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Noun Phrases

4.1 Overview

Most of our discussion in the previous two chapters has been concerned with providing empirical substantiation for the claim that sentences are hierarchically structured out of constituents belonging to a restricted (perhaps universal) set of *categories*, and with considering the nature of categories. Implicitly, we postulated a *two-level* Theory of Categories: that is to say, we tacitly assumed that there are two *levels* of categories in natural language, namely

- (1) (i) *word-level categories, e.g.*
N = Noun; V = Verb; A = Adjective; P = Preposition;
ADV = Adverb; M = Modal; D = Determiner, etc.
- (ii) *phrase-level categories, e.g.*
NP = Noun Phrase; VP = Verb Phrase; AP = Adjectival Phrase;
PP = Prepositional Phrase; ADVP = Adverbial Phrase, etc.

In this chapter and the next, however, we are going to argue that our existing Theory of Categories should be extended to include a third type of category intermediate between word-level and phrase-level categories. That is to say, we are going to argue in favour of positing that there are nominal constituents larger than the Noun but smaller than a full Noun Phrase, verbal constituents larger than the Verb but smaller than a full Verb Phrase, adjectival constituents larger than the Adjective but smaller than a full Adjectival Phrase . . . and so on. We'll begin our discussion in this chapter by looking at the internal structure of Noun Phrases: in the next chapter, we shall go on to look at the syntax of other types of Phrase.

4.2 Small nominal phrases

Let's begin our story by introducing the hero – namely, the fictional character designated in (2) below:

- (2) the king of England

There can surely be little doubt that the overall sequence in (2) is a Noun Phrase: for example, like other NPs, it can take the genitive 's inflection, as in:

- (3) *the king of England's crown*

Likewise, there seems to be plenty of evidence that the sequence [*of England*] is a PP constituent in (2). After all, it can be coordinated with another similar PP (= *of*-phrase), as in:

- (4) *the king [PP of England] and [PP of the Empire]*

It can also function as the 'shared constituent' in cases of *shared constituent coordination*, as in:

- (5) *He is the king, and she is the queen, [PP of England]*

And it can function as a *sentence fragment* in an appropriate context: cf.

- (6) SPEAKER A: Was he the king of France?
SPEAKER B: No, [PP of England]

Moreover, it can be preposed, e.g. in questions:

- (7) [PP *Of which country*] was he the king?

And it can be replaced (in a somewhat archaic style) by the pro-PP *thereof*: cf.

- (8) *He dwelled in England, and was the king thereof for many a year*

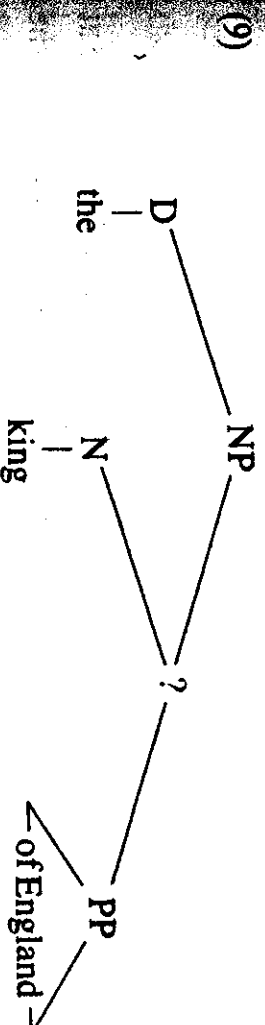
The obvious conclusion to draw is thus that there is overwhelming evidence that [*of England*] is a PP constituent of the overall Noun Phrase [*the king of England*].

But what is the immediate constituent structure of the whole Noun Phrase? In his influential 'Immediate Constituents' article, Rulon Wells argued (1947 [1957, p. 188]):

that the ICs [= immediate constituents] of *the king of England opened Parliament* are *the king of England* and *opened Parliament*, that those of the former are *the* and *king of England* and those of the latter are *opened* and *Parliament*, and that *king of England* is divided into *king* and *of England*.

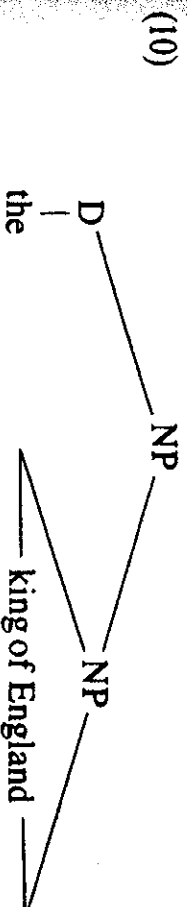
What is of interest to us here is Wells' implicit claim that the phrase [*the king*

of England] has the structure (9) below:



I have not attached any specific category label to the constituent [*king of England*] here, since Wells gives no label for it. But let's speculate on what our mystery constituent (designated by ? in (9) above) might be.

Well, since it's a phrase containing the Noun *king*, an obvious suggestion is that the sequence *king of England* is just another Noun Phrase. In other words, we might assume that [*the king of England*] has the skeletal structure (10) below:



But this seems to be wrong, for several reasons. For one thing, the 'small' nominal phrase [*king of England*] does not have the same distribution as a 'full' Noun Phrase such as [*the king of England*], as we see from (11) below:

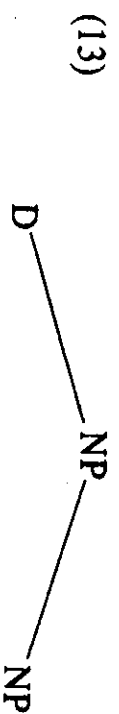
- (11) (a) *The king of England* opened Parliament
 { *King of England }
 (b) They crowned *the king of England* yesterday
 { *king of England }
 (c) Parliament grants little power to *the king of England*
 { *king of England }

Secondly, if [*king of England*] were a Noun Phrase, then it would mean that Determiners like *the* would be analysed as premodifying full Noun Phrases: for, a structure such as (10) above would need to be generated by a Phrase Structure Rule such as (12) below:

