59a). However, Janke and Neeleman (2012) argue that a process of VP-shell formation that can be used to generate

structures in which the verb 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 both (56) and the relevant setting of the OV/VO parameter (notice that verb movement is necessary if case domains are constructed with reference to a preceding verb):



Janke and Neeleman (2012) analyze the movement in (60) as self-attachment. That is, the movement does not target a pre-fabricated position; rather the verb re-projects in its surface position (Ackema, Neeleman, and Weerman 1993, Koenenman 2000, Hornstein and Uriagereka 2002, Bury 2003, Fanselow 2003, Surányi 2005, Bayer and Brandner 2007). One advantage of the absence of a pre-fabricated position is that it explains why there is no verb movement when there is no DP to be licensed. If there were a prefabricated head position, it could attract the verb even when Case Adjacency is not at stake, thus undermining our account of the word order facts.

It is important to realize that the Case-First Constraint is not an adjacency condition. If there is an independent trigger for verb movement, the verb can move away from the object, leaving case to be assigned by its trace. Such movement does not affect the predictions of the Case-First Constraint, as this condition still regulates word order in the assignment domain anchored in the verb's trace. Therefore, case adjacency effects will persist in VO languages with V-to-I or V-to-C.

The picture that emerges, then, is the following. Where case plays no role, 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:

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

John has beautifully yesterday beautifully sung

(62) 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 (60), rather than the ascending structure in (59b).

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:

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

John has raw the fish raw eaten

The English counterpart of (63a) cannot be (64a), because this representation violates the Case-First Constraint. VP-shell formation rescues the structure, but leads to a non-mirroring word order:

(64)a. *John [[ate raw] the fish]. b. John ate [the fish [_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 we may assume that they are adjoined to VP in a simple ascending structure:²⁰

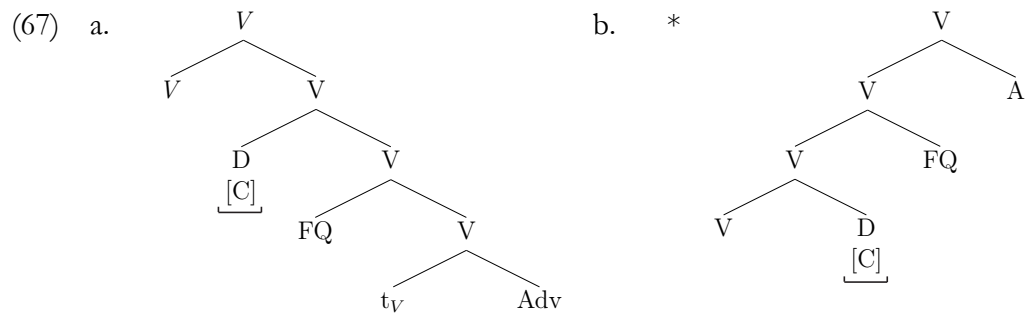
(65) John [[ate the fish] drunk].

Three further facts follow. First, if a sentence contains both an object- and a subject-oriented secondary predicate, they come in this order (see (66a)). Second, object-oriented secondary predicates cannot be stranded by VP-fronting, but subject-oriented secondary predicates can be (see (66b)).²¹ This is because in (65), but not (64b), 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 (66c)).

- (66) 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 (66c) 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 (67a) that can host object-oriented floating quantifiers, but this is not the case in an ascending structure like (67b). For details, we must refer the reader to the original paper.



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 (68a) is ambiguous between a collective reading of *quickly* and a distributive reading. Given the analysis above, this follows: 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 will get a collective reading. This is indeed the case; there is a strong tendency for *quickly* in (68b) to take scope over *three letters*.

- (68) 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 (69) are ruled out as a violation of the Case-First Constraint in (56).

(69) *John [ate [slowly [the fish [A_V raw]]]]].

Alternative proposals, even if they require adjacency between the verb and its complement in the underlying structure, struggle to explain the ungrammaticality of (69).

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

GENERALIZATION A':

- i. In V-DP-AdvP languages, reordering of DP and AdvP is prohibited.
- 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 the structural ambiguity of V-DP-XP strings can be replicated, for instance in the Scandinavian languages.

4. Extending the analysis to AP adjacency

4.1 The basic pattern

The data discussed in sections 2 and 3 show a striking parallelism between the nominal and verbal extended projections. 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 parallelism in the data of course suggests that a parallel account should be developed. We will therefore argue that the Case-First Constraint as motivated above for the extended verbal projection has a counterpart in the extended nominal projection (see Van Riemsdijk 1992

for related ideas).

In order to develop this account, we need to decide on the morpho-syntactic factor in which the nominal counterpart of the Case-First Constraint is anchored. In the same way that (56) mentions Case, its counterpart in the noun phrase must mention some property of APs that affects the linear positions in which they can occur. Our proposal is that this anchor is an abstract morpheme that we will refer to as JOIN.²²

JOIN is intended to solve the tension between two basic observations. First, given the use of APs as predicates in copula constructions, it is likely that their basic type is $\langle e,t \rangle$ (see Partee 1986 and Zamparelli 2000). However, when an AP functions as a nominal modifier, it has to shift to a different type, namely $\langle \langle e,t \rangle, \langle e,t \rangle \rangle$. This allows adjectives to combine with the nominal, which is itself of type $\langle e,t \rangle$, and yield a constituent of the same type, thus accounting for the distributive similarities between bare nominals and nominals modified by APs.

