PP-Peripherality and Ambiguity in the Noun Phrase *

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1 Introduction

This paper focuses on a little-studied property of the noun phrase: the propensity of most languages to prefer an order in which a PP modifier or complement is more peripheral to the noun than is an adjectival modifier. This observation, termed by Adger (2012) as *PP-peripherality*, predicts that in languages where both types of modifiers appear on one side of the noun, the prepositional phrase is further away from the head than the adjective. This observation, if true, raises a number of questions about the noun phrase: what is it that requires a PP to be further from the noun it modifies? Is this requirement based in the structure of the noun phrase, or is it a linear condition? Does the existence of a single linear order necessarily indicate a single underlying structure for that order?

In this paper, I attempt to duplicate Adger's findings in a variety of both head-initial and head-final languages. I then discuss a number of predictions that arise from his, and other, representations of the noun phrase. I present new data from a number of head-final and head-initial languages that show a tendency towards PP-peripherality, but that also provide evidence of a new problem for these structural accounts of PP-peripherality. I show that, even in languages where both modifiers occur on one side of the noun, a scopal ambiguity may arise that cannot be explained by a purely structural

approach.

The structure of the paper is as follows. I present a basic typological description of the behaviour of adjectival and adpositional modifiers in the noun phrases of various head-initial and head-final languages. I then discuss how this behaviour is explained by Adger (2012), as well as two other structure based accounts: that of Sadler (2000) and that of Rouveret (1994). In section 4, I present a number of predictions that these structural accounts make: the (im)possibility of scopal ambiguity between the two modifiers (section 4.1); the behaviour of the class of scope sensitive adjectives, and whether they differ from intersective adjectives (section 4.2); the observation made by Abels and Neeleman (2012) that only nouns can intervene in clusters of stacked adjectives (section 4.3); and the possibility that a type of Quantifier Raising could save the structural accounts (section 4.4). I show that the predictions of these structural accounts do not hold up against the data, and therefore offer in section 5 the possibility that a linear condition could capture the data as presented in this paper. I conclude with a discussion of the merits of a base generation approach to the relatively free word order found in the head-final languages over a movement based approach.

2 An introduction to the problem

Within the domain of the noun phrase, much work has been done on the ordering of separate elements, most notably on adjective ordering (Barrit, 1952; Cinque, 2010; Sproat and Shih, 1991; Whorf, 1945) and on Greenberg's (1963) Universal 20, an observation about the relative ordering of determiners, numerals, adjectives and the head noun, later developed by Cinque (2005) and Abels and Neeleman (2012). The basic generalization revealed by Universal 20 is that when the elements Demonstrative, Numeral and Adjective appear to the left of the head noun, their relative ordering is largely fixed, whereas when they appear to its right, their order is much freer. This is discussed in more detail in the next section. However, relatively little has been written on

a phenomenon described by Adger (2012) as *PP-peripherality*. He describes the generalization as follows:

(1) *PP-Peripherality*: "When (intersective) AP modifiers and PP 'complements' both occur to one side of N inside a noun phrase, the PP is separated from the N by the AP." (p.6)

While Adger's work focuses largely on head-initial languages, one mooted benefit of his "syntax of substance" is that it would explain why PP-peripherality should hold in head-final languages as well. I will discuss his approach in more detail below.

My work will follow Adger's in terms of method: I do not attempt a large-scale typological survey. Rather, I will focus on a relatively small number of languages for which I have access to native speaker informants. I attempted to have a relatively equal number of head-initial and head-final language families represented, and most of the informants were linguistics faculty or students. This was arranged on purpose to ensure that subtle judgments on marked word orders and ambiguities could be gathered with a reasonable degree of confidence in the results. Out of necessity, I had only one or two informants per language in most cases, but I hope to expand this research with a more thorough study of the languages in question.

I will discuss whether the data supports Adger's observation on PP-peripherality. Adger himself recognizes that PP-peripherality is not an iron-clad linguistic universal, and that adjectives can occur further away from the noun than the PP. However, he claims that in these cases, the AP bears special intonation, or that the linear string is marked in some other way compared to its PP-peripheral counterpart. One major obstacle in determining the reach of PP-peripherality is that head-final languages, those in which the noun would be preceded by adjectival and prepositional (or postpositional) modifiers, tend to allow scrambling and are generally much freer in terms of word order than are head-initial languages. This means that determining which order is the most neutral or least marked in such languages can be

challenging, even for native speakers. While there is reason to continue this research in more detail, with a larger group of informants and possibly from a wider variety of languages, this work goes some way towards establishing the basis for further research.

2.1 Modifiers in the noun phrase

I will here attempt a basic typological description of the behaviour of PP and AP modifiers in relation to a head noun in a cross-section of the world's languages. In particular, I am interested in testing David Adger's (2012) observation on PP-peripherality. In order to do so, I compared entries in the World Atlas of Language Structures Online (Various, 2012) on the relative order of noun and adjective, the relative order of subject and verb, and whether languages have pre- or postpositions. From this research, I was able to compile two lists of languages: those that are generally head-initial (having the order NA, VS and having prepositions) and therefore likely to have post-nominal modifiers, and those that are generally head-final (having instead AN, SV and postpositions) and therefore likely to have pre-nominal modifiers. To the head-initial languages, I added several of the Romance languages, as these also have post-nominal modifiers in the noun phrase. According to Adger, we should expect the head-initial languages to display the order N A PP in the noun phrase[1], with respect to adjectival and adpositional modifiers of the head noun, and the head-final ones to have PP A N. The orders N PP A and A PP N should not be attested if the generalization holds. The languages which have their modifiers on either side of the noun, such as English with its A N PP ordering as well as the reverse order of PP N A, are irrelevant for the purposes of this investigation, because the generalization

[1]For the purposes of this paper, the choice of DP or NP is largely irrelevant, as the important relationships are the c-command relationships that hold *within* DP/NP. For this reason, I abstract away from the DP/NP distinction and use NP for the sake of convenience. However, the observations still hold if the relevant maximal projection is taken to be DP rather than NP.

is linear, and restricted to the cases in which PP and AP both occur to one side of the noun.

Having compiled the two lists, I attempted to find representative native speakers from as many of the languages as possible, from whom I could elicit acceptability judgments and other data. Of the head-initial languages, I was able to collect data from Hebrew, Arabic, Welsh, Spanish and Catalan. From the head-final languages, I had informants from Japanese, Hungarian and Turkish. While the number of languages represented in the head-initial group is larger, the number of language families is roughly the same, so I consider the two datasets comparable. However, an important consideration is that head-final languages tend to allow scrambling, while head-initial languages do not. This fact can obscure the most neutral or unmarked word order in head-final languages, making solid generalizations a somewhat difficult task. This difficulty will be considered in the discussion of the datasets, and any further analysis.

Firstly, I elicited data on the normal order of adpositional and adjectival modifiers in the noun phrase, which confirmed that each of the languages displayed either pre- or post-nominal modification in unmarked orderings, rather than either the A N PP or PP N A ordering discussed above. I collected data on PP complements as well as PP modifiers, as Adger's formulation of PP-peripherality deals solely with complements, but I found that the data on both complements and adjuncts differed very little, if at all. For the sake of brevity, I therefore concentrate on non-complements, as these are the case most likely to provide a counter-example to Adger's generalization, because they are structurally further from the noun. I then requested information on the relative order of the modifiers in the given language, as well as the reading resulting from that order and whether any other readings, or indeed orders, were possible. The data I received within each dataset were largely consistent, with any deviations particular to a given language clarified below. I will first discuss the results of this exercise before considering the bearing they have on the issue of PP-peripherality.

None of the head-initial languages allowed the order N PP A, but N A PP was attested in each of them. This much is consistent with the idea of PP-peripherality. The head-final languages all allowed both PP A N (as predicted by Adger) and A PP N. However, the Japanese informant noted a subtle preference for the PP A N order as more natural, and the Turkish informant expressed a more definite preference for the same order, considering A PP N to sound less natural than PP A N, although not to the extent that the former was ungrammatical. Hungarian appears to allow both orders, but under strictly different readings, so that each is more natural than the other in different settings.

Spanish

(2) El cuadro falso del siglo XV
The picture fake of-the century XV

(3) ?*El cuadro del siglo XV falso
The picture of-the century XV fake
The fake picture from the 15$^{\text{th}}$ century

Spanish allows the order N A PP, with N PP A being significantly degraded compared to the PP-peripheral order.

Catalan

(4) El quadre fals del segle XV
The picture fake of-the century XV

(5) ?*El quadre del segle XV fals
The picture of-the century XV fake
The fake picture from the 15$^{\text{th}}$ century

Catalan showed the same results as Spanish, which may be expected as these

two languages are very closely related.

Hebrew

(6) Ha- tmuna ha-mezuyefet me-ha-me'a ha-15
The-picture the-fake from-the-century the-15th

(7) *Ha-tmuna me-ha-me'a ha-15 ha-mezuyefet
The-picture from-the-century the 15th the-fake
The fake picture from the 15th century

In Hebrew, the N PP A order is disallowed, while N A PP is perfectly grammatical.

Arabic

(8) El Louha el-Muqallada min el qarn el Khamis-ʔashar
The picture the-fake from the century the fifteenth

(9) *El Louha min el Qarn el Khamis-ʔashar el-Muqallada
The picture from the century the fifteenth the-fake
The fake picture from the 15th century

Arabic similarly allows N A PP while excluding N PP A. These results are consistent with Adger's observation.

Welsh

(10) Y llun ffug o'r 15fed ganrif
The picture fake from-the 15th century

(11) *Y llun o'r 15fed ganrif ffug
The picture from-the 15th century
The fake picture from the 15th century

N A PP is perfectly acceptable in Welsh. N PP A may be grammatical, but does not correspond to the intended meaning or structure. When acceptable at all, the adjective would modify the noun contained within the prepositional phrase, rather than the head noun, so the bracketed structure would be [N [$_{PP}$ P [A]]]. This is not the relevant structure, so we may say that Welsh excludes N PP A in the case under discussion.

As can be seen in the above data, the head-initial languages all allowed the order in which the adjective intervenes between the noun and the prepositional modifier, and disallowed the order in which the PP and the A are inverted. This is in keeping with the data collected by Adger, and with his observation that PPs are more peripheral to the head noun than are adjectival modifiers.

I turn now to head-final languages.