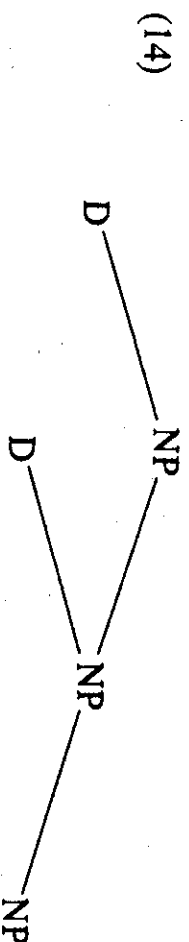
- (12) NP → D NP

But rule (12) is *recursive* (in that the symbol 'NP' occurs on both the lefthand and the righthand side of the arrow). Now, this means that the rule will generate NPs containing *multiple Determiners* (in fact, NPs containing indefinitely many Determiners). To see this, consider what happens when we apply rule

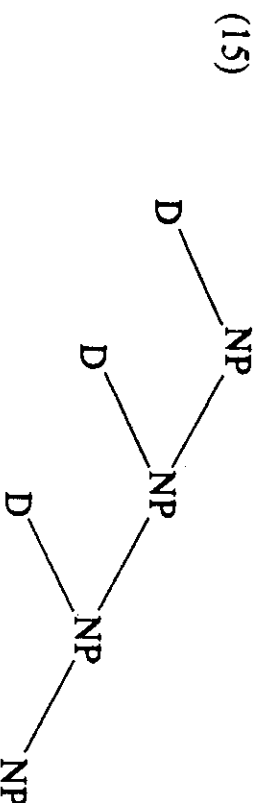
(12): it will generate the structure (13) below:



But rule (12) can now re-apply to the structure (13), to expand the NP node at the bottom of the tree in (13) into another [D NP] sequence, resulting in the structure (14) below:



And (14) also contains an NP node at the bottom of the tree which can likewise be expanded into a [D NP] sequence by re-application of rule (12), thereby deriving the structure (15) below:



And it should be obvious to you by now that we can go on recursively (= repeatedly) re-applying the same rule to produce an NP structure containing not just three Determiners (as in (15) above), but four, five, six... in fact a potentially *infinite* number.

'Well, what's wrong with that?' you might ask. The problem is that multiple Determiner sequences are ill-formed in English, as we see from the impossibility of NPs such as those in (16) below (each of which contains a sequence of just two Determiners):

- (16) (a) * [D *the*] [D *the*] king of England
 (b) * [D *the*] [D *this*] king of England
 (c) * [D *a*] [D *the*] king of England
 (d) * [D *our*] [D *your*] king of England
 (e) * [D *the*] [D *our*] king of England
 (f) * [D *an*] [D *our*] king of England
 (g) * [D *that*] [D *our*] king of England

Of course, it may well be true that part of the reason why some of the Phrases in (16) are ill-formed is *semantic* in nature. And indeed, this might be argued to be the case in (16) (a) – (d); for example (16) (c) might be said to be odd

because *a* is indefinite and *the* is definite, so that we have a contradiction of some sort. And we might argue that if *multiple Determiner* sequences result in some form of semantic anomaly, then there's nothing *syntactically* wrong with them: i.e. we might argue that such sequences are grammatical, but semantically ill-formed. If this is so, then there's no reason to prevent *syntactic* rules like (12) from generating such sequences, since the task of syntactic rules is to generate *syntactically well-formed structures*.

But the question is whether it is plausible to claim that *all* multiple Determiner sequences in English can be ruled out as ill-formed on semantic grounds. As we have already suggested, this is plausible enough for examples such as (16) (a) – (d) above. But it could surely not be said that Phrases such as (16) (e) – (g) are semantically ill-formed. Why not?

Well, for one thing, ungrammatical *Determiner + Possessive* sequences such as those in (16) (e) – (g) have perfectly grammatical paraphrases in English, as we see from the following paradigm:

- (17) (a) * *a my* book
 (b) *a book of mine*
 (18) (a) * *this your* tie
 (b) *this tie of yours*
 (19) (a) * *some your* friends
 (b) *some friends of yours*
 (c) *some of your* friends

Now, if multiple Determiner sequences are simply *meaningless*, then we wouldn't expect to find an alternative grammatical way of expressing the same meaning in English: and yet examples such as (17) – (19) show that we can indeed find grammatical ways of expressing the relevant concept. The fact that the ill-formed Noun Phrases in the (a) examples in (17)–(19) above have perfectly grammatical synonymous counterparts in the (b) sentences suggests that the nature of the ill-formedness in the (a) examples is *syntactic* rather than *semantic*.

A second argument for analysing the ill-formedness of multiple Determiner sequences in English as *syntactic* is that many such sequences which are ill-formed in English are well-formed in other languages. For example, *Determiner + Possessive* sequences have grammatical counterparts in languages such as Italian, Spanish, and Romanian – as the following examples show:

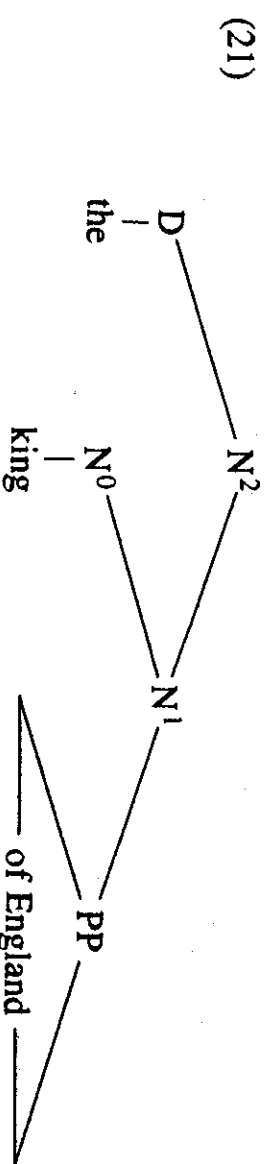
- (20) (a) *un mio* libro [Italian]
 a my book ('a book of mine')