JOIN is the abstract morpheme responsible for this shift. It was originally proposed in Chierchia and Turner 1988 and its content has since been modified in Baker 2003 and Truswell 2004. We assume that JOIN is attached to the AP, and that its semantics is as proposed by Truswell. We further assume that JOIN derives a modifier that selects a nominal category, in order to account for the fact that APs can act as modifiers of nouns, but not as modifiers of, say, other adjectives (cf. **The bus is big red*). Both Baker and Truswell encode this selectional requirement in the lexical entry for JOIN.²³

An analysis of attributive modification based on JOIN has two advantages over analyses based on θ -identification or similar mechanisms. θ -identification, as proposed by Higginbotham 1985, necessarily leads to a semantics of intersective attribution as coordination: *this is frozen chicken* means ‘this is frozen and this is chicken. However, when multiple intersective adjectives are attached, their order matters. As Svenonius (1994) points out, *frozen chopped chicken* is not the same thing as *chopped frozen chicken*. This fact is hard to understand under a θ -identification analysis, as both expressions would mean ‘this is chicken and this is chopped and this is frozen.’

It follows from a JOIN-based account, however. JOINP takes the NP it combines with (including any lower attributive APs) as an argument to which the AP it contains is applied. So, *frozen chopped chicken* is chopped chicken that is frozen, while *chopped frozen chicken* is frozen chicken that is chopped.

The second problem with a θ -identification account has to do with adjectives that can only be attributive. If nothing distinguishes the attributive and predicative use of adjectives, it is hard to capture such a restriction. On a JOIN-based theory, however, the two usages are associated with different types. Exclusively attributive adjectives, like *former* and *main*, can therefore be stored with $\langle \text{et}, \text{et} \rangle$ as their lexical type, or with JOIN pre-attached (i.e. they are cranberry morphs). Languages that do not have attributive adjectives at all (such as Slave; see Rice 1989) may simply not have JOIN in their lexicon.²⁴

There are several languages that may have an overt correlate of JOIN. Russian is a prime example. Its adjectives have a short and a long form (see Babby 1970, Siegel 1976 and Pereltsvaig 2000). As Siegel argues, the short form is predicative, while the long form is used in attribution. There are cases in which a long form is apparently used as a predicate, but these are plausibly analyzed as involving nominal ellipsis. It is therefore tempting to say that the long form is derived from the short form through attachment of JOIN, now spelled out. A second possible overt realization of JOIN was suggested to us by Klaus Abels (p.c.). Attributive adjectives in German carry an inflectional ending that systematically begins with a schwa. This ending is absent in predicative adjectives. One can treat the systematic occurrence of schwa as coincidental, but it seems more elegant to analyze it as JOIN, which is attached before the inflectional ending that expresses ϕ -features (which has a variety of forms – *r, n, m, s* and \emptyset).

Although case and JOIN are very different elements, there is a certain functional equivalence between them: a DP can only be an argument if it bears case; an AP can only be an attributive modifier if accompanied by JOIN.

With this much in place, we can formulate our analysis of the special ordering restrictions

that hold of AP-modifiers. We propose that the order in which adjectival and non-adjectival modifiers are merged with the noun is free in principle. However, JOIN is subject to the condition in (70):

(70) *JOIN-First Constraint*

- a. The JOIN domain of an AP-modifier consists of that AP and any XP intervening between it and the noun.
- b. No category lacking JOIN can precede an AP in its JOIN domain.

Like the Case-First Constraint, the JOIN-First constraint must be paired with a parameter that regulates order, in the case at hand between attributive adjectives and nouns:²⁵

(71) *AN/NA Parameter*

JOIN domains are constructed with reference to a preceding/following noun.

We first consider languages in which JOIN domains are constructed with reference to a preceding noun. In such languages, attributive APs must appear to the right of the noun. As no adjectival modifier may be preceded in its JOIN domain by a non-adjectival category, any other material that follows the noun must also follow attributive APs. The JOIN domain of the AP in (72a) consists of just the AP itself, which is therefore leftmost, as required (we return to the structure of the N-AP-XP order below). However, the JOIN domain of the AP in (72b) contains XP, in violation of (70).

(72) a. N AP XP

b. *N XP AP

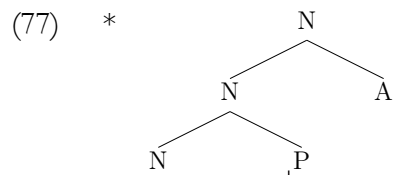
In languages where JOIN domains are constructed with reference to a following noun, AP-N order is forced. The implication of this order is that the noun and the AP may be adjacent or that they may be separated by one or more non-adjectival categories. In the first case, the JOIN-First Constraint is satisfied trivially, as there is nothing in the JOIN domain other than AP; in the second case, the JOIN domain contains multiple elements, but the AP remains leftmost, in accordance with (70):

The same is true for the other noun-initial languages we have discussed:

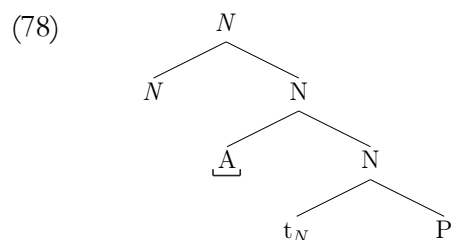
- (76) a. el cuadro falso del siglo XV Spanish
 the picture fake of-the century XV
 (from the 15th century > fake; fake > from the 15th century)
- b. as-suura l-muqallada min al-qarn al-xamis-ʕashar Arabic
 the-picture the-fake from the-century the-fifteenth
 (from the 15th century > fake; fake > from the 15th century)

The first reading in (75) and (76a,b) is trivial. But where does the second reading come from?

In fact, if we take the parallel with the extended verbal projection seriously, the answer to this question is straightforward. Just like the Case-First Constraint can trigger the formation of a VP-shell, the JOIN-First Constraint can trigger the formation of an NP-shell. 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 (77), as that would violate the JOIN-First Constraint.