Japanese

(12) Nise-mono-no 15-seeki-no e
fake-thing-GEN 15-century-GEN picture

(13) 15-seeki-no nise-mono-no e
15-century-GEN fake-thing-GEN picture
The fake picture from the 15th century

Both PP A N and A PP N orders are acceptable in Japanese. PP A N may be slightly more natural, but the difference is subtle according to my informant.

Turkish

(14) Sahte 15. yüzyildan resim
fake 15 century picture

(15) 15. yüzyildan sahte resim
15 century fake picture
The fake picture from the 15th century

The order in which the adjective intervenes between the PP and the noun is preferred to A PP N, although the latter is not fully ungrammatical. This is also largely consistent with PP-peripherality.

Hungarian

(16) A hamis 15. szazadi festmény
the fake 15 century picture

(17) A 15. szazadi hamis festmény
the 15 century fake picture
The fake picture from the 15th century

Both orders are acceptable, but they each refer to different objects. "A hamis 15. szazadi festmény" would refer to something that is imitating a picture from the 15th century, while "a 15. szazadi hamis festmény" describes a fake picture (perhaps a copy of another work) that is actually from the 15th century. The modifier on the left therefore takes scope over that further right in both cases. Additionally, contrary to data presented by Adger, my informant claims that phrases such as these are not allowed as a complete sentence (i.e. with a copular verb as in "The fake picture is from the 15th century), but are allowed at least as a phrasal subject of a sentence, as in "The fake picture from the 15th century was stolen". Adger claims that postnominal complements are not possible in sentences, only in non-sentential strings such as titles.

As anticipated, the head-final languages are more flexible in their word orders. However, Japanese and Turkish both exhibit a preference for the order PP A N, in keeping with PP-peripherality. Hungarian had no such

preference, with both the PP A order and its inverse being equally acceptable. Taken as a whole however, it seems that the head-final languages do have a slight preference for the PP-peripheral ordering, but the same preference in the head-initial languages is much stronger.

The net result of this typological survey is that head-initial languages, those whose modifiers follow the head noun, exhibit a strong preference for a certain order in those modifiers, with the adjective intervening between the prepositional phrase and the noun. On the other hand, the head-final languages, whose modifiers precede the head noun, are less fixed in their order: it is generally preferred that the PP precedes the adjective, but this preference ranges from seemingly non-existent in Hungarian to fairly strong in Turkish. That being said, the difference in acceptability between the PP-initial and PP-medial orders in Turkish is still not as strong as the equivalent difference in the head-initial languages.

This observation is in stark contrast to Greenberg's (1963) observation known as the Universal 20. Greenberg's work, later confirmed and expanded on by Cinque (2005) and Abels and Neeleman (2012), focused on the relative order of elements within the noun phrase. Concentrating on nouns, adjectives, numerals and demonstratives, as in the phrase "those four dashing lads", he found that in languages where the non-nominal elements precede the noun, the order is fixed as Dem Num A N, but where any one or more of them follow the noun, the order there is much more free. Thus, before the noun, demonstratives precede numerals, numerals precede adjectives, and adjectives precede the noun, but post-nominally, many more linear strings are allowed. The full list of licit and illicit orders is below:

(18) a. (i) DEM NUM A N *attested*
those four dashing lads
(ii) DEM NUM N A *attested*
(iii) DEM N NUM A *attested*
(iv) N DEM NUM A *attested*

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

p.29

If the generalization from Universal 20 is that word order is fixed before the noun and freer after it, the data presented earlier in this section seem to show the opposite: in languages where modifiers precede the noun, the order is more flexible than in languages where they follow it. Of course, the two observations concern different elements: the Universal 20 describes the behaviour of demonstratives, numerals, adjectives and nouns, while the current generalization regards two different types of nominal modifiers: AP and PP. However, the apparent contradiction is striking.

The data I collected were largely consistent with those of Adger, and can be taken as support for his generalization on PP-peripherality. The

picture is much clearer in head-initial languages which universally prefer the N A PP order to N PP A, than it is in the head-final languages, which are generally more flexible in their use of PP A N and A PP N, although the former tends to be preferred. This fact is also consistent with the well-known observation (see eg. Corver and van Riemsdijk 1994, and references therein) that scrambling is much more common in head-final languages than it is in head-initial languages, meaning that neutral or unmarked word orders are harder to determine in those languages that do allow scrambling, such as the head-final languages examined here. This correlation is discussed in greater detail in section 5.2. The data presented here, showing that word order in the noun phrase in head-final languages is more flexible than in head-initial languages, as well as observations about scrambling in general, also contrast with the generalization resulting from work on Greenberg's Universal 20, which shows that word order tends to be more restricted before the noun than it is following it. While Adger did not intend for PP-peripherality to be more than an observation, the data discussed above provide support for its being applicable to a wide variety of languages and language families.

Scrambling is a phenomenon in which word order is variable within a clause. It is usually understood to apply at the level of CP or IP, and targets constituents. Some examples of scrambling in German, from Corver and van Riemsdijk (1994) are below.

(19) a. . . . weil Hans wahrscheinlich *das Buch* gekauft hat
. . . because Hans probably *that book* bought has
b. . . . weil Hans *das Buch* wahrscheinlich gekauft hat

(20) a. . . . weil niemand *dieses Buch* gekauft hat
. . . because nobody *this book* bought has
b. weil *dieses Buch* niemand gekauft hat pp.1–2

Scrambling is known to exist in a variety of languages. Notably for our purposes, scrambling occurs in all of the head-final languages discussed here (Japanese, Hungarian and Turkish), as well as the Germanic SOV languages (other than English). Furthermore, other head-final languages, such

as Korean, Hindi–Urdu, Finnish and Tatar, among many others, make use of scrambling. There seems to be a strong correlation between head-final languages, where the adjective and PP both precede the noun, and those that allow scrambling. However, this correlation is not necessarily intuitive. As mentioned earlier, scrambling generally applies at the clause–level, rather than within smaller constituents. The classic examples of scrambling involve arguments of the verb moving to a position high in the clause. In these cases, PPs are less easily scrambled than DP arguments. What we have seen in the NP is on a much smaller scale. Here, it appears that word order between adjective and prepositional phrase is less rigid than in languages that do not allow scrambling, such as the head-initial languages discussed above. I will not go so far as to say that the freer word order we have seen in head-final languages is an example of scrambling, but the fact that variable word order at the clause level seems to correlate with variable word order within the NP is notable. Furthermore, it is possible that traditional analyses of scrambling may be adapted to explain the freer word order found in the NP.

Explanations of scrambling at the clause level generally take one of two forms. Either it is understood that scrambled word orders are derived from a single underlying word order via movement (e.g. Webelhuth, 1989 and Müller and Sternefeld, 1994 for an A'-movement appraoch, and Vanden Wyngaerd, 1989 and Deprez, 1994 for an A-movement approach), or the free order of constituents is taken to be the result of different base generated structures (e.g. Bayer and Kornflit, 1994, Neeleman, 1994). Both of these approaches could be adapted to the NP: either the two different orders of PP and adjective are both base generated, or one is derived from the other via movement. In both of these cases, it has to be explained why the PP-medial order is not available in head-initial languages. I return to this question in section 5.2.

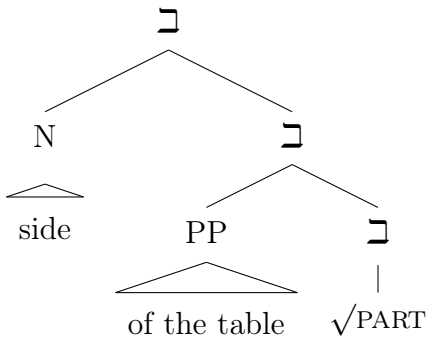
3 Previous analyses

3.1 *A Syntax of Substance*

In *A Syntax of Substance*, David Adger proposes a novel syntactic system that separates the structure building operation from the structure labeling operation. Adger claims that one consequence of this system is an empirically rigourous explanation of the observation known as PP-peripherality, wherein adjectival modifiers intervene between the head noun and the PP complement. This section provides a description of the salient features of the system and its empirical predictions. How these predictions fare against novel data is discussed in section 4.

Adger divorces the noun from the relation it depicts, with the relation being indicated by a separate root. For example, the phrase *side of the table* is represented as follows, where ב represents the *part* type relation depicted by the noun *side*.

(21)

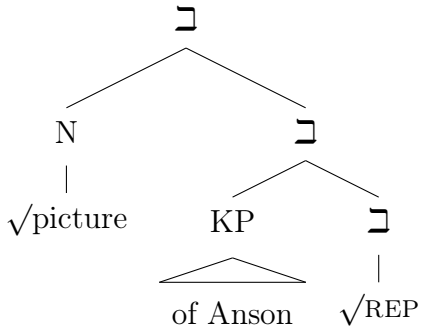


p.6

The ב root comes in different varieties, indicating different relations between the head noun and its prepositional "complement", which in Adger's structure is no longer a complement of the noun. Such relations may be part-whole, as above; representation, as in *the picture of Mary*; inalienable possession, as in *John's mother*; or property, as in *the height of the door*,

among others. Obviously, not all of these relations have prepositional "complements": *John's mother* requires the genitive in English and largely disallows a PP complement (c.f. *The mother of John talked to the butcher.*). Adger claims that the sister of the relational root is in fact a case phrase, KP, and that the case of the NP contained within it is usually spelled out with a preposition in English, but may be spelled out differently, including as the genitive. Therefore, the structure is more accurately represented as follows.