- (b) *esas ideas tuyas* [Spanish]
those ideas yours ('those ideas of yours')
- (c) *cartea ta* [Romanian]
book + the your (= book the your = 'your book')

Now, if multiple Determiner sequences were semantically anomalous, one would expect synonymous sequences to be equally anomalous in other languages: the fact that they are not suggests that the ill-formedness of multiple Determiner sequences in English is *syntactic* rather than *semantic* in nature (though in the case of NPs such as (16) (c) [*ta the king of England*], the ill-formedness may be both syntactic and semantic). In other words, it seems likely that 'multiple Determiner' sequences are ruled out in English by some syntactic principle, not by semantic considerations alone. And the obvious principle to invoke is one to the effect that Determiners in English modify a type of nominal phrase which is smaller than a full Noun Phrase, though larger than a single Noun.

Overall, then, it would seem likely that our mystery constituent (indicated by '?') in (9) above is an 'intermediate' type of nominal phrase, larger than N, but smaller than NP. But what label can we attach to it? Well, I'm afraid that our existing inventory of categories summarised in (1) above simply doesn't provide us with enough category labels to go round. For, (1) recognises only two types of nominal constituent, namely N and NP: it has no label for a constituent 'intermediate' between the two. So, we need a rather more sophisticated set of category labels. But where can we find them?

Fortunately, Zellig Harris' (1951) *Structural Linguistics* provides us with a simple answer. Harris (ibid., p. 266) suggests a system of what he calls 'raised numbers' to label successively larger phrasal expansions of a given head constituent. Adapting his *numerical superscript* system in minor ways (e.g. Harris starts counting at '1', but we're going to start counting at '0'), we might then resolve the problem posed by the phrase [*the king of England*] in the following way. We might argue that the Noun *king* is an N⁰, that the 'small' nominal phrase [*king of England*] is a single phrasal expansion of *king* and hence an N¹, and that the full NP [*the king of England*] is a double phrasal expansion of the head Noun *king*, and hence an N². Given this notation, (2) would have the structure (21) below:



In the *numerical superscript* notation, N⁰ corresponds to the simple category N of our earlier system in (1), N² corresponds to NP, and N¹ has no counterpart at all in our original system.

At this point, however, we should mention two rival (but entirely equivalent) notational alternatives to Harris' *number notation*. One is the *bar notation* introduced in Chomsky's (1970) 'Remarks on Nominalisation' paper; and the second is the *prime notation* used (for example) in an influential study of Phrase Structure by Jackendoff (1977a). The three systems are notational variants of each other (i.e. different ways of saying the same thing), and the correspondences between the three can be summarised as in (22) below:

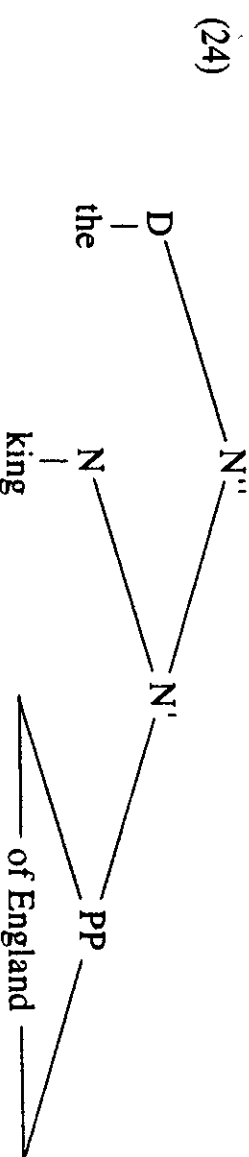
(22)	NUMBER NOTATION	BAR NOTATION	PRIME NOTATION
	N ⁰ (N-zero)	N	N
	N ¹ (N-one)	\bar{N} (N-bar)	N' (N-prime)
	N ² (N-two)	$\bar{\bar{N}}$ (N-double-bar)	N'' (N-double-prime)

Thus, the skeletal structure of [*the king of England*] could be represented in exactly equivalent fashion in each of the three systems as in (23) below:

- (23) (a) [N² the [N¹ [N⁰ king] of England]]
 (b) [$\bar{\bar{N}}$ the [\bar{N} [N king] of England]]
 (c) [N'' the [N' [N king] of England]]

Given that these three notational systems are entirely equivalent, it is not surprising to find that they are used interchangeably: for example, Jackendoff's (1977a) book uses the bar notation in its title (it is called \bar{X} *Syntax*), but uses the prime notation throughout the rest of the book!

For typographical reasons (if you use a typewriter or a word-processor, you'll understand what they are!), we'll henceforth use the prime-system [N, N', N''] in our tree diagrams, though (somewhat schizophrenically!) we'll refer to the relevant constituents as N, N-bar, and N-double-bar. Believe it or not, this is standard practice! Given these conventions, the constituent structure of our (in)famous phrase [*the king of England*] will now be represented in the manner outlined in (24) below:



And we'll say that *king* is an N, [*king of England*] is an N-bar, and [*the king of England*] is an N-double-bar (hence also an NP, since we earlier said that N'' corresponds to the traditional category of NP).

4.3 Evidence for N-bar

Having managed to disentangle ourselves from the notational knots we were tied up in, we can now go on to ask ourselves what evidence there is that Wells was right to assume that an NP such as [*the king of England*] contains the 'small' nominal phrase (i.e. what we are calling an N-bar) [*king of England*] as one of its immediate constituents. In this connection, it is interesting to consider the arguments which Wells himself put forward in support of his own analysis (though it should be borne in mind that Wells was writing in a different era, and within a different theoretical framework). One such argument which he adduces (1957, p. 192) is a *distributional* one to the effect that [*king of England*] must be a constituent because it can occur as an independent unit in other types of sentence-structure, as in Wells' example:

(25) He became [*king of England*]

A second argument which he puts forward (ibid., p. 191) is that such an analysis will enable us to capture the structural parallelism between the two phrases in (26) below:

- (26) (a) the [*English king*]
(b) the [*king of England*]

Wells assumes (though does not argue) that the bracketed sequence [*English king*] is a constituent in (26) (a), and argues that a parallel analysis of (26) (b) along the lines of (24) above would be 'the best analysis of that phrase' because 'it harmonizes with other analyses' (i.e. with his analysis of phrases like [*the English king*]). He is implicitly invoking a principle of maximising *structural symmetry* between related constructions.