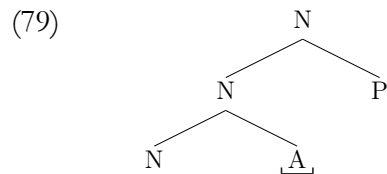


However, this order of merger can lead to a well-formed structure if the AP is left-attached and the noun undergoes head movement. In (78), the AP is the only element in its JOIN domain. (Notice that noun movement is necessary because – by hypothesis – JOIN domains are constructed with reference to a preceding noun in N-AP languages.)



As with VP-shell formation, we assume that NP-shell formation involves self-attachment. The noun does not move to a pre-fabricated position, but re-projects in its surface position.

Notice that this representation has the same linear order as the ascending structure in (79) (which of course also satisfies the JOIN-First Constraint). However, in (78) the AP c-commands and therefore takes scope over the PP, while in (79) the PP c-commands and therefore takes scope over the AP. In other words, the option of NP-shell formation allows us to capture the scopal ambiguity of the examples in (75), (76a) and (76b).



The proposal that the N-AP-PP order is structurally ambiguous (allowing either (78) or (79)) makes a crucial prediction. The substring N-AP is a constituent in the structure in (79), but not in (78). 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 is correct. Consider the Spanish examples in (80). If in (80a) the elided nominal constituent in the right conjunct is to be interpreted as ‘fake picture’, then in the left conjunct the PP must take scope over the AP. If in (80b) the PP applies to both nouns, it must be outside the scope of the AP in the right conjunct.

- (80) 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 pictures from the fifteenth and eighteenth century’ (from the 15th c. > fake)
- b. el cuadro auténtico y el cuadro falso del siglo XV
 the picture real and the picture fake of-the century XV
 ‘the real and fake pictures 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 (78). Note that this structure is incompatible with an account of AP-adjacency based on structural

layering, as N and AP do not form a constituent in (78).

The observations made for Spanish in (80a) carry over to Arabic and Welsh:

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

In the remainder of this section, we discuss two issues that require clarification, the possibility of AP stacking and the existence in some languages of apparent counterexamples to the JOIN-First Constraint.

4.2 Stacking

The first issue we consider involves an asymmetry between the nominal and verbal extended projections. We have drawn a parallel between case-marked DPs and adjectival modifiers (in the form of the Case-First and JOIN-First Constraints). However, when it comes to stacking, there seems to be an unexpected difference between DPs and APs. 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 VO 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). For example, the indirect

object must take scope over the direct object, and the V-DP_{IO} substring fails constituency tests like movement and ellipsis:

- (82) 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 woolen scarf.
- c. *If John gave Mary anything prickly, he did a woolen sweater.

That stacking of adjectives does not necessarily lead to the formation of an NP-shell becomes apparent when we compare the unmarked order of modifiers in French, which is the mirror image of the order found in English (see (83) and (84)). This mirror image effect suggests that in a string N-AP₁-AP₂ in French, AP₂ c-commands AP₁. In other words, we seem to be dealing with a simple base-generated structure.

- (83) a. the [<old> [black [<?old> piano]]]
 b. le [[piano <?antique>] noir] <antique> French
 the piano old black old
- (84) a. the [<average> [white [<?average> dog]]]
 b. le [[[chien <?moyen>] blanc] <moyen> French
 the dog average white average

So, AP₂ in [[N AP₁] AP₂] apparently does not violate the JOIN-First Constraint, but DP₂ in [[V DP₁] DP₂] does violate the Case-First Constraint. Why should this be?

Our account relies on the assumption that no head can contain the same attribute twice, a constraint discussed in some detail by Neeleman & Van de Koot 2002 under the rubric of ‘Distinctness’. This constraint has implications for the case system if it is true that the cases borne by the direct and indirect object in a double-object construction are checked against the same head (V in the proposal outlined in section 3). In particular, if both cases are represented in V, then they must be distinct. The orthodox view is that one DP will bear dative and the other accusative.²⁶

4.3 Independent noun movement

We have seen in section 3 that Case Adjacency holds of the base positions of the verb and the object. If the verb moves independently of the Case-First Constraint, VO structures can be generated in which Case Adjacency is satisfied despite the fact that verb and object are separated by other material. Perhaps the best-known case in point is verb movement in French (see (49)). Our account permits such verb movement, because the Case-First Constraint only imposes ordering restrictions on the elements in the case domain of a DP, and the case domain is defined in such a way that it excludes the case-assigning head. There is hence no need for the verb to be adjacent to the object, as long as the object is adjacent to the verb's trace.

The parallel formulation of the Case-First and JOIN-First Constraints leads to the expectation that APs in head-initial structures do not have to be adjacent to the surface position of the noun either. If the noun moves independently of the JOIN-First Constraint, structures can be generated that apparently violate AP adjacency, but in fact satisfy it because the AP is adjacent to the noun's trace.

An example of this comes from work on Greenberg's (1963) Universal 20 (Cinque 2005, Abels and Neeleman 2012). Any account of Universal 20 assumes that there is a cross-linguistic hierarchy Dem(onstrative) > Num(eral) > Adjective > Noun. That is, numerals are merged after adjectives and demonstratives are merged after both these categories. This implies that orders like N-Dem-Num-A (found in Kĩtharaka) or Dem-N-Num-A (found in Maasai) must involve leftward noun movement. But if this is the case, these orders do not in fact constitute counter-examples to AP adjacency, even though Dem and Num intervene between the noun and attributive adjectives.

- (87) a. [N [Dem [Num [<AP> t_N <AP>]]]]
b. [Dem [N [Num [<AP> t_N <AP>]]]]

Abels and Neeleman (2006) argue, on the basis of data in Cinque 2005, that movement reduces the typological frequency of neutral orders. In the realm of universal 20, no order derived by

movement is typologically frequent, and all typologically frequent orders can be base-generated (in addition, there are base-generated infrequent orders that violate harmony principles). Thus, apparent exceptions to AP adjacency are relatively rare.