(22)



p.80

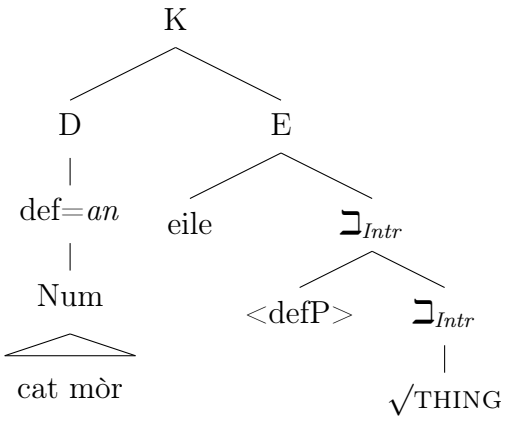
Adger's syntax of substance also differs from traditional accounts in other ways. For him, the noun and any intersective adjectives, like *big*, *green* and *square*, form a constituent, c-commanding the KP and בּ. He identifies, along with Willis (2006), a separate class of adjectives, exemplified by *eile*, "other" in (Scottish) Gaelic, as "scope sensitive", as they take scope over the PP complement to the noun. To this class, I add other scope sensitive adjectives like *fake* (which appears to have a similar scope-taking property across many languages), as well as "operator" adjectives like *former* (which do not appear to have similar properties cross-linguistically).[2] Adger places this class of adjectives in a separate projection from that which contains the noun and

[2]It appears that some scope sensitive adjectives have similar properties across a number of languages, while others are language specific. The exact properties of these adjectives I set aside for future research in order to concentrate on their behaviour with respect to intersective adjectives.

intersective adjectives, and requires movement of the N+A constituent above the scope sensitive adjective, as below. Additionally, these adjectives are generated outside of the N+A constituent, and so cannot intervene between the noun and intersective adjectives.

(23) an cat mòr eile
the cat big other
The other big cat

(24)



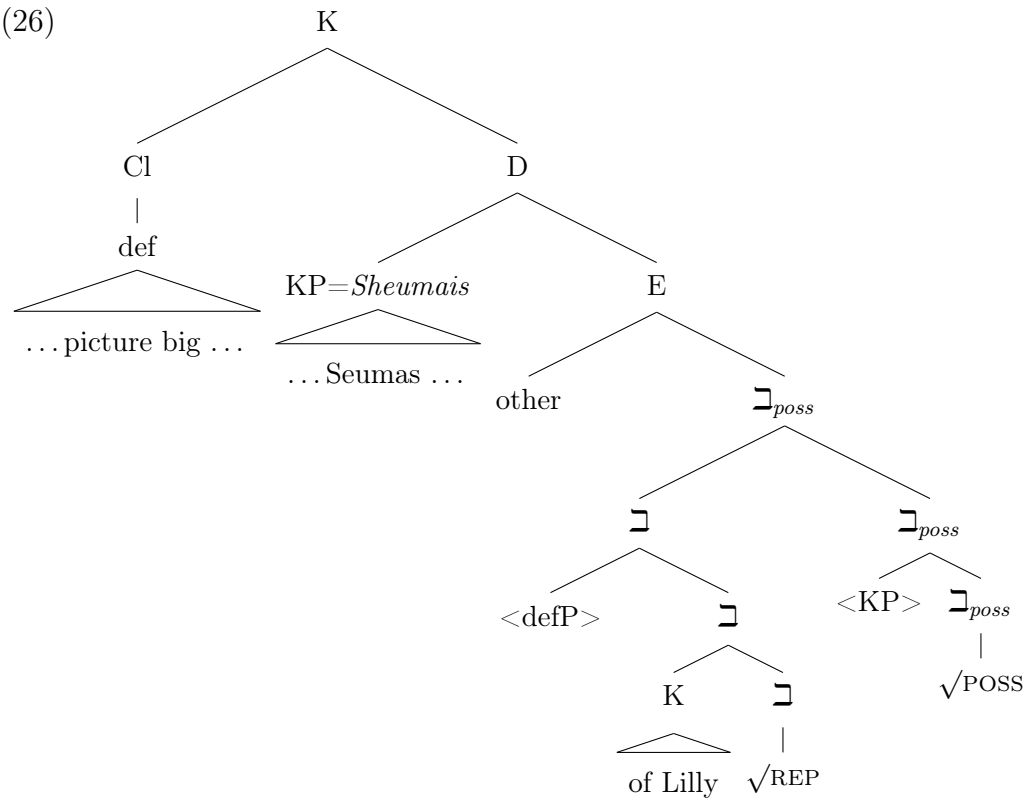
p.124

Without stipulating that these adjectives must be linearized to the left of ⊐P, this structure makes the prediction that scope sensitive adjectives should behave differently to intersective adjectives, especially in terms of location in a linear string. I return to this prediction in section 4.2.

A fuller picture of the salient aspects of Adger's new syntax is below. This structure represents the Gaelic phrase "Seumas's other big pictures of Lilly", *dealbhan mòra Sheumais eile de Lilly.* "E" represents the projection containing the scope sensitive adjectives.

(25) dealbhan mòra Sheumais eile de Lilly
pictures big Seumas.GEN other of Lilly
Seumas's other big pictures of Lilly

(26)



p.125

According to this structure, *other* c-commands *of Lilly*, explaining why the adjective takes scope over the PP/KP. The constituent containing the noun and intersective adjective scopes over both the scope sensitive adjective and the PP complement. Although I return to this point in more detail in section 4.1, I will here point out that this structure cannot account for cases where the PP takes scope over either of the adjectives.

This approach accounts for PP-peripherality in head-initial languages by relying on the structure of the noun phrase itself. It ensures that KP, as sister to the relational root בּ, is structurally lower than the noun that is traditionally analyzed as the head of the phrase. This noun forms a constituent with any intersective adjectives that modify it, so it is impossible for the PP or KP to intervene between these two elements. Assuming that the N+A constituent can be linearized to the right of the relational head and its

PP/KP complement, it is also able to predict PP-peripherality in head-final languages for the same reason: as long as NP and AP form a constituent to the exclusion of the PP complement, PP must be more peripheral to the noun than the adjective.

However, in order to fully accept this analysis and especially its explanation for word order in Gaelic, we must accept that defP obligatorily moves above the possessor KP *Sheumais* in our example. Additionally, E, or the class of adjectives that may scope over prepositional phrases, must be understood to occupy a separate structural position to intersective adjectives and to be much further from the nominal head. From this fact, and without further stipulation, we also predict that this class of adjectives behaves differently in terms of structural and linear position than intersective adjectives. It remains to be seen whether these assumptions are valid.

While Adger's approach evidently accounts for PP-peripherality in languages where both modifiers are linearized on the same side as the noun, the c-command relations between the elements are fixed, so, under a traditional understanding of scope, the scopal relations must also be fixed. This fact predicts that phrases with both an adjectival and a prepositional modifier must be unambiguous. In section 4.1 I return to this prediction to determine whether it stands up to the evidence.

3.2 Approaches to the Welsh noun phrase, and their application to PP-peripherality

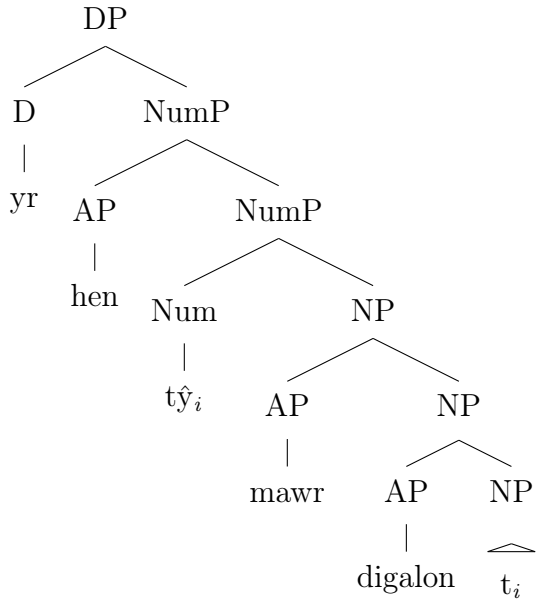
If PP-peripherality proves to be a generalized phenomenon, there should be a general explanation for it. That is, it should not be derived on a language-by-language basis, but should rather be the result of a general property of the noun phrase, or of the language faculty. Several possibilities exist, although they are not necessarily mutually exclusive. We have seen one example of a structural account, that of Adger (2012). PP-peripherality may equally be the result of a linear restriction of some kind. Languages may also prefer to have an adjective closer to the noun than a pre- or postpositional phrase

for ease of parsing, or for some other cognitive reason. In this section, I will discuss two analyses of various phenomena in the Welsh DP, as well as the predictions they would make in terms of PP-peripherality.

Sadler (2000) examines the structure of the noun phrase in Welsh, in particular with respect to an analysis put forward by Rouveret (1994). In Welsh, the head noun precedes the possessor phrase, PP complements and modifiers, as well as the vast majority of adjectival modifiers. Determiners, some numerals and a very few adjectives precede the noun. The basic post-nominal word order is any adjectival modifiers, followed by possessors, followed by prepositional complements (Sadler, 2000). Rouveret proposes that N obligatorily moves to occupy a functional Num projection in head-to-head movement, and that Num occupies a position between D and N. If APs are left-adjoined to NP, the surface word order is accounted for, as long as the few adjectives that appear prenominally can be assumed to adjoin to NumP rather than NP. This structure produces a tree like the following.

(27) yr hen tŷ mawr digalon
the old house big sad
The big sad old house

(28)



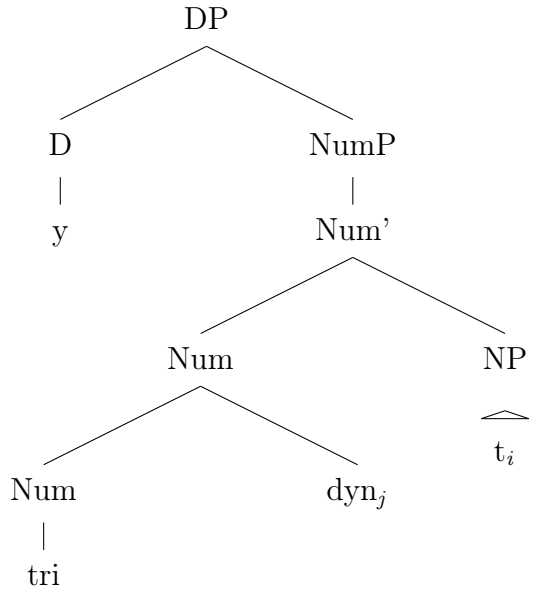
p.75

Sadler (2000) identifies several problems with this analysis. She questions the motivation for Rouveret's obligatory movement of N to Num in light of two different constructions that occur with numerals in Welsh, shown in (29) and (30) below.