While there are potential pitfalls in Wells' argumentation, other independent evidence can be adduced in support of his analysis. For example, a further argument in support of the key claim that the sequence [*king of England*] is a constituent concerns the fact that it can undergo *Ordinary Coordination* with another similar sequence, as in:

- (27) Who would have dared defy the [*king of England*] and [*ruler of the Empire*]?
Moreover, it can function as the 'shared constituent' in cases of *Shared Constituent Coordination*: cf.

- (28) He was the last (and some people say the best) [*king of England*]

Given our assumption that only a unitary constituent can undergo *Simple Coordination*, or can function as the 'shared constituent' in cases of *Shared Con-*

stituent Coordination, the obvious conclusion to draw is that the sequence [*king of England*] must indeed be a constituent. And this provides empirical support for the analysis in (24) above.

An additional type of argument in support of the N-bar analysis can be formulated in relation to *Pronominalisation* facts. Recall from our discussion in Chapter 2 that only a unitary constituent can be replaced by a proform – and indeed only a *phrasal* constituent of some sort. In the light of this observation, consider the use of the proform *one* in the following examples:

- (29) (a) The present [*king of England*] is more popular than the last *one*
(b) *The [*king*] of England defeated the *one* of Spain

How can we account for the contrast here? Well, if we posit that [*king of England*] is a 'small' nominal phrase of some sort (an N-bar, to be precise), then we could say that *one* in English is the kind of proform which can replace a 'small nominal phrase': in other words, we can say that *one* is a pro-N-bar. Thus, we could argue that [*king of England*] in (29) (a) can be replaced by *one* because it is an N-bar; whereas *king* in (29) (b) cannot be replaced by *one* because it is only an N and not an N-bar (and we already know that proforms replace phrasal constituents, not individual words). But any such analysis naturally presupposes that [*king of England*] is indeed a phrasal constituent of some sort, as in Wells' analysis (24).

So, both *Coordination* and *Pronominalisation* facts provide strong empirical support for the N-bar analysis. Accordingly, we shall henceforth assume that this analysis is correct, and that there is indeed an intermediate type of nominal constituent (namely N-bar) which is larger than N but smaller than NP. We thus posit that there are three types of nominal constituent in English, namely N, N' (= N-bar), and N'' (= N-double-bar = NP). This means that we no longer recognise only two categorial *levels* of nominal constituent (N and NP): on the contrary, we are now assuming that there are three categorial levels of nominal constituent, namely N, N-bar, and N-double-bar.

4.4 Complements and Adjuncts

What we have argued so far is that in an NP such as [*the king of England*], the postnominal PP [*of England*] expands the head Noun *king* into the N-bar [*king of England*], while the Determiner *the* expands the N-bar [*king of England*] into the N-double-bar [*the king of England*]. Now, we might seek to generalise our conclusions about the function of the PP [*of England*] in this phrase by suggesting that all postnominal PPs (and indeed perhaps all postnominal phrases of any kind) have essentially the same constituent structure status, and thus serve to expand N into N-bar.

However, any such hasty conclusion would ignore the traditional distinction between two different types of postnominal phrase – namely (i) those which function as *Complements*, and (ii) those which function as *Adjuncts*. We can illustrate the difference between these two types of postmodifier in terms of the contrast in (30) below:

- (30) (a) a student [*of Physics*] (= Complement)
 (b) a student [*with long hair*] (= Adjunct)

In the case of (30) (a) [*a student of Physics*], the bracketed PP [*of Physics*] is (in an intuitively fairly obvious sense) the ‘Complement’ of *student*: the PP tells us what it is that the individual concerned studies. Hence the NP [*a student of Physics*] can be paraphrased by a clausal construction in which *Physics* functions as the Complement of the Verb *study*: cf.

- (31) (a) He is [*a student of Physics*]
 (b) He is [*studying Physics*]

But this is not at all the case in (30) (b), [*a student with long hair*]. In this case, the bracketed PP [*with long hair*] doesn’t in any sense function as the Complement of *student*, so that we don’t have any corresponding paraphrase in which [*long hair*] is used as the Complement of the Verb *study*: cf.

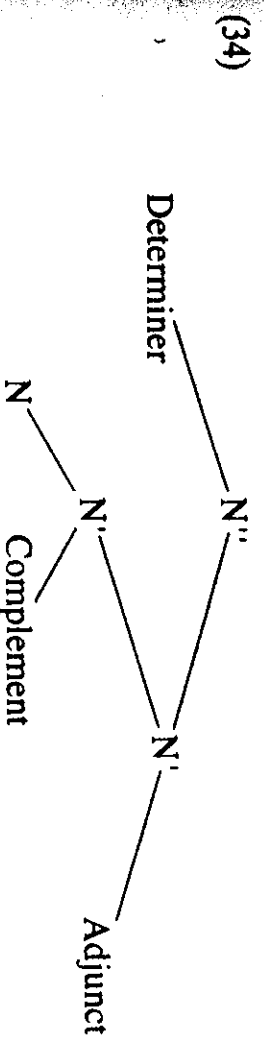
- (32) (a) He is [*a student with long hair*]
 (b) ≠ He is [*studying long hair*]

Thus, in (31) (a) [*a student of Physics*], the bracketed PP [*of Physics*] specifies what the student is studying: but in (32) (a) [*a student with long hair*] the bracketed PP doesn’t tell us anything about what the student is studying; it merely serves to give us additional information about the student (i.e. that he happens to have long hair). In traditional terms, the kind of PP found in [*student of Physics*] (or indeed [*king of England*]) is said to be a *Complement*, whereas that found in [*student with long hair*] is said to be an *Adjunct*.