As was true for Case Adjacency and verb movement, even languages with independent noun movement can provide evidence for AP adjacency. We demonstrate this by looking at Welsh adjectival orders. As is well known, merger of adjectives is regulated by the following cross-linguistic hierarchy: *other* > quality > age > size > color > provenance (see Cinque 2010 and references given there). In other words, adjectives describing provenance are merged before adjectives describing color, and so on. This hierarchy can be used to detect independent noun movement (just like the earlier hierarchy Dem > Num > A > N).

If the noun remains in situ, any adjectives following it are predicted to come in ascending order (see (88a)). So, adjectives describing provenance should precede adjectives describing color, and so on. This is the case in two of the languages with noun-adjective order that we have looked at, Arabic and Spanish, possibly suggesting absence of noun movement in these languages (Spanish follows the general Romance pattern in this respect; the Arabic adjectival order is described in Kremers 2003).

If the noun moves leftward, however, any adjectives between it and its trace are expected to come in descending order (see (88b)). Indeed, this criterion has been used to argue for noun movement in Celtic (see Guilfoyle (1988) and Sproat and Shih (1991) for Irish, and Rouveret (1994) for Welsh).

(88) a. [[N AP₁] AP₂]

b. [N [AP₂ [AP₁ t_N]]]

We now look at Welsh in more detail. Willis (2006) establishes that the language has the following order of adjectives:

(89) N – AP_{SIZE} – AP_{COLOUR} – AP_{PROVENANCE} – AP_{AGE} – AP_{QUALITY} – *other*

Given the cross-linguistic hierarchy of adjectives given earlier, it seems that adjectives in Welsh

come in descending order initially (size – color – provenance) and then appear in ascending order (age – quality – *other*). There is a straightforward analysis of this pattern: (i) the APs lower on the hierarchy are left-attached, (ii) the APs higher on the hierarchy are right-attached, and (iii) the noun moves across the lower APs. This movement targets a position below the numerals, given that the neutral order in the Welsh noun phrase is Num-N-A-Dem:

(90) [[Num [[[[[N [AP_{SIZE} [AP_{COLOUR} [AP_{PROVENANCE} t_N]]]]] AP_{AGE}] AP_{QUALITY}] *other*]] Dem]

PPs in Welsh follow *all* adjectives. That this is true of the lower adjectives cannot be seen as evidence for AP adjacency: these adjectives are attached to the left of the noun’s trace, while PPs are attached to its right. However, the fact that PPs also follow the higher adjectives is an instantiation of the general pattern of AP adjacency. Just like French, on close inspection, provides evidence for the Case-First Constraint, so Welsh provides evidence for the JOIN-First Constraint.²⁸

5. Two additional arguments from Spanish

In this section we discuss two additional arguments for our account. Although the discussion is intricate, the arguments are simple in structure. First, our account leads us to expect a specific type of exception to the descriptive generalization that APs cannot be separated from the noun in NA languages. In particular, under very specific circumstances, the string N-AP-PP-AP is predicted to be grammatical. We are not aware of other accounts of AP adjacency that generate the same prediction. Second, our account predicts that any structure with the correct word order can in principle satisfy the JOIN-First Constraint. We show that, in addition to ascending structures and NP-shell structures, this is true for structures with N-AP-AP-PP order when generated by extraposition.

Both arguments are based on the interaction between the JOIN-First Constraint and a restriction on adjectival stacking in Spanish. Consider (91).

- (91)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

As (91a-c) show, Spanish allows adjectives to either follow or precede the noun. However, as (91d) shows, stacking of adjectives that are left-attached is not possible. That is, both *antigua* ‘old’ and *fantástica* ‘fantastic’ may appear prenominal, but not simultaneously. We attribute the ungrammaticality of (91d) to what Chomsky and Lasnik (1977) would have called a surface filter.²⁹ It is formulated below:

- (92) In the Spanish extended nominal projection, AP₁ may not c-command AP₂ if AP₁ precedes AP₂ 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 (91d), with the consequence that *fantástica* may not c-command *antigua*. However, in the structure at hand it must, in violation of (92).

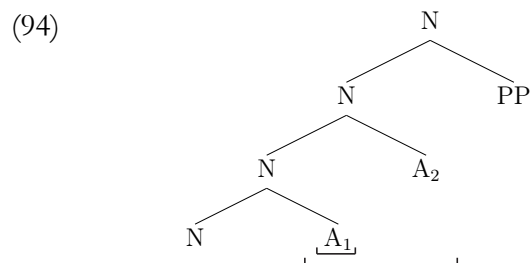
Note that if two APs are separated by overt material, (92) allows left-to-right c-command. Thus, (91c) is grammatical on an interpretation in which *fantástica* takes scope over (and hence c-commands) *antigua*, while the string in (91b) permits a second structural parse in which *antigua* takes scope over *fantástica*.

- (93) una [antigua [película fantástica]] Spanish
 a old film fantastic
 ‘an old fantasy movie’ (old > fantastic)

In both structures the noun interrupts the adjectival sequence.

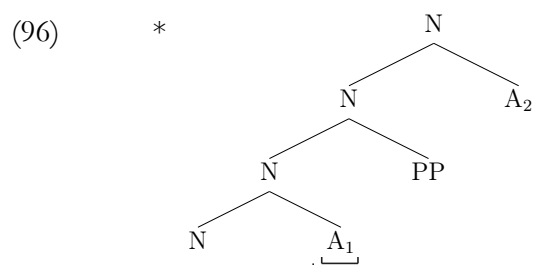
As it stands, the condition in (92) is a language-specific stipulation that requires further scrutiny. It would take us too far afield to explore its status here. What is relevant in the current context is that (92) interacts in interesting ways with the JOIN-First Constraint in structures that contain two APs and a PP.