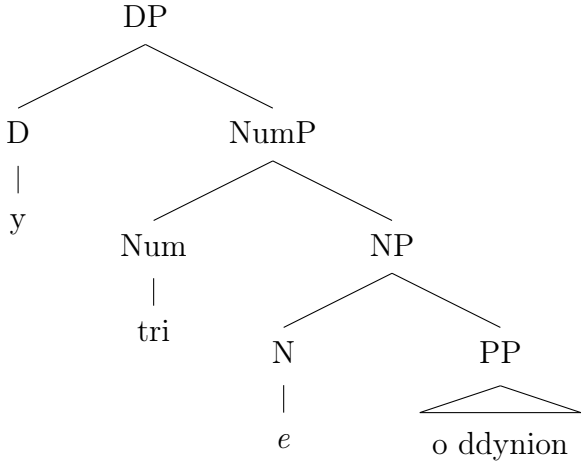
(29) y tri dyn
the three men
The three men

(30) tri o ddynion
three of men
Three men

(31)



(32)



pp.77–79

Rouveret argues that N must move to Num in order for a number feature of sorts on the noun to be checked, but does not explain why this feature need not be checked in the partitive example in (32).

Additionally, if N undergoes head movement to Num, Rouveret would predict that prenominal adjectives would precede this adjunction. In fact, they intervene between Num and N, as shown below.

(33) y ddau hen greadur
the two old creature
The two old creatures

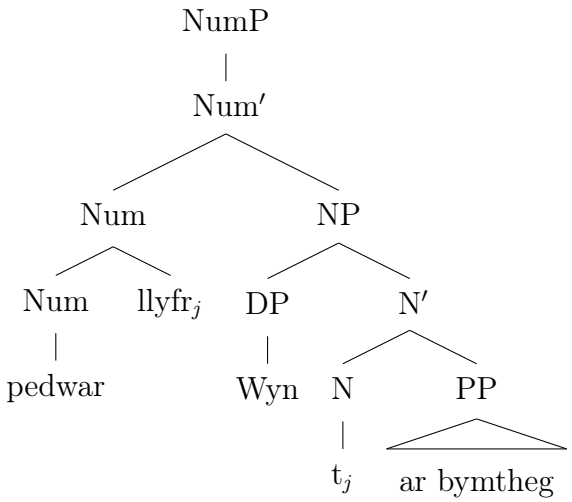
(34) pedwar hen lyfr Wyn
four old book Wyn
Wyn's four old books p.79

There is another numeric construction in Welsh which is akin to a combination of those found in (29)–(34). In this third construction, one (simplex) part of a complex numeral occurs prenominally while the other part follows the noun. This can be seen below.

(35) pedwar llyfr ar bymtheg
four book on fifteen
Nineteen books

Given Rouveret's analysis, he would predict that a possessor would appear between the Num-N adjunction and the PP containing the second part of the complex numeral, as DP and PP possessor phrases are left specifiers of NP, as in the tree below.

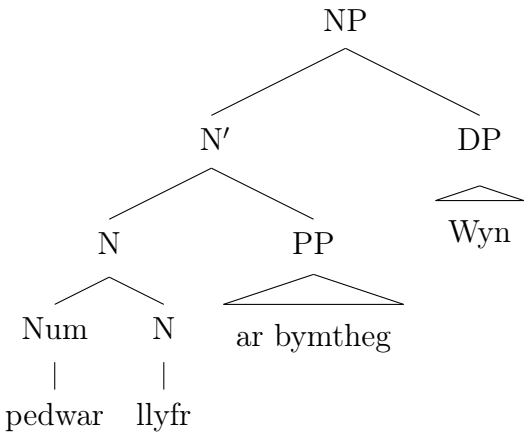
(36) *



(37) pedwar llyfr (*Wyn) ar bymtheg (Wyn)
four book (Wyn) on fifteen (Wyn)
Wyn's nineteen books p.80

Instead, Sadler proposes the following structure:

(38)

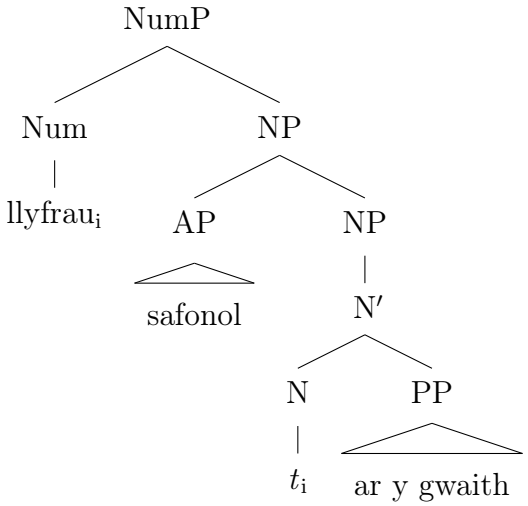


p.104

Incorporating the examples of Rouveret's analysis given above, the following structure represents the relative position of the noun, adjective and PP in his approach.

(39) llyrfau safonol ar y gwaith
books standard on the work
standard books on the work

(40)

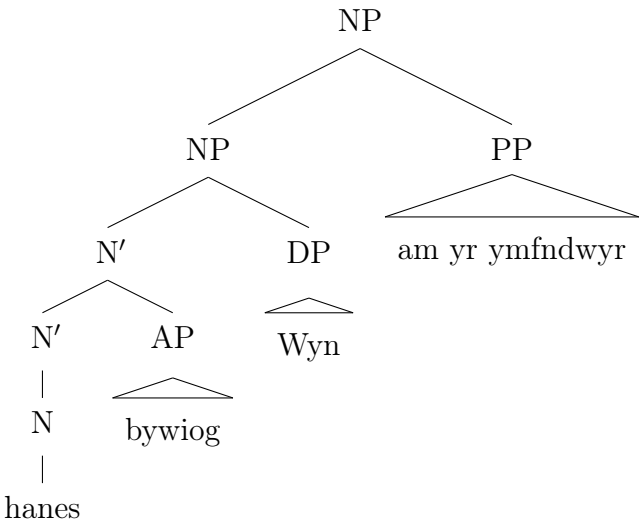


p.74

Sadler, on the other hand, proposes the following.

(41) hanes hywiog Wyn am yr ymfndwyr
story lively Wyn about the emigrants
Wyn's lively story about the emigrants

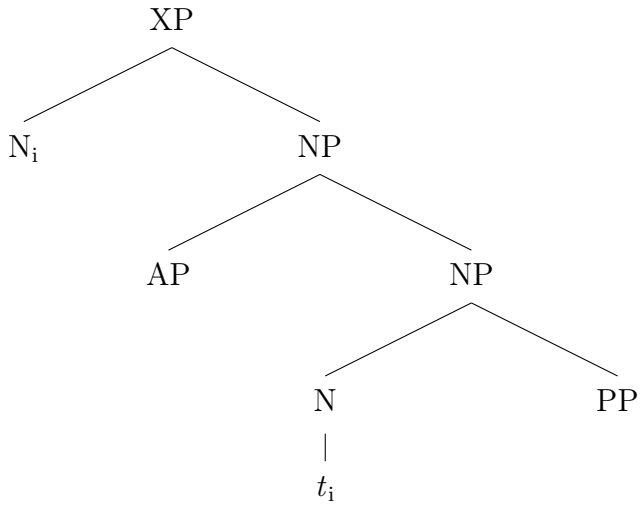
(42)



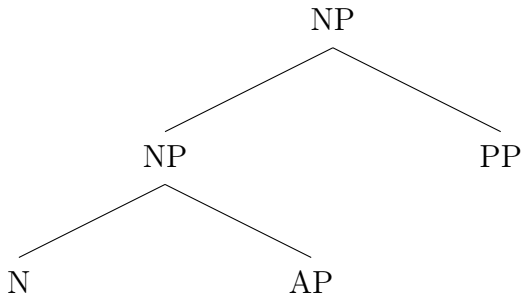
pp.93–94

Simplifying these structures, we see that the two authors have two different approaches to the position of the PP, and therefore two different reasons as to why PP should be more peripheral. The two simplified structures are below.

(43)



(44)



Both NP structures are therefore different to Adger's (2012), although Rouveret's has the same c-command relations. Rouveret makes use of an NP shell structure, which will be discussed in section 5. However, it is evident from these structures that neither of them can explain the ambiguous scope patterns that arise in some of the head-initial languages. Sadler's approach only accounts for the case in which PP takes scope over the adjective, while Rouveret's, conversely, can only explain why the adjective takes scope over PP, as does Adger's (2012). Neither of them has an explanation for the other case. Indeed, it appears that no single structural account of PP-peripherality

can explain the observed ambiguity, without making use of some scope raising device. I discuss the possibility of a type of Quantifier Raising being used to this end in section 4.4.

4 Predictions arising from structural analyses

4.1 The unambiguous nature of structural approaches

David Adger observes that when AP modifiers and PP complements both occur on one side of the head inside a noun phrase, the AP intervenes between the PP and the N (p.9). This generalization is claimed to hold across languages, again given that both modifiers appear on the same side as the noun. Such languages would include those that are generally head-initial, such as Celtic languages (Welsh, Irish, Scottish Gaelic), Hawaiian and Semitic languages (Arabic, Hebrew), as well as certain other languages that are head-initial in the noun phrase, such as many Romance languages (Spanish, Catalan, Italian). Additionally, we would expect languages that are generally head-final to fall into this category. Such languages would include Japanese, Hungarian, Turkish, Tatar, Hindi, Gujarati and Pashto, among many others.

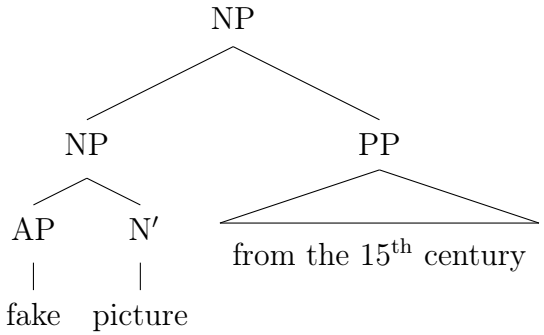
In addition to questioning native speakers of some of these languages about unmarked word orders in their languages, I asked about the meaning of various linear strings, as well as about ambiguities that may arise from certain orderings.

I am particularly interested in phrases like the English "the fake picture from the 15^{th} century", which is ambiguous. In one reading of this particular phrase, the PP scopes over the adjective, resulting in a meaning along the lines of "a picture from the 15^{th} century, which is in fact a fake" (45). In the other, the adjective takes scope over the PP, giving roughly "an item which purports to be a picture from the 15th century, but really isn't" (46). The relevant structures are given in (47) and (48). The ambiguity can be explained by the fact that one linear string can be represented by two different syntactic structures, resulting in the observed scopal differences.