Of course, terms like *Complement* and *Adjunct* denote grammatical functions or relations, and thus have the same status as terms like ‘Subject’ and ‘Object’. The obvious question to ask therefore is what is the *structural* correlate of the Complement–Adjunct distinction, and how do Complements and Adjuncts differ from the other class of nominal modifiers which we are already familiar with – namely Determiners. What we shall claim here is that the difference is essentially the following:

- (33) (a) Determiners expand N-bar into N-double-bar
 (b) Adjuncts expand N-bar into N-bar
 (c) Complements expand N into N-bar

Given the assumptions in (33), a Noun Phrase containing a Determiner, an Adjunct, and a Complement would have the schematic structure (34) below:



We can see from (34) that Determiners are sisters of N-bar and daughters of N-double-bar; Adjuncts are both sisters and daughters of N-bar; and Complements are sisters of N and daughters of N-bar. This means that Adjuncts resemble Complements in that both are daughters of N-bar; but they differ from Complements in that Adjuncts are sisters of N-bar, whereas Complements are sisters of N. Likewise, it means that Adjuncts resemble Determiners in that both are sisters of N-bar, but they differ from Determiners in that Adjuncts are daughters of N-bar, whereas Determiners are daughters of N-double-bar.

Perhaps we can bring out the relevant distinctions rather more clearly in terms of the respective Phrase Structure Rules needed to generate Determiners, Adjuncts, and Complements. Given the claims made in (33) above, Determiners will be introduced by the rule (35) (i) below, Adjuncts by rule (35) (ii), and Complements by rule (35) (iii):

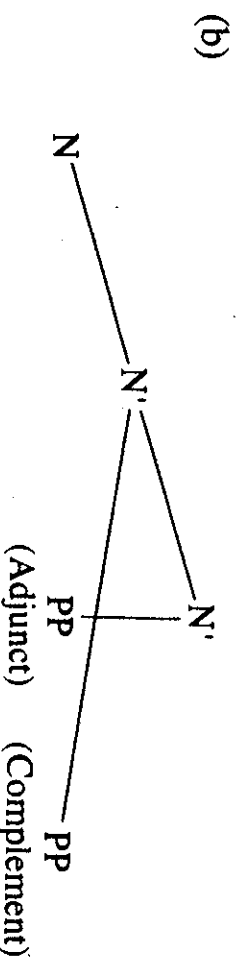
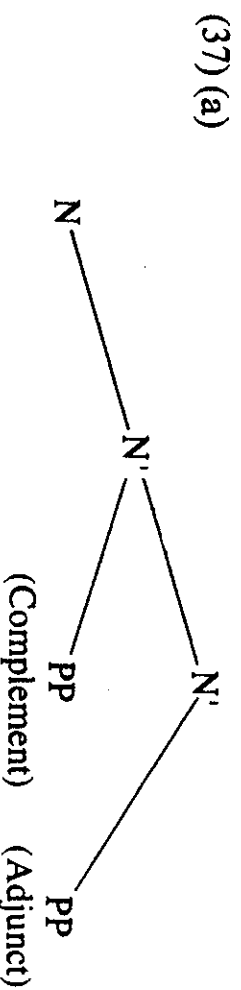
- (35) (i) $N'' \rightarrow D \ N'$ [Determiner Rule]
 (ii) $N' \rightarrow N' \ PP$ [Adjunct Rule]
 (iii) $N' \rightarrow N \ PP$ [Complement Rule]

For ease of reference, we have called (35) (i) the Determiner Rule (since it introduces Determiners), (35) (ii) the Adjunct Rule, and (35) (iii) the Complement Rule.

Now, if you think about it, you’ll realise that the rules in (35) make rather interesting predictions about the relative *ordering* of Adjuncts and Complements. More specifically, they predict that Complements will always be ‘closer’ to their head Noun than Adjuncts. In other words, our rules in (35) predict that if we modify *student* by an Adjunct PP such as [*with long hair*], and a Complement PP such as [*of Physics*], then the Complement phrase must precede the Adjunct phrase. And, (as Hornstein and Lightfoot 1981a, p. 22) note, this prediction is entirely correct – cf. their examples:

- (36) (a) the student [*of Physics*] [*with long hair*]
 (b) *the student [*with long hair*] [*of Physics*]

Given the 'no crossing of branches' restriction, it follows that the rules in (35) will generate Adjunct PPs to the right of Complement PPs as in (37) (a) below, not to the left as in (37) (b):

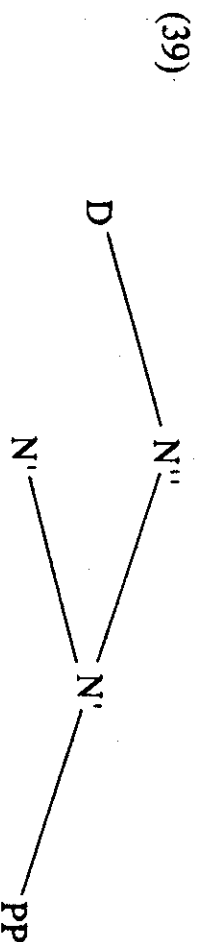


(37) (b) which is the structure associated with the ungrammatical (36) (b)) is ruled out because it violates the 'no crossing of branches' restriction. But (37) (a) which is the structure of the grammatical (36) (a)) contains no crossing branches, and thus is well-formed. So, it follows from (37) that Complements must occur closer to their head Nouns than Adjuncts. And this is precisely why the Complement phrase has to precede the Adjunct phrase in (36) – and why (more generally) postnominal Complements precede postnominal Adjuncts (as noted by Jackendoff 1977a, p. 58).