One obvious structure that can accommodate two APs and a PP is a simple ascending one (see (94)). 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 (95).



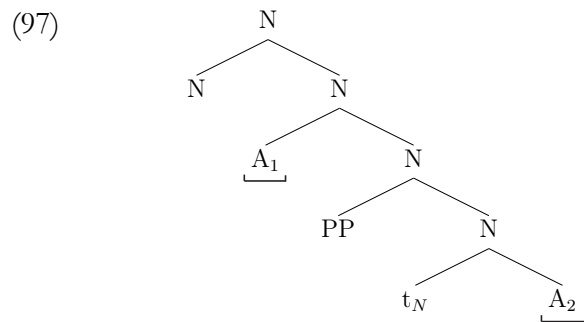
- (95) una película antigua fantástica de Buñuel Spanish
 a film old fantastic of Buñuel
 ‘a wonderful old movie by Buñuel’ (fantastic > old)

A more complex situation arises when the PP is merged following one AP, but preceding the other. In that case, an ascending structure cannot be built, as that would violate the JOIN-First Constraint: in (96), the rightmost AP is preceded in its JOIN domain by the PP.



Hence, NP-shell formation is necessary. One relevant structure that satisfies the JOIN-First Constraint and the condition in (92) is given in (97). Here, the JOIN domain for the leftmost AP is constructed with reference to the noun in its derived position, while the JOIN domain of the

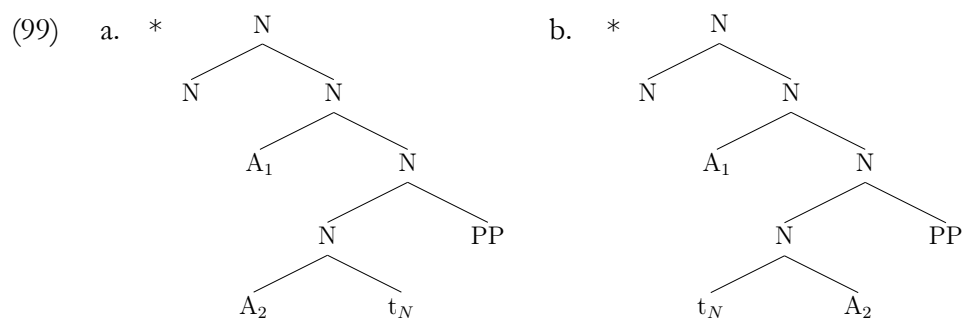
rightmost AP is constructed with reference to the nominal trace. As a consequence, neither AP is preceded by other material in its JOIN domain:



In (97), AP₁ precedes and c-commands AP₂. This does not violate the condition in (92), however, because the two APs are separated in the surface string by the PP. The prediction, then, is that the order N-AP₁-PP-AP₂ 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 (98) is grammatical and denotes a fake faultless painting, not a faultless fake.³⁰

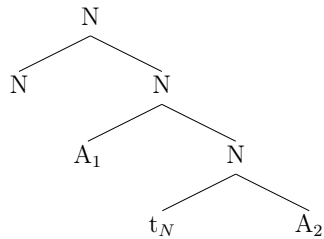
- (98) un cuadro falso del siglo XV impecable Spanish
 a painting fake of-the century XV faultless
 ‘a fake faultless painting from the fifteenth century’ (fake > from 15th C. > faultless)

Two other candidate structures in which the PP is merged between the two APs violate (92). In both (99a) and (99b), AP₁ c-commands AP₂ and AP₁ and AP₂ form an uninterrupted sequence.



We therefore predict that in the post-nominal domain the order in (97)/(98) 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 (92):

(100)



Both predictions are correct, as the data in (101) show. These examples are grammatical, but only on the reading in which the painting is a faultless fake. They cannot be used to refer to a fake faultless painting.

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

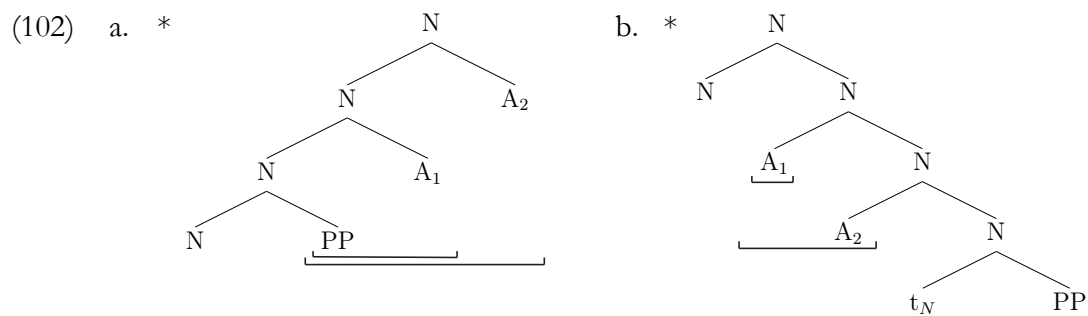
This, then, is the first additional argument for our account: we correctly predict that under very specific circumstances AP adjacency can be violated, yielding an N-AP-PP-AP order. We are not aware of other theories that can capture this pattern.

We now turn to our second additional argument. The best possible evidence for any linear constraint consists of data showing that it can be satisfied by different structures with the same terminal yield. We have already made an argument along these lines: in head-initial languages, both ascending and descending structures satisfy the JOIN-First Constraint as long as any APs precede other material. It can be shown that under particular conditions an underlying structure N-PP-AP-AP can be reconciled with the JOIN-First Constraint through extraposition of the PP. If so, this is a third way of generating the required terminal yield (N-AP-AP-PP).