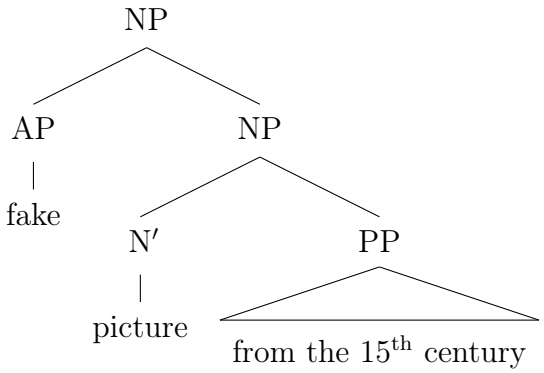
(45) *Meaning 1* A fake picture that is actually from the 15$^{\text{th}}$ century (e.g. a copy of a Roman fresco, dating from 1492).

(46) *Meaning 2* A picture that is purported to be from the 15$^{\text{th}}$ century (e.g. a copy of a work from 1483, that was actually made in 1989).

(47)



(48)



However, in languages where an adjective and a PP modifying the same noun are both pronounced on the same side of the noun, certain questions arise. Does the relevant ambiguity, as found in English-type languages, arise? If so, how can we account for the scopal ambiguity when the structure appears to be unambiguous?

I will first examine the logically possible orders of the relevant elements to review which are attested and which are not. This information is below.

(49)

N A PP	A N PP	PP A N
**N PP A	??PP N A	?A PP N

ANP is the order of languages like English, and as we have already seen it is an attested order. Languages like Irish, Arabic, Hebrew and Hawaiian exhibit the NAP order; these languages are largely head-initial. Head-final languages like Japanese, Finnish, Hindi and Turkish use the order PAN.

Moving to the second line of the table, we find two orders in which the preposition intervenes between the noun and its adjective, namely NPA and APN. According to David Adger's (2012) generality on PP-peripherality, stated in (1), these orders should be illicit, or at least unattested as unmarked orderings. As discussed in section 2.1, none of the head-initial languages studied allow a PP to intervene between the head noun and an adjective, so the order N PP A is so far unattested. However, contrary to Adger's observation, the head-final languages do allow such an intervention, although this order seems marginally more marked than the PP-peripheral order. The final order, PNA, is the reverse ordering as English. I have been unable to determine whether it is attested, but if it is, we would expect the same behaviour as regards the relevant ambiguity as is found in English.

In general, the responses I received on ambiguity were not very uniform, but it appears that Arabic has the described ambiguity, and that both Italian and Spanish may have it.[3] The ambiguity is therefore at least possible in some head-initial languages. In the head-final languages, however, the ambi-

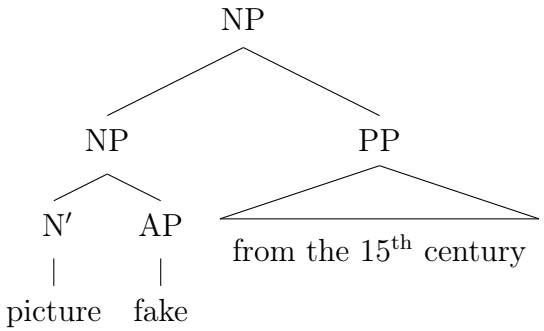
[3]Approximately half of the 10 Spanish informants and two out of three Italian informants thought the phrase in their language was ambiguous in the relevant way. Two Japanese informants out of five thought the phrase was ambiguous, but they were the two non-linguists in the group. Due to the subtlety of the ambiguity in question, and the relative confidence of the linguists' judgments compared to the non-linguists', I give more weight to the judgments of the linguists. I therefore treat Japanese as though it does not have the ambiguity.

guity was not attested at all: the different linear orders were not ambiguous, and different orders resulted in different scope patterns, with scope always correlating with linear order. That is, when AP preceded PP, AP had scope over PP, and vice versa.

Another pattern here arises: in head-initial languages, where word order is relatively fixed, a single linear string may be associated with two different meanings. However, in head-final languages, which tend to have much freer ordering, such ambiguities are less common, if they exist at all. Rather, these languages appear to make use of their free word order in order to express the different meanings.

The existence of such an ambiguity raises a paradox: how can two different meanings, reflecting two different scopal relationships, be related to a linear string, as in (50)? I return to this question in section 5.1.

(50)



4.2 How different are scope sensitive adjectives?

Adger claims that the class of scope-sensitive adjectives like *fake* and Gaelic *eile* are generated externally to the constituent that contains the head noun and intersective adjectives. This structure would predict therefore that, barring additional movement, members of this class of adjectives cannot intervene between the noun and any intersective adjectives that modify it. However, such a linear order is perfectly licit in English:

(51) The big fake picture from the 15th century.

Furthermore, when it appears in this linear order, it has the same scopal ambiguity described above between *fake* and *from the 15th century*. That is, even when *big* apparently forces *fake* to be in the XP containing the noun and other adjectives (whether or not *def* moves above E), the ambiguity remains.

This order is also licit in Turkish, Hungarian and Japanese:

Turkish

(52) Yeşil sahte resim
green fake picture

Hungarian

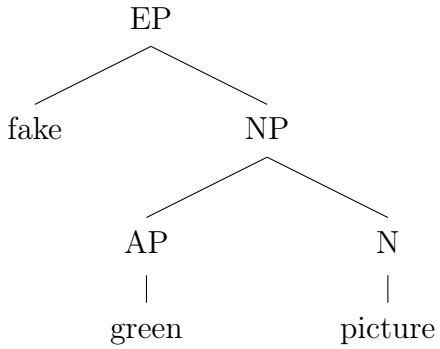
(53) A zöld hamis festmény
the green fake picture

Japanese

(54) Midori-no nise-mono-no e
green-GEN fake-thing-GEN picture
(The) green fake picture

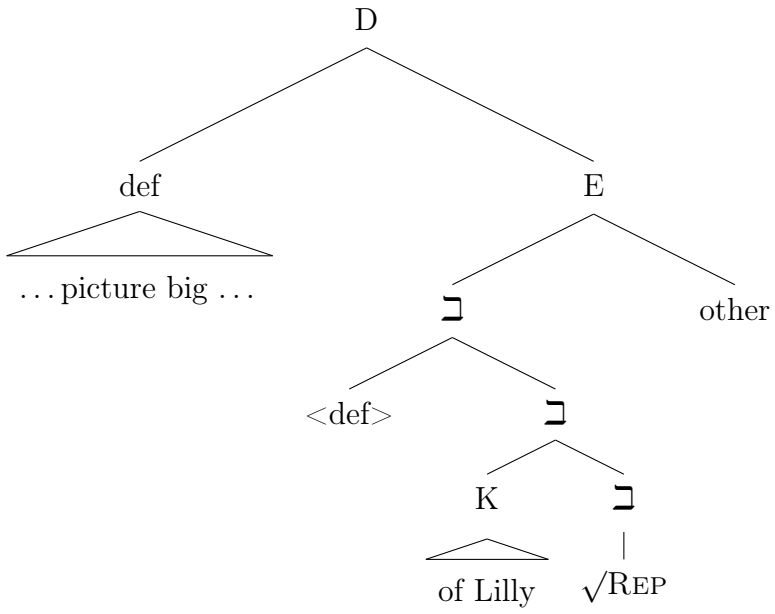
From these data, it appears that the noun and any intersective adjectives cannot form a constituent to the exclusion of *fake*-type adjectives. This is because *fake*-type adjectives can intervene between the noun and intersective adjectives. If the noun and intersective adjective were a constituent, this would not be possible:

(55)



Another problem with Adger's proposed structure of the NP relates to how the structure is linearized. Given that scope sensitive adjectives are generated in a separate projection to other adjectives and the noun, it follows that, without further stipulation, they may be linearized on either side of בP, and not necessarily on the same side as the N+A constituent. For example, the structure may be as follows:

(56)



However, it appears that this prediction is not borne out. Data from each of the languages studied show that adjectives have to appear on the same side of the NP.

Spanish

(57) *El falso cuadro verde
The fake picture green
The fake green picture

Catalan

(58) *El fals quadre verd
The fake picture green
The fake green picture

Hebrew

(59) *Ha-mezuyefet (ha-)tmuna (ha-)yeruka
The-fake (the-)picture (the-)green
The fake green picture

Arabic

(60) *El muzayyafa el Soura el Xadra
The fake the picture the green
The fake green picture

Welsh

(61) ??Y ffug lun gwyrdd
The fake picture green
The fake green picture

Japanese

(62) *Nise-mono-no e midori-no
fake-thing-GEN picture green-GEN

(63) *Midori-no e nise-mono-no
green-GEN picture fake-thing-GEN
(The) fake green picture

Turkish

(64) *Sahte resim yeşil
fake picture green

(65) *Yeşil resim sahte
green picture fake
(The) fake green picture

Hungarian

(66) *A hamis festmény zöld
the fake picture green

(67) *A zöld festmény hamis
the green picture fake
The fake green picture

Additionally, scope sensitive adjectives may not be separated from intersective adjectives by a PP in the head-initial languages:

Spanish

(68) ?El cuadro verde del siglo XV falso
The picture green from-the 15^{th} century fake
The fake green picture from the 15th century

Catalan

(69) ?El quadre verd del segle XV fals
The picture green from-the 15th century fake
The fake green picture from the 15th century

Hebrew

(70) *Ha-tmuna ha-yeruka me-ha-me'a ha-15 ha-mezuyefet
The-picture the-green from-the-century 15th the-fake
The fake green picture from the 15th century

Arabic

(71) *El Soura el Xadra min el qarn 15 el muzayyafa
The picture the green from the century 15 the fake
The fake green picture from the 15th century

Welsh

(72) *Y llun gwyrdd o'r bymthegfed ganrif ffug
The picture green from the 15th century fake
The fake green picture from the 15th century

Turning now to head-final languages, we see that Turkish disallows the equivalent example:

(73) *Sahte 15. yüzyildan yeşil resim
fake 15 century green picture
The fake green picture from the 15th century

However, both Japanese and Hungarian allow it:

Japanese

(74) Nise-mono-no 15-seeki-no midori-no e
fake-thing-GEN 15-century-GEN green-GEN picture
The fake green picture from the 15th century

Hungarian

(75) A hamis 15. szazadi zöld festmény
the fake 15 century green picture

The fact that none of the head-initial languages allow scope sensitive adjectives to be separated from intersective adjectives by a PP, and that neither head-initial nor head-final languages linearize *fake*-type adjectives on the other side of the noun from intersective adjectives shows that, structurally, the scope sensitive adjectives behave the same way as other adjectives. This fact shows that Adger's explanation for the linear order of *eile* in Gaelic, as well as other adjectives of the same class in other languages, cannot be correct.