But I bet you're wondering whether the rules proposed in (35) above really work! So let's see whether they do. If we apply the Determiner Rule (35) (i) $[N'' \rightarrow D N']$, we generate the substructure (38) below:

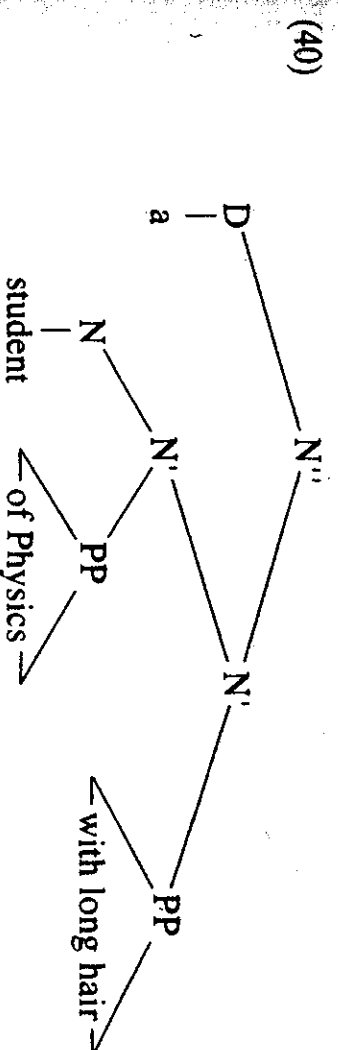


If we then apply the Adjunct Rule (35) (ii) $[N' \rightarrow N' PP]$ to expand the N-bar in (38), we derive:



If we subsequently apply the Complement Rule (35) (iii) $[N' \rightarrow N PP]$ to the N' at the bottom of the tree in (39), we derive the structure (40) below (we have

attached the relevant lexical items, to make the discussion less abstract):



And this is precisely the constituent structure associated with a Noun Phrase such as [*a student of Physics with long hair*]. So, you see, the rules do actually work, after all!

4.5 Optional constituents of the Noun Phrase

Thus far, we have been looking at the internal structure of Noun Phrases of the schematic form (41) below:

(41) Determiner + Noun + Complement PP + Adjunct PP

and we have argued that such NPs can be generated by a set of Phrase Structure Rules such as (35) above, repeated here for convenience as (42) below:

- (42) (i) $N'' \rightarrow D N'$ [Determiner Rule]
 (ii) $N' \rightarrow N' PP$ [Adjunct Rule]
 (iii) $N' \rightarrow N PP$ [Complement Rule]

However, one fairly obvious point which we have overlooked in our rules in (42) is that Determiners, Adjuncts, and Complements are all *optional* constituents of Noun Phrases. Let's consider first the optional use of Determiners.

One thing which it is important to get clear at the very outset of our discussion is exactly what we do and do not mean by claiming that 'Determiners are optional constituents of the Noun Phrase'. All we mean is that 'Some Noun Phrases are used without Determiners': what we emphatically do not mean is that 'Any Noun Phrase of any kind can optionally be used with or without a Determiner'. Of course, there are complex conditions which determine when Determiners can or cannot be omitted from a Noun Phrase: for example, in general, Noncount Nouns and Plural Count Nouns can be used without an overt Determiner, but Singular Count Nouns cannot: cf.

- (43) (a) *Childhood* can be traumatic (= Noncount Noun)
 (b) *Children* can be traumatic (= Plural Count Noun)
 (c) **Child* can be traumatic (= Singular Count Noun)

However, it is not our purpose here to deal with the complex conditions under which Determiners can or cannot be omitted in English (or more generally): the reader interested in such questions should consult the relevant section on the use of Determiners in a detailed reference grammar such as Quirk *et al.* (1985). What concerns us here is simply the question: 'What is the structure of Noun Phrases which lack Determiners, and how will our existing set of rules (42) above have to be modified in order to cope with such NPs?'

So, to return to a familiar example, what concerns us here is how we are to generate a simple Determiner-less nominal expression such as:

- (44) Students of Physics with long hair

The first question we should ask about (44) is: 'What is the constituent status of the overall phrase?' In other words, is (44) an N-bar, or an N-double-bar (i.e. full Noun Phrase)? The answer is that (44) is indeed a full Noun Phrase, as can be shown by a variety of familiar constituent structure tests. For example, it can occur in isolation as a 'sentence-fragment', as in (45) below:

- (45) SPEAKER A: What kind of students do you hate teaching?
SPEAKER B: [Students of Physics with long hair]

Given our assumption that only full Phrases can occur as sentence fragments, it follows that the bracketed Phrase [students of Physics with long hair] uttered by Speaker B in (45) must be a full Noun Phrase.

And indeed this analysis is independently confirmed by other sets of facts. For example, such expressions can be coordinated with a full NP, and can also be pronominalised by a pro-NP such as *them*:

- (46) (a) [NP Students of Physics with long hair] and [NP their professors]
often don't see eye to eye
(b) [NP Students of Physics with long hair] sometimes think the world owes *them* a living

But given that expressions such as [students of Physics with long hair] can function as NPs, how can we account for the fact that they lack Determiners?

Sadly, the answer is disappointingly unspectacular! We say the obvious, and specify that Determiners are *optional* constituents of NP. Or, more precisely, we replace our earlier Determiner Rule (42) (i) [N'' → D N'] by the revised rule (47) below:

- (47) N'' → (D) N' [new Determiner Rule]

The parentheses around D in (47) indicate that the Determiner is an optional constituent of N'' (recall that N'' = NP). If we replace our earlier Determiner

Rule (42) (i) by our new rule (47), our revised system of Phrase Structure Rules is now (48) below:

- (48) (i) N'' → (D) N' [Determiner Rule]
(ii) N' → N' PP [Adjunct Rule]
(iii) N' → N PP [Complement Rule]

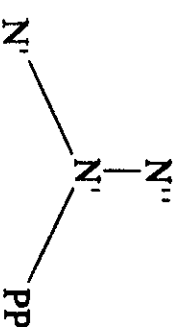
Let's consider how our revised rule system works.