VP-shell and NP-shell formation are the default repair strategies for potential violations of the Case-First and JOIN-First Constraints. However, repair through extraposition of potentially offending material is an additional possibility, at least in principle. That such repair is uncommon

is probably because A'-movement typically requires an interpretive license. By contrast, head movement need not feed semantics or pragmatics and can therefore be employed to generate neutral word orders.

However, where NP-shell formation is not an option, we might expect extraposition to be used for repair of potential violations of the JOIN-First Constraint. Such circumstances are present in Spanish DPs in which the noun combines with a PP before it combines with two APs. This order of merger is not possible in a simple ascending structure, as both APs would violate the JOIN-First Constraint (see (102a)). It is also not possible to generate an NP-shell structure. The two APs in (102b) form an uninterrupted adjectival sequence in which AP₁ c-commands AP₂, contra (92).

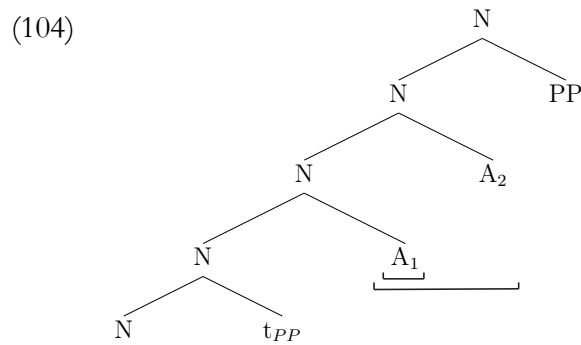


We can demonstrate that both structures are indeed ungrammatical if we consider the Spanish equivalent of *a beautiful fake painting from the fifteenth century* (where the painting purports to be from the fifteenth century). The DPs below are not possible translations. (103a) is ungrammatical and (103b) has the wrong scope (namely: fake > beautiful).

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

The only noun-initial structure that allows the intended interpretation and satisfies both the JOIN-First Constraint and the condition in (92) is one in which the PP undergoes extraposition.

In (104), the two APs satisfy the JOIN-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 AP₂ c-commands AP₁ (as required by (92)). The target interpretation can be recovered following reconstruction of the PP.



Indeed, (105) is a possible translation of *a beautiful fake painting from the fifteenth century*.

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

Thus, for structures in danger of violating the JOIN-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 (95). The only thing they have in common is their linear order. This of course confirms that AP-adjacency is a phenomenon better accounted for by a linear than a structural constraint.

One may hope to find extraposition as a secondary repair strategy in the verbal extended 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 (92), we have not been able to build a convincing case and will have to leave this issue for future research.

6. Concluding remarks

In this paper we have identified parallel generalizations that suggest a basic similarity between the nominal and verbal extended projections. Interestingly, this similarity does not seem amenable to

an analysis in the classical style of *Remarks on Nominalization*. The elements involved have very different syntactic and semantic functions, and are therefore unlikely to be associated with parallel structural layers. We have instead argued for an account in terms of linear constraints, in particular a reformulated version of Case Adjacency and a similar constraint governing the distribution of attributive adjectives.

Syntacticians working in the Principles and Parameters tradition have long been skeptical as regards linear constraints (especially after Reinhart's (1976) seminal work on binding). But the undeniable fact that many syntactic phenomena are not sensitive to linear order does not imply that no such phenomena exist. Indeed, specific proposals to abandon all reference to linear order in the description of syntactic phenomena have run into difficulties. The prime example is Kayne's (1993) anti-symmetry program, (for discussion, see Sternefeld 1994, Chametzky 2000, Ackema and Neeleman 2002, Guimaraes 2008, Abels and Neeleman 2009, 2012). Even in the domain of binding and coreference, it is not obviously true that linear order plays no role (either in addition to c-command; see, for instance, Williams (1997), or under a weaker form of command; see, for instance, Bruening 2014).

If it is accepted that there are linear constraints that regulate word order, three questions present themselves: what restrictions hold of such constraints, where are they located, and why should they hold? We will answer these questions in turn.

On the basis of the material discussed in this paper, precedence constraints seem strictly local. This is a good thing, as it would obviously be undesirable if any two elements, no matter how far away, could be subject to an ordering restriction. Locality is partly built into the constraints we propose via the notions of case domain and JOIN domain, which in turn are dependent on the syntactic locality of case assignment and modification. We would speculate that this is not a coincidence, but that all precedence constraints make reference to an ordering domain.

In addition, it is striking that both constraints have a morphosyntactic anchor that can be

represented as the topmost functional head in the relevant extended projection: case has been argued to project a KP that embeds DP; JOIN could be seen as a functional head that takes AP as its complement. This means that Case and JOIN project labels that are accessible on the extended projection as a whole. Again, we think that this is not a coincidence, but would suggest instead that ordering restrictions that affect a syntactic category α must refer to properties of the top-node of α .

The answer to the question of where precedence constraints apply depends on one's view of syntax. If syntax is a derivational system without look-ahead, then linear constraints driving syntactic movement (such as the Case-First and JOIN-First Constraints) must be part of the syntax proper, which would lead to the conclusion that the syntax encodes precedence relations. If the syntax is a representational system (see Brody 1995 and subsequent work) or a derivational system with look-ahead, then linear constraints driving syntactic movement could be filters that operate at the PF interface. In either case, one would have to assume a certain degree of free movement subject to licensing at the interfaces; see Büring 2013 for relevant discussion and references.