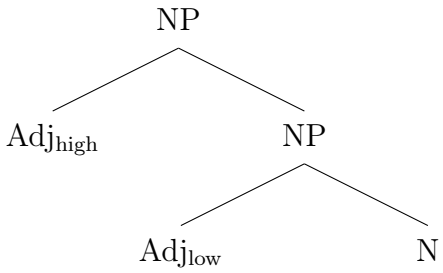
Given that Adger must stipulate that *other*-type adjectives have to appear to the left of ⊐P, and that he does not explain why these adjectives appear to have the almost the same behaviour as other adjectives in terms of where they appear in the phrase, his is not a satisfactory account of PP-peripherality. Indeed, as mentioned in section 3.2, the inability of any structural account to explain the scopal ambiguity found in this type of phrase means that it is not only Adger's analysis that is unsatisfactory, but structural approaches in general.

4.3 Evidence from adjective clusters

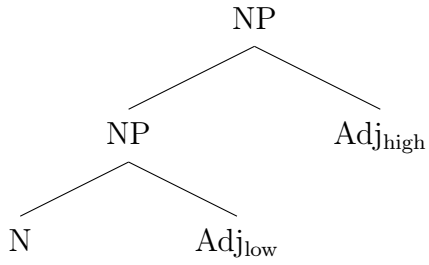
Abels and Neeleman (2012) observe that cross-linguistically, a series of stacked adjectives can only be interrupted by a noun, and not by a demonstrative or a numeral. They do not comment on the possibility of a PP intervening in such a sequence, but I leave this point aside. They show that an analysis of Greenberg's (1963) Universal 20 based on the specifier-head-complement (SHCH) hypothesis, such as Cinque's (2005), cannot explain why stacked adjectives are only separable by the noun. This is because the SHCH hypothesis relies on many functional projections, each of which has its own featural specifications, and disallows adjunction. It is essential for the hypothesis that the featural specifications of each of the functional projections, and the Agr heads that dominate them, are non-identical, otherwise the particular order of the functional projections, and therefore the order of the adjectives that are attracted to those heads by the individual featural specifications, cannot be explained.

In a traditional grammar, however, one would predict that a string of stacked adjectives cannot be interrupted, except by the noun. This is because the adjectives can be adjoined to NP, due to the lack of restriction on adjunction structures, and the various sub-parts of the adjunct can have identical featural specifications. Under this approach, the noun can precede or follow the string of adjectives, or interrupt it, but there is no base generated structure in which a numeral or demonstrative can intervene in the string. This is shown in the structures below.

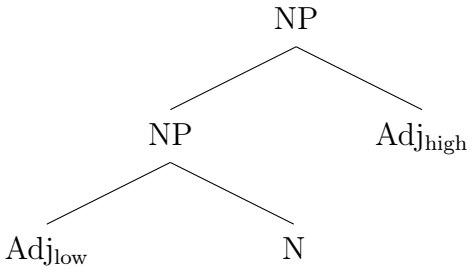
(76) a.



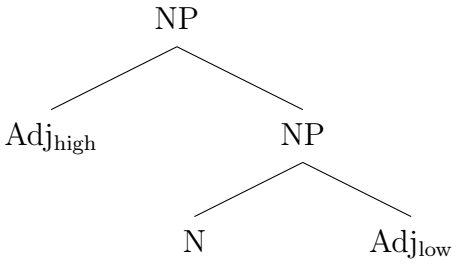
b.



c.



d.



pp.56–57

Importantly, the adjectives are all adjoined to NP, and they do not have their own projection dominating NP. If they are adjoined to the noun phrase, then nothing but other adjuncts can intervene between them and the noun. However, if they are hosted in their own projection that dominates NP, it is conceivable that some other projection could intervene.

Looking back at the structures proposed by Sadler (2000) and Rouveret (1994), we can see that the impenetrability of the stacked adjectives is not guaranteed. In Rouveret's structure (see (28)), it is entirely possible for another projection to intervene between NumP and NP, which would mean that some other constituent would interrupt the sequence of adjectives and noun.

Similarly, and as mentioned elsewhere, Adger's analysis, which involves

separate positions for scope sensitive and intersective nouns, would not necessarily ensure that the only element that can intervene in a string of stacked adjectives is the noun.

The structural approaches we have seen cannot explain the observation found inAbels and Neeleman (2012) that the only element that can intervene in a cluster of stacked adjectives is the noun. It is not impossible that a structural analysis could account for this fact, but Adger, Sadler and Rouveret all fail to do so.

4.4 Can Quantifier Raising save the structural approach?

One major flaw in a structural analysis of the ambiguity found in the headintial languages is how to explain the fact that the adjective scopes over the prepositional phrase in one of the available readings. In an Adger-type approach, the structure is fixed, and so scope would seem to be as well. However, one attempt to remedy this problem would be to make use of Quantifier Raising (QR) in order to explain how the adjective can take scope over the PP while appearing to remain below it in the structure. However, such an explanation has several shortfalls.

This adjectival QR would clearly not apply to all adjectives, but only the ones that are scope sensitive. However, it is not clear that even scope sensitive adjectives, such as *fake* or its equivalent in the languages discussed above, or *eile* "other" in Gaelic, have enough in common with quantifiers to naturally undergo QR. We also saw evidence in 4.2 that scope sensitive adjectives behave very similarly to intersective adjectives in terms of where they appear in a structure. This suggests that their denotation, or at least their semantic type is very similar to that of intersective adjectives, and would therefore differ from that of quantifiers as traditionally understood. In order to pursue this approach, therefore, we would need a new type of quantifier raising that applies solely to scope sensitive adjectives. While not out of the question, such "adjective raising" would need to be significantly different from traditional QR.

We have also seen evidence in section 4.1 that in the case of head-final languages like Hungarian and Japanese two different structures exist. In the head-final languages discussed, both the PP A N order as well as the A PP N order were allowed, to varying degrees, and each order represented a different meaning; in fact, each order represented the meaning that would be expected based on surface scope. In English-type languages, while there is only one linear order, this linear order can be derived from two different structures, one of which has c-command relations corresponding to Meaning 1, and the other to Meaning 2. On the surface, it is not clear that the ambiguity does not arise from some type of adjective raising, but using constituency tests of the ellipsis type, we can disambiguate between the two meanings, and show that there are in fact two different underlying structures for the same linear string in head-medial languages.

English

(77) a. The real picture from the 15th century, and the fake one too.

b. The fake picture from the 15th century, and the one from the 13th century too.

Dutch

(78) a. Een valse munt uit de vijftiende eeuw en één uit de
a false coin from the 15th century and one from the
dertiende eeuw.
13th century

b. Een valse munt uit de vijftiende eeuw en een echte.
a false coin from the 15th century and a real.

German

(79) a. Das Gefälschte
the faked
The fake one (picture from the 15th century)

b. Das aus dem 15. Jahrhundert
The from the 15. century
The one (fake picture) from the 15th century

Neither of these language groups appears to make use of any kind of quantifier or adjective raising in deriving the meanings under discussion. If adjective raising were available, it would be puzzling that head-final languages did not make use of it, given the apparent preference for a PP-peripheral structure in unmarked word orders. Furthermore, using data from constituency tests, it is clear that head-medial languages do make use of two different structures to derive the ambiguous string. If neither head-final nor head-medial languages are able to or need to make use of adjective raising, it seems unlikely that head-initial languages would be able to use such a tool to force an adjective to scope over an apparently c-commanding PP.

Given that a tool like QR is unable to save a structural account of PP-peripherality, and the ambiguity that is attested in PP-peripheral phrases in head-initial languages, I turn now to the possibility of an approach to PP-peripherality and the data discussed above anchored in a linear condition.

5 Adjacency and linear conditions

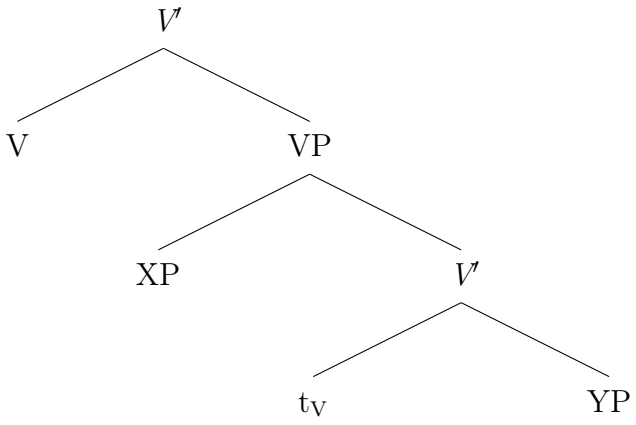
Janke and Neeleman (2012) discuss the structure of the VP, especially with regard to ditransitives. In English, among other languages, ditransitive verbs allow two different constructions: the double object construction, which has two DP arguments of the verb (80-a), and the dative (or DP-PP) construction, where the verb has a DP direct object and a PP indirect object (80-b).

(80) a. John gave Susie a doll.
b. John gave a doll to Susie.

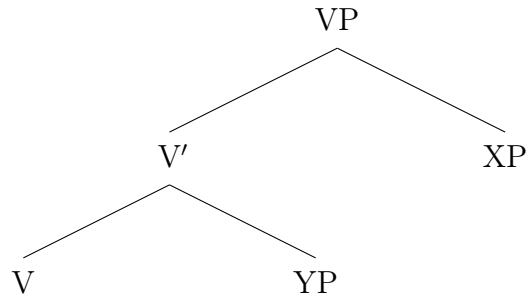
These constructions have proven problematic because their binding properties often conflict with their apparent constituency. The binding data suggest

a descending structure as in (81), so-called because constituents further to the left are structurally higher. However, the constituency tests suggest an ascending structure as in (82), where constituents further to the right are higher. This conflict between binding and constituency, referred to as a Pesetsky paradox (Pesetsky, 1995), has been analyzed by Pesetsky as indicating that both the ascending and descending structure exist for a single phrase simultaneously, and by others (e.g. Phillips, 1996, 2003; Lechner, 2003; Landau, 2007) as requiring that one structure be related to the other derivationally. Alternatively, Ernst (1994) has argued that slight changes to our understanding of binding theory would allow an ascending structure to account for both constituency and binding data.