We start by applying the Determiner Rule (48) (i), which tells us that we can expand an N'' into an optional Determiner plus an N-bar: if we reject the option of having a Determiner, then our rule will generate the structure (49) below:

- (49) N''
|
N'

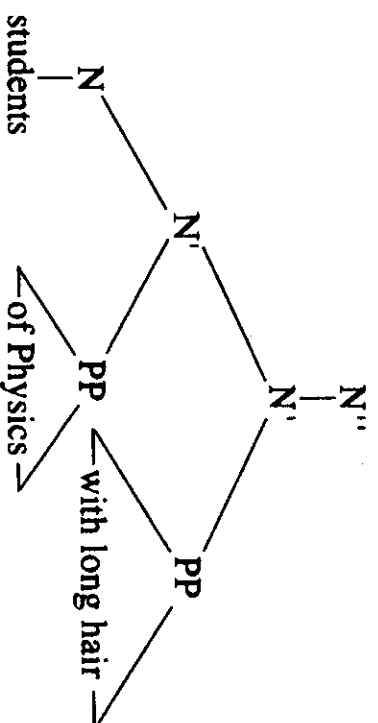
We now apply the Adjunct Rule (48) (ii): this tells us that we can expand N-bar into another N-bar plus a PP Adjunct; thus, if we apply the rule to (49) above, we derive the structure (50) below:

- (50)



Now let's move on to the Complement Rule (48) (iii), which tells us that we can expand N-bar into a head Noun followed by a PP Complement; applying this rule to (50) above will yield the structure (51) below (we have inserted appropriate lexical items for concreteness):

- (51)



Thus, our revised rules in (48) above can indeed generate NPs which contain no Determiner.

But hold on a minute! It isn't just *Determiners* which are optional constituents of Noun Phrases: for, as we noted above, *Complements* and *Adjuncts* are also optional constituents of NP. For example, in the case we are discussing, both the Complement PP [*of Physics*] and the Adjunct PP [*with long hair*] are

optional, as we see from the paradigm in (52) below:

- (52) (a) a student [*of Physics*] [*with long hair*] (Complement and Adjunct)
 (b) a student [*with long hair*] (Adjunct, no Complement)
 (c) a student [*of Physics*] (Complement, no Adjunct)
 (d) a student (no Adjunct, no Complement)

The obvious question to ask, therefore, is how we are to modify our existing Phrase Structure Rules (48) above so as to take into account the optionality of Complements and Adjuncts.

Let's consider first the question of how we generate NPs which contain an Adjunct but no Complement – i.e. NPs such as (52) (b) [*a student with long hair*]. The obvious suggestion is to deal with optional Complements in the same way that we dealt with optional Determiners – namely by specifying that a Complement PP is an optional constituent of N-bar. Thus, we might propose to replace our existing Complement Rule (48) (iii) [$N' \rightarrow N \text{ PP}$] by the revised rule (53) below:

- (53) $N' \rightarrow N \text{ (PP)}$ [new Complement Rule]

where the parentheses round PP in (53) indicate that a Prepositional Phrase Complement is an optional constituent of N-bar. If we now replace our earlier Complement Rule by our new one, our revised overall system of Phrase Structure Rules becomes (54) below:

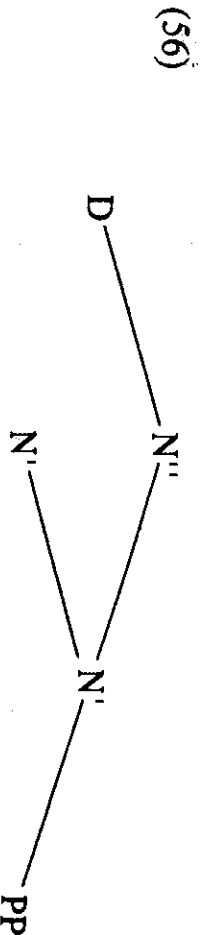
- (54) (i) $N'' \rightarrow (D) N'$ [Determiner Rule]
 (ii) $N' \rightarrow N' \text{ PP}$ [Adjunct Rule]
 (iii) $N' \rightarrow N \text{ (PP)}$ [Complement Rule]

Let's see how we can apply our revised system of rules to generate a Noun Phrase such as (52) (b) [*a student with long hair*].

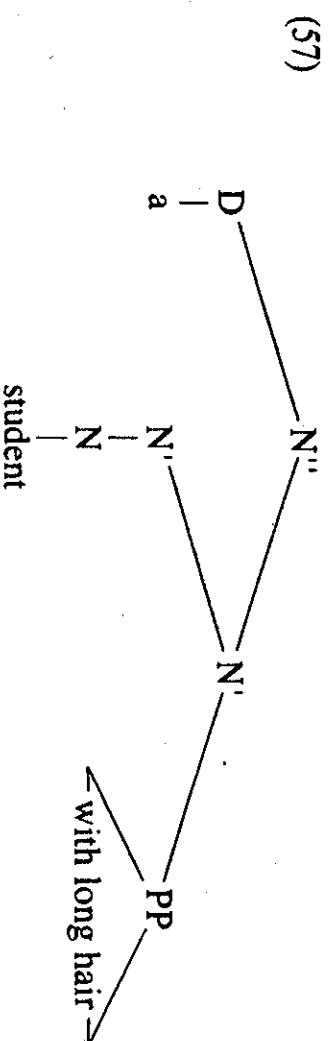
First, we start by applying the Determiner Rule (54) (i): if we choose the optional Determiner, this generates the structure (55) below:



We now go on to apply the Adjunct rule (54) (ii) to expand N-bar in (55) into the sequence [$N' \text{ PP}$], as in (56) below:



We now apply our new Complement Rule (54) (iii): this tells us that we can expand an N-bar into an N with or without an optional PP complement. Well, let's suppose that we decide not to choose the PP complement. In this case, N-bar will be expanded into N alone, as in (57) below (we have inserted relevant lexical items for the sake of making our discussion more concrete, and thus more intelligible):



Hence, we see that a very simple modification of our earlier Complement Rule will suffice to enable us to generate NPs in which the head N has no Complement.