It is often claimed that syntax cannot represent linear order, because rules of interpretation never refer to it. This is not the strongest of arguments (if the observation is correct, it could simply be a property of interpretive rules that they are not sensitive to everything represented in syntax). However, if one were to accept it, it would favor a view of the proposed precedence constraints as applying at the PF interface, and of syntax as representational or derivational with look-ahead. If the precedence constraints indeed apply at the PF interface, it follows that they are insensitive to traces of phrasal movement (see the discussion of extraposition in section 5).

The answer as to why the Case-First and JOIN-First Constraints should exist can only be tentative. One aspect of the language faculty that is uncontroversially sensitive to linear order is the parsing process. Ackema and Neeleman (2002) and Abels and Neeleman (2013) suggest that the ban on rightward head movement might find an explanation in this. If parsing involves

immediate structure assignment (see Gorrell 1995) and movement is dealt with using a filler-driven strategy (see Phillips and Wagers 2007), it follows that there is a fundamental difference between leftward and rightward movement: the former involves insertion of a trace while the structure is being built, while the latter involves insertion of a trace in an already built structure. In particular in the case of head movement, this can lead to rather extensive restructuring. A ban on rightward head movement could therefore facilitate the parsing process.

Loes Koring (personal communication) suggests that a similar functional explanation might hold of the Case-First Constraint. The idea is as follows. As case is licensed by V, a case-marked DP will, when encountered by the parser, initiate a search for a verb. If the DP precedes the verb, the direction of search coincides with the direction of structure building. If the DP follows the verb, however, the search needs to scan the parser's left context, leading to a pause in the structure building process. It is therefore advantageous to minimize the distance between verb and object in VO languages, but object-verb adjacency has no particular benefits in OV languages. This is of course exactly what the Case-First Constraint achieves.

A similar line of reasoning might be given as motivation for the JOIN-First Constraint, if it is the case that the JOIN+AP combination triggers the search for a noun (recall that JOIN+AP attaches only to nominal categories). In noun-final DPs the direction of search coincides with the direction of structure building, but in DPs with N-AP order it does not, leading to the need to pause structure building if noun and adjective are separated. The JOIN-First Constraint would then facilitate parsing in the same way as the Case-First Constraint.

By contrast, hypothetical Case-last and JOIN-last constraints would lack such functional motivation. They are unobjectionable as far as the grammar is concerned, but would bring no processing benefit – in fact, they would be obstacles to efficient parsing.³¹

There is an obvious affinity between these suggestions and work by Hawkins (2014), who was the first to motivate verb-object adjacency on the basis of processing considerations. However, where Hawkins concentrates on the parsing of thematic dependencies, the proposal

here refers to morphosyntactic elements. If it is true that linear constraints that affect a syntactic category α must refer to properties of the top-node of α , then they cannot be rooted in thematic dependencies, which are inherently relational. This, then, favors Koring's interpretation of the data.

22 November 2015

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Footnotes

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 prefer the term ‘AP adjacency’ over ‘PP-peripherality’.

² Unless otherwise stated, data were gathered by the authors (see the acknowledgments for more information). We return to the Spanish judgment in (7) below (see the discussion surrounding (32)).

³ If the meaning of the AP allows it to modify the noun phrase contained in the PP, the AP-PP-N order gives rise to a substantial garden path effect (with [[[AP N] P] N] as the initial parse). This is presumably an early-attachment effect.

⁴ 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 (29) below). A well-known alternative is to treat structures without *-de* as A-N compounds or structures akin to such compounds. Again, Paul (2005) argues against this. Here, 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.

⁵ These readings can be told apart most easily if the object under discussion is taken to be a picture 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 forger must be from the fifteenth century.

⁶ It is important to distinguish the item under discussion from a second suffix *-i*, which attaches to place names and derives genuine adjectives.

⁷ 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.

⁸ The Japanese example in (28b) is from Tsujioka 2002:127. Tsujioka explicitly states that *hurui* 'long-time' is non-predicative and that the AP-DP-N order can therefore not be the result of a rule that allows fronting of predicates.

⁹ Intonation can help disambiguate DPs like *the fake picture from the fifteenth century*. If a brief pause is inserted between *fake* and *picture*, then *fake* takes wide scope, and if a brief pause is inserted between *picture* and *from the fifteenth century*, then the PP takes wide scope. The first of these two intonations requires fast pronunciation of the string following the pause for reasons that escape

us. However, the two readings are still available under a neutral intonation without pauses.

¹⁰ The example in (37a) might be a case of right-node raising. However, it does not have the tell-tale intonation that right-node raising requires, as in *Mary's story about, and John's sketch of, the great Harry Houdini will appear in The New Yorker*. 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.

In any case, the example crucial to the argument is (37b), which shows that APs can be structurally higher than PPs.

¹¹ 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.

¹² One genuine counterexample to generalization A' comes from VOS languages like Malagasy, as described in Pearson (2007). For discussion on what links VOS order to lack of case adjacency, see Neeleman (in prep).

¹³ Many languages allow scrambling across arguments, but this does not seem to be linked to OV order. There are OV languages that lack such scrambling (e.g. Dutch), as well as VO languages that allow it (e.g. Icelandic). We briefly discuss the matter in footnote 27.

¹⁴ 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.

¹⁵ An anonymous reviewer finds that the scope ambiguity is clearer in examples with two numerals, such as *Ze hebben vijf films gezien met z'n drieën* 'the three of them have seen five films' (5 > 3; 3 > 5).

¹⁶ 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.

¹⁷ 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 (53b) is A-scrambling; heavy-NP shift could be seen as a rightward counterpart of A’-scrambling.

¹⁸ This formulation of the OV/VO parameter is specific to the order of case-marked DPs with respect to the verb. Of course, many other word order restrictions correlate with OV/VO order. We think that these are best dealt with through a parameter hierarchy of the type proposed in Roberts (2012) and Biberauer and Roberts (2015). This is because the correlations in question often face exceptions.