(81)



(82)



p.2

Janke and Neeleman (2012) argue that English allows both ascending and descending structures, but, contra Pesetsky (1995) that a given phrase can

only be represented by one of the structures at a time. Considerations of case adjacency and economy determine which structure applies to a given linear string. In English, accusative case can only be assigned to a DP under adjacency with a verb, or a preposition. Additionally, the definition of economy used by Janke and Neeleman requires that, from a set of competing structures, the one that has the fewest movements must succeed. Two structures are considered to be in competition iff they are both well-formed and their hierarchical relations are identical, excepting those relations created by movement (p.4).

In the DP-PP ditransitive frame, the direct object is linearly adjacent to the verb and the indirect object to the preposition. In this case, the ascending structure is appropriate because it allows the verb and DP to be adjacent without requiring movement, as a descending structure would. On the other hand, an ascending structure would not allow the direct object DP to be adjacent to the verb in the double object frame because the indirect object DP would intervene between V and DO. The descending, VP-shell structure (as in (81)) is required instead. According to this proposal, the VP-shell structure is only generated when the ascending structure fails. It is, in the words of Janke and Neeleman, a repair strategy and is disallowed under the following circumstances: a) when the VP contains only one constituent other than the verb, b) when only the constituent merged first bears accusative case or c) when the verb's sole argument is a PP (even if other material is contained within the VP) (p. 4).

This approach allows a unified structure to explain data on both binding and constituency, at the cost of requiring minor, independently motivated changes to binding theory as it is generally understood.[4] Under this approach, the VP-shell provides an alternative, back-up structure available in case the default ascending structure fails. Again, the driving force behind the need for these two different structures is the requirement that DPs need to be adjacent to the verb in order to receive case. However, this is not

[4]See Janke and Neeleman (2012), and references therein, for more detail.

the only adjacency condition that exists. Ackema and Neeleman (2003) discuss other cases of "context-sensitive spell-out", where what appear to be syntactic phenomena are conditioned by adjacency. Among these cases are case adjacency, as discussed above, as well as agreement weakening in Dutch and Arabic, cliticization in Dutch and Celtic languages, and *pro*-drop in Old French and Arabic.

In each case, if a (syntactic) feature, such as number and person (or, for Ackema and Neeleman 2003, Plural, Addressee and Participant, each of which is unitary and together can combine to represent person and number features) is contained within the same prosodic phrase as the another instantiation of the same feature at PF, the first feature may be deleted or altered, changing how the terminal that hosts it is spelled out. That is, a language could have a rule stating that if a terminal (A) with a particular feature bundle (F1 and F2) is in the same prosodic phrase (represented by braces) as another terminal (B) with its own feature bundle (F1 and F3), the feature bundle of A can be altered, for instance by having one feature deleted. This has the effect of changing the phonological realization of A, given that the language has separate spell-out rules for A(F1 and F2) and A'(F2). This example is represented below.

(83) $\{ \ldots [_{A}\ F_1\ F_2] \ldots [_{B}\ F_1\ F_3] \ldots \} \rightarrow \{ \ldots [_{A}\ F_2] \ldots [_{B}\ F_1\ F_3] \ldots \}$

(84) a. $[_{A}\ F_1\ F_2] \rightarrow$ /a/
b. $[_{A}\ F_2] \rightarrow$ /a'/ p.686

Case adjacency and certain cases of allomorphy are therefore two examples of syntactic phenomena that are affected by considerations of linearity and adjacency. I propose that the scopal paradox discussed in section 4.1 provides another example of such a phenomenon.

5.1 A linear approach to PP-peripherality

As we have seen above, there is a stark contrast in the variability of word order observed in head-final versus head-initial languages. The head-initial languages discussed here universally disallow the N PP A order, with the N A PP order being licit instead. On the other hand, the head-final languages tended to have a preference for the PP-peripheral order PP A N, but allowed A PP N to varying extents as well. While these data seem largely to support Adger's observation of PP-peripherality, there is still an asymmetry between the amount of freedom allowed by the generalization, with head-initial languages being much more rigid in their orderings than head-final languages. This much may be explained by the propensity for head-final languages to also feature scrambling, as opposed to head-initial languages, which generally do not, but I return to this possibility in section 5.2.

In general, the data presented above show a preference for an order in which the PP is more peripheral to the noun it modifies than is an adjective, both in head-initial and head-final languages. Indeed, it appears that, although the head-final languages may allow an ordering in which the PP intervenes between noun and adjective, such an order is slightly more marked in comparison to one that is compatible with PP-peripherality. It may be argued that only unmarked orders should be taken into consideration, as the marked orders could be derived from the unmarked orders via movement. However, it is striking that *none* of the head-initial languages allow PP-medial ordering, while such an option is available, to varying degrees, in *all* of the head-final languages. I argue that, for the purposes of Adger's generalization on PP-peripherality, the point stands that languages tend to prefer a PP-peripheral order to a PP-medial one, but there still remains the question of why there is such an asymmetry in the availability of PP-medial orders between head-final and head-initial languages, as argued above. I do not believe that this question can be answered merely in terms of a structural account.

Janke and Neeleman (2012) argue that in order for a ditransitive structure

to be well formed, the case bearing DP must be left-most in its case domain. They define the case domain of a given head as "all positions m-commanded by that head and not m-commanded by a closer case assigner" (p.3). In VO languages, this has the effect of disallowing any intervener between the verb and the case-bearing DP, as the DP must be left-most in its domain, and the domain immediately follows the verb. In OV languages on the other hand, when there is an intervener between the case-bearing DP and the verb, giving the order [DP XP] V, that intervener is part of the case domain of the DP, and the DP is left-most in that case domain. When there is no intervener, i.e. DP V or XP DP V, the case domain of the DP contains only that DP, so the left-most condition is trivially fulfilled. Therefore, this condition requires a strict word order in VO languages, where an intervener is disallowed, but allows the option of scrambling in OV languages. If a similar condition exists within the NP, with concord between the noun and adjective requiring the adjective to be left-most in its case or agreement domain, then we would predict PP-peripherality to be required in head-initial languages, as the PP could not intervene between the noun and the adjective without forcing the adjective from the left-most position in its agreement domain. On the other hand, both PP A N and A PP N would be allowed in head-final languages, as the adjective is left-most in both cases: in the first, it is left-most in its domain because it is the only element there, and in the second, although the domain contains a PP, the adjective is further to the left of it. Janke and Neeleman's (2012) linear restriction on the position of a DP within the VP therefore also provides a viable explanation of the behaviour of adjectives within the DP/NP, and an alternative to the structural account typified by Adger (2012) that has proven to be so problematic.

However, a further asymmetry was evident in the data: the sole linear order allowed in the head-initial languages tended to be ambiguous between the PP scoping over the adjective or vice versa; conversely, head-final languages, which allowed two orderings, tended towards unambiguity. The two different orders in the head-final languages were each unambiguous, and usually had

two separate readings. Thus, the asymmetries can be summed up as follows: the unambiguous (head-final) languages are lax in word order restrictions, whereas the ambgiuous (head-initial) languages are more rigid.

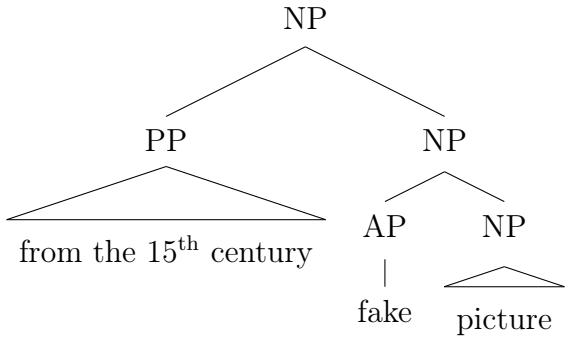
For the sake of clarity, I repeat the two meanings of *the fake picture from the 15th century* below.

(85) *Meaning 1* A fake picture that is actually from the 15$^{\text{th}}$ century (e.g. a copy of a Roman fresco, dating from 1492).

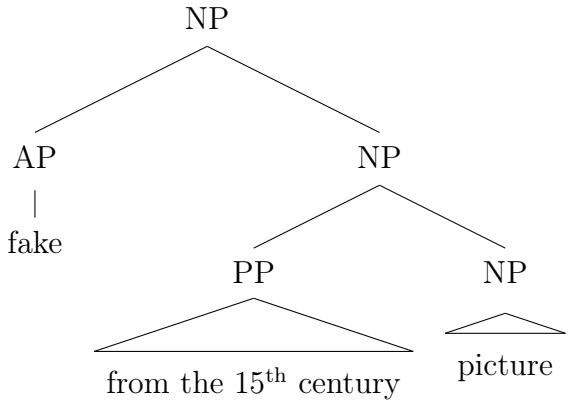
(86) *Meaning 2* A picture that is purported to be from the 15$^{\text{th}}$ century (e.g. a copy of a work from 1483, that was actually made in 1989).

If structural c-command determines scopal relations between constituents in a tree, head-final languages can be assumed to make use of the structures below. (87) represents Meaning 1, where the PP scopes over the adjective. (88) represents the opposite scopal relation: the adjective scopes over the PP, resulting in Meaning 2.