¹⁹ 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.

²⁰ The claim that object-oriented and subject-oriented depictives in English occupy different positions is not ours. It goes back to at least Williams 1980; see also Andrews 1982, Culicover and Wilkins 1984 and Rothstein 1985. 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.

As to why subject-oriented secondary predicates cannot be merged lower in the tree, one option is to make use of Williams (1980) notion of c-subjacency, a locality constraint on

predication. We suspect, however, that a more general constraint is at work, as subject-oriented floating quantifiers are also excluded from appearing inside VP: **We gave John both a good talking to.*

²¹ This contrast is real, but not as sharp as expected. We have no account for this.

²² An alternative anchor could be provided by the hypothesis that APs need to receive case from the head N, as argued by Larson and Yamakido (2005). This idea is promising as it would allow a more direct parallel with Case Adjacency in the verbal domain. However, for the time being, it seems to us that the idea that APs must undergo type-shift in order to function as attributive modifiers is better established than the idea that they need case.

²³ Demonstratives, numerals and relative clauses do not require prior attachment of JOIN to be used as nominal modifiers. The basic type of PPs and genitives is subject to debate. However, PPs, in contrast to APs, can modify APs. Hence, if PPs require type-shift in nominal contexts, this cannot be the result of attachment of JOIN. An anonymous reviewer points out that there is independent evidence for the claim that what is needed to ‘glue’ a PP to a nominal projection is different from what is needed to glue an AP to a nominal, across languages. In particular, many languages, for example a wide range of Niger-Congo languages, allow APs to modify NPs but do not allow PPs to do so.

²⁴ Some languages, including Yoruba, only have a closed-set of apparent attributive adjectives and no predicative adjectives. This situation must be analyzed by saying that the language has no adjectives at all and by reassigning the apparent prenominal adjectives to a different, possibly functional, category (see Cinque 2010).

²⁵ For reasons of space, we abstract away from potential differences between the OV/VO parameter and the AN/NA Parameter. These parameters are of course important, but our current focus is on the Case-First and JOIN-First Constraints, and the effects of these constraints are, to a large degree, independent of the exact formulation of the parameters in question.

There are two potential differences that we are aware of. First, as mentioned before,

French and other Romance languages allow certain APs to appear in prenominal position. We do not know how this affects the AN/NA parameter.

Second, the choices that the OV/VO parameter offers are often taken to be mutually exclusive, but in many languages APs can optionally appear on either side of the noun. Whether this is a principled difference is not easy to decide; it depends, among other things, on the status of post-verbal DPs in OV languages like Old English and Middle Dutch. At least at first sight, these languages allow case-marked objects to either precede or follow the verb, which would restore full parallelism.

²⁶ The orthodox view is too simplistic in two ways. First, in languages with morphological case, there are verbs that assign the same case twice. Second, it is not obvious that in languages without morphological case, the two internal arguments in a double object construction carry different case features. To illustrate this, take the case of quirky subjects, which are found in languages with morphological case when a DP moves to subject position and retains its case, rather than switching to nominative. The absence of quirky subjects in languages without morphological case might be suggestive of an impoverished case system that lacks the distinction between dative and accusative.

There are two kinds of analysis for heads that apparently assign the same case twice. The first is to adopt a formal indexing mechanism that makes it possible to distinguish multiple occurrences of the same attribute in a single head. Such a mechanism has been proposed in Neeleman and Van de Koot 2002 for a parallel problem in theta theory. The mechanism in question is very restrictive, but could in principle be extended to the case system. As long as the relevant indices are visible to the Case-First Constraint, VP-shell formation will be forced in double object constructions.

A second approach is to argue that, contrary to appearances, the two cases assigned by a double-object verb are always distinct. This means that in double-dative or double-accusative

constructions the similarity of the cases must be a surface phenomenon. Indeed, some proposals assert that apparently identical morphological cases assigned by the same verb have different feature content in syntax, and are only similar in that they are realized at PF by the same set of affixes (see Wunderlich 2003 and references mentioned there). For languages without morphological case, the problem of the missing quirky subjects can be addressed by assuming that certain empty functional heads are tolerated in object position but not in subject position. There is some independent evidence for this from the distribution of null complementizers in English (Stowell 1981) and null determiners in Italian (see Longobardi 1994).

We leave the choice between these two general approaches open for now.

²⁷ Note that in head-final structures, both objects will satisfy the Case-First Constraint without VP-shell formation.

²⁸ It is tempting to analyze N-movement in Welsh as triggered by the AN/NA parameter. If the setting of that parameter requires that JOIN domains are constructed with reference to a preceding noun, the noun will have to move across attributive adjectives that are left-attached. (This is of course already part of the logic of NP-shell formation.) We will have to leave this issue to future research.

²⁹ An alternative analysis of the ban on prenominal stacking in Spanish could be based on the assumption that there is a unique prenominal position into which adjectives can move. There is reason to be suspicious of such an account. Work on Universal 20 has established that unmarked movement within the noun phrase must target a constituent containing the noun (Cinque 2005, Abels and Neeleman 2012).

³⁰ Notice that the PP in (97) precedes its sister. This is not the normal situation in Spanish. It suggests that for PPs there is an attachment requirement that can be overruled under specific circumstances. The N-AP-PP-AP order is not found in Welsh, which suggests that in this language PPs can never precede the node to which they are attached. We do not know why this

difference should exist.

³¹ Future research is necessary to develop this idea. It seems likely to us that the adjacency effects described are only found when a phrase initiates a search for a head. This may suggest that there is a grammatical limitation on precedence constraints, namely that their anchor is a head.