(87)

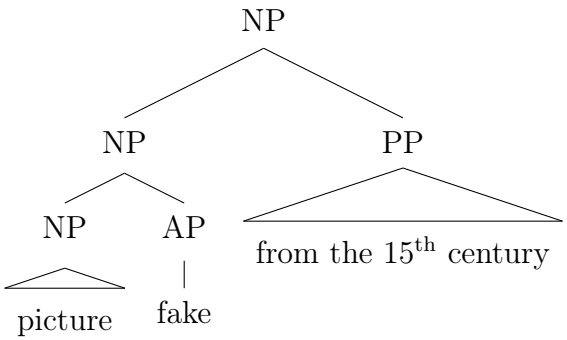


(88)

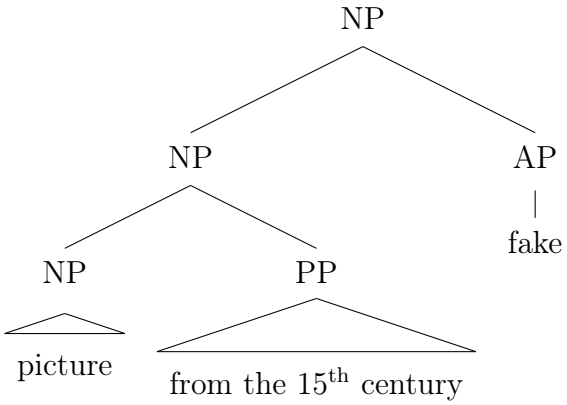


For head-initial languages, the following two trees are logically possible. However, we have seen that only (89) appears to be allowed in all of the languages discussed, as it is the one that is consistent with PP-peripherality. In the head-initial languages, (89) represents Meaning 1 and (90) Meaning 2; the trees are essentially the mirror image of those used in head-final languages.

(89)



(90)



Head-final languages appear to have more freedom to change word order

to suit intended meaning. The reason for this is discussed in section 5.2. Head-initial languages, on the other hand, appear to be forced to use the same linear order to express two different meanings. However, this does not mean that they necessarily use the same structure to express both meanings simultaneously. Again, if structural c-command is the determiner of scopal relations, and if the head of the NP has only one sister as shown in (89) and (90), such a structure is impossible.

The constituency tests in section 4.4 show that the adjective and noun form a constituent to the exclusion of the PP, and that the noun and PP form a constituent to the exclusion of the adjective. However, the PP and adjective cannot form a constituent on their own.

In order to explain the ambiguity in scopal relations between the prepositional phrase and the adjective, either two different structures must be available for the same linear string, or one structure exists in which PP and AP c-command each other. Since the noun and either of its complements can form a constituent to the exclusion of the other, the three elements cannot be involved in ternary branching.[5] Therefore, given that ternary branching is not an option in this case, the only way for the PP and the adjective to mutually c-command each other is if they are sisters. However, the PP and adjective do not form a constituent themselves, and therefore cannot mutually c-command each other. Furthermore, such a constituent would not have a single head, and would thus contradict a traditional understanding of phrase structure, which requires each phrase to have one and only one head (Jackendoff, 1977; Chomsky, 1970). The single, ambiguous structure is therefore not possible in this case. I turn, then, to the possibility of two different structures existing for this single linear string.

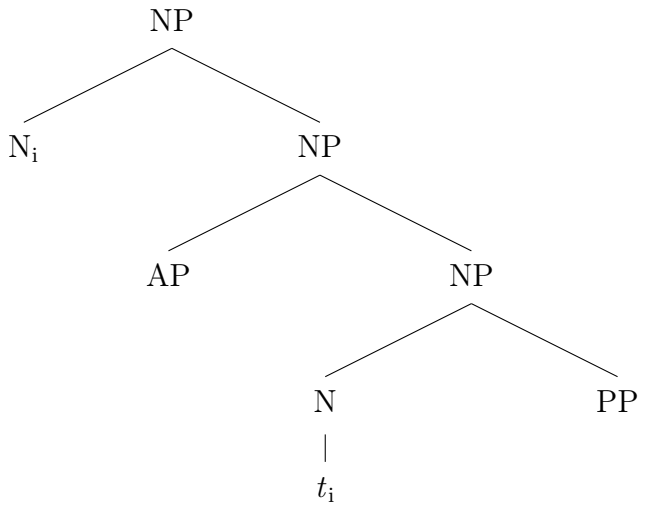
The most obvious structure is one in which the noun takes the adjective as its complement, ensuring that the PP does not intervene between the two and that it is therefore more peripheral than the adjective. The PP would

[5]Actually, the very fact that two constituent structures seem to be available suggests that we are looking at two different trees for the same linear order.

then adjoin to the right of the NP. This structure, which is the same as the one in (89), reflects Meaning 1, because the PP c-commands the adjective, and therefore scopes over it.

Generating the PP as a sister to the noun would mean that the resulting structure violates PP-peripherality, and we have seen that this is not allowed in head-initial languages. Such a structure is represented in (90). It does, however, capture the c-command relations required by the observed scope patterns. I propose that a structure like (90) undergoes movement in order to ensure that the noun is left-adjacent to the adjective that modifies it. The movement involved is obligatory, and I will return to the reasoning behind this assertion below.

(91)



This movement creates a structure that is very similar to the VP-shells proposed by Janke and Neeleman (2012). Their VP-shells are motivated by the need for DPs to be adjacent to a verb in order to receive accusative case in the double-object frame, and the alternative ascending structure is used when such a need does not arise, or is already satisfied by this default structure. In the NP it appears that the ascending structure is also the default. It results in Meaning 1, and this is the meaning found in the head-initial languages that did not appear to have ambiguous scopal relations. It is also the

more readily-available reading in the languages that do have the ambiguity, as well as being the preferred reading in the head-final languages. Given the economy considerations discussed by Janke and Neeleman, it should also be preferred on the basis that this structure does not require any movements, whereas alternative structures do. The only exception to this economy condition is if the ascending structure is unavailable or unviable for some reason, such as a violation of the case-adjacency condition.

The structures that I propose for the NP are therefore similar to those proposed by Janke and Neeleman (2012) for the VP. However, as adjectives do not need to move for case reasons, the motivation behind the movement in the NP-shell must differ from that required in the VP-shell. It appears that in head-initial languages, the adjective prefers be right-adjacent to the noun it modifies, and that the vast majority of adjectives cannot precede the noun. (We have seen several counter-examples to this generalization in Welsh, and there exist similar counter-examples in other languages. However, it does not seem out of the question that those adjectives that can precede the noun are in a different structural position than the majority of adjectives, and that they differ in other qualities as well. Sadler, 2000 similarly analyzes the noun-preceding adjectives as different to those that follow the noun in Welsh.)

There are several possible reasons why the noun cannot follow the adjective in head-initial languages. Adjectives tend to agree with the noun they modify in terms of (at least) gender and number in many of these languages, and this agreement may be facilitated by adjacency to a noun, much as a verb must be adjacent to a noun in order to license its accusative case in English and other languages. It may be that there are prosodic considerations, so an adjective cannot be separated from the noun it modifies by a certain prosodic boundary, perhaps a prosodic word boundary. This could not be the case in a trochaic language like English, where the adjective and noun routinely occupy two different prosodic words, but many of the head-initial languages are iambic. I must leave the precise answer of why the requirement

for an adjective to be right-adjacent to the noun it modifies in head-initial languages exists to further research, but note that the aforementioned possibilities provide several promising avenues to consider.

5.2 What can scrambling tell us about the noun phrase?

In section 2.1, I addressed the correlation between scrambling and freer word order in the NPs of head-final languages. I established that it may be possible to view the phenomenon of non-rigid order between adjective and prepositional phrase in these NPs in a similar way to scrambling. To reiterate, the two different orders in head-final languages could be derived from movement, or they could be base generated. In either case however, the non-availability of the PP-medial order in head-initial languages must be explained.

Let us first take the case of a movement-based approach. Under such an approach, there would be a single underlying word order that is base generated, and any variations from this order would be derived through movement. This movement would have to be optional in head-final languages and either obligatorily present or obligatorily absent in head-initial languages, depending on the base generated structure. The movement would also have to have the effect of changing the scopal relationships between the different elements of the NP. While this approach is by no means impossible to implement, a mechanism for the movement, a reason for the non-availability of the movement in head-initial languages, and a landing site for the moved constituent would all have to be determined and justified in order for such an analysis to work. Furthermore, a movement-based approach does not in and of itself explain why the only word order allowed in head-initial languages is N A PP. Rather, it requires an additional mechanism to explain this fact. I turn now to the possibility of a base generated solution.

A base generation approach would need a filter in order to exclude the possibility of PP-medial orders in head-initial languages, and this filter would have to be specific to those languages. We have already seen an example of such a filter: the case-adjacency requirement discussed in Janke and Neele-

man (2012). Under this account, both PP A N and A PP N are base generable in head-final languages, because the adjective is always left-most in its "case" or agreement domain: in the first case, the domain consists of just the AP, and in the second it consists of AP and PP, but AP is left-most. However, the PP-medial order fails in head-initial languages because it forces the adjective out of the left-most position in its agreement domain. Thus, only one order is allowed in head-initial languages, while the order in head-final languages is less rigid. Additionally, it is important to observe that the *only* order allowed in head-initial languages by the base generation approach is the one that is found in the attested orders. This is by virtue of the requirement that AP be left-most in its domain, and therefore that PP is more peripheral to the noun than AP in head-initial languages. Again, the same requirement leads to two different orders in head-final languages due to the difference between the agreement domains of the adjective in the various structures.

The base generation approach to freer word order in the NP of head-final languages thus does not require any further mechanisms than are required for an explanation of the data on PP-peripherality seen in section 5.1, but explains both PP-peripherality and freer word order in head-final languages with one requriement: that AP be left-most in its agreement domain. A movement approach, on the other hand, requires several adjustments and additions to the theory in order to adequately explain why word order is more free in head-final languages and why only the AP-medial order is allowed in head-initial languages. Therefore, for the reasons of simplicity and elegance, I prefer the base generation analysis to explain the freer word order, correlated with scrambling, observed in head-final languages.

6 Conclusion

In this paper, I have shown that a structural approach to explaining PP-peripherality is unsatisfactory given novel data on ambiguity between the modifiers in a noun phrase. Instead, I propose an explanation based on a

linearity condition that requires adjacency between noun and adjective in head-initial languages. This condition allows two different structures for the single PP-peripheral word order found in the head-initial languages, thereby accounting for the scopal ambiguity. The condition also predicts a less rigid word order in head-final languages, as well as that the two structures allowed in these languages are each unambiguous. These predictions are borne out.

This linear approach also avoids the problems faced by the structural accounts discussed, namely the scopal ambiguity, the behaviour of scope sensitive adjectives compared to intersective adjectives, and the fact that only the noun may intervene in clusters of stacked adjectives.

The adjacency condition, based on a similar condition on the VP from Janke and Neeleman (2012), accounts for the correlation between scrambling at the clause level and freer word order in the NP in head-final languages. The exact reason for the existence of this condition is unclear, but may be related to concord between the noun and adjective, ease of parsing, prosodic concerns, or a combination of the above.

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