So, now we've seen how to deal with optional Determiners on the one hand, and optional Complements on the other. But what about optional *Adjuncts*? In other words, how are we going to generate a structure such as (52) (c) [*a student of Physics*], which contains a Complement PP [*of Physics*], but no Adjunct PP? Well, the obvious suggestion is to deal with optional Adjuncts in exactly the same way that we dealt with optional Determiners and Complements. That is to say, we might simply stipulate that Adjuncts are an optional constituent of N-bar. The natural way of doing this might seem to be simply to put parentheses round the Adjunct PP introduced by our existing Adjunct Rule (54) (ii) above, so that our earlier rules (54) would be revised along the lines of (58) below (where (58) (ii) is the new Adjunct Rule):

- (58) (i) $N'' \rightarrow (D) N'$ [Determiner Rule]
 (ii) $N' \rightarrow N' \text{ (PP)}$ [new Adjunct Rule]
 (iii) $N' \rightarrow N \text{ (PP)}$ [Complement Rule]

But if you think about it, you'll realise that (58) (ii) can't be right at all. After all, one of the possibilities allowed for in our new Adjunct Rule (58) (ii) is that of omitting the PP Adjunct, in which case the Adjunct Rule would amount to:

- (59) $N' \rightarrow N'$

But rule (59) is *vacuous*, in a number of ways. For one thing, it's self-defining, and hence doesn't actually tell us anything about how to form an N-bar (it's a bit like a person who, when asked to define a *troglydite* says 'Well, a troglydite's a troglydite, and that's all there is to say about it!'). More seriously,

rule (59) does no more than chase its own tail (well, if you want the relevant technical jargon, the rule is *vacuously recursive*). Why? Because its output (= N') is the same as its input (= N'), so that the rule allows you to stack a potentially infinite number of non-branching N-bar constituents on top of each other. This means that we (quite wrongly) predict that any Noun Phrase should be potentially infinitely structurally ambiguous, according to how many non-branching N-bars it has stacked on top of other N-bars. For, we assume that differences in structure will generally correlate with perceived differences of meaning: so, rule (59) implies that a simple NP like [a boy] should be infinitely ambiguous according to whether it contains one, two, three, four, five, . . . etc. non-branching N-bar constituents. But this is an absurd claim, and one which we shall treat with the contempt it deserves!

The bottom line of our argumentation here is that we cannot deal with the optionality of Adjuncts in terms of a rule such as (58) (ii) saying that an N-bar can be expanded into another N-bar plus an optional Adjunct PP. So, assuming that we don't opt for the 'tail-chasing' (sorry, I mean *vacuous recursion*) solution (59), how are we going to deal with the optionality of Adjuncts? Well, there's an even simpler solution than you might have expected: and that is to simply stipulate that our earlier Adjunct Rule (54) (ii) is an *optional rule*. That is to say, we can either choose to apply the rule, or not apply it, as we wish. In other words, we might revise our earlier rules (54) in the manner indicated in (60) below:

- (60) (i) N'' → (D) N' [Determiner Rule]
 (ii) N' → N' PP [Adjunct Rule: *optional*]
 (iii) N' → N (PP) [Complement Rule]

In the light of our claim that the Adjunct Rule (60) (ii) is *optional* (and hence can be 'skipped' if we wish to do so), let's go back to the question of how we generate a structure like (52) (c) [*a student of Physics*]. As before, we start by applying the Determiner Rule (60) (i) [N'' → (D) N']: this tells us that we can form an NP (= N-double-bar) out of an optional Determiner and an N-bar. If we take the Determiner option, then we generate the structure (61) below:

- (61)
-

Now we come to the Adjunct Rule, (60) (ii). Since this rule is *optional*, we can choose to either apply it, or not apply it. We'll take the latter course, and choose to 'skip' the rule altogether. This means that we go on to apply the Complement Rule (60) (iii), which expands N-bar into a head N plus an

optional PP Complement. Well let's suppose we take up the option of having a PP Complement: in this case, the result of applying the Complement Rule (60) (iii) to (61) will be the structure (62) below (as before, we have inserted appropriate lexical items, for the sake of clarity):

- (62)
-

Since the PP [*of Physics*] in (62) is a Complement of the head of Noun *student*, we have now managed to achieve our goal of generating a Noun Phrase without an Adjunct.

So, we have managed to adapt our original rule system so as to cope with NPs which contain Adjuncts but not Complements, and conversely NPs which contain Complements but not Adjuncts. But what about NPs which contain neither Complements, nor Adjuncts – e.g. NPs such as (52) (d) [*a student*]. Can our revised system of Phrase Structure Rules (60) handle these? Well, let's see.

We'll begin by applying the Determiner Rule (60) (i) to generate the structure (61) above. We then 'skip' the optional Adjunct Rule (60) (ii): we go directly on to the Complement Rule (60) (iii), which tells us that we can expand an N-bar into a head N, plus an optional PP complement. But this time, let's take the option of not choosing to have a PP complement, so that we expand N-bar simply into an unmodified N: the result will be that by applying the Complement Rule (60) (iii) to (61) above we generate (63) below (as before, the relevant lexical items have been inserted):

- (63)
-

Since the NP in (63) above contains neither a Complement PP nor an Adjunct PP, it seems clear that our existing system of rules in (60) is perfectly adequate to deal with NPs which lack both Complements and Adjuncts.

We have now seen that the very simple set of rules we devised in (60) will generate a full range of NP structures, with or without Determiners, with or without Adjuncts, and with or without Complements, and will assign appropriate structures to the NPs concerned: for example, (52) (a) [*a student of*

Physics with long hair] will be assigned the structure (40) above; (52) (b) [*a student with long hair*] will be assigned the structure (57); (52) (c) [*a student of Physics*] will be assigned the structure (62); and (52) (d) [*a student*] will be assigned the structure (63). Now, if you look closely at these four structures (40), (57), (62) and (63), you'll see that the categorial status of the expression *student* changes from one example to another. More precisely, *student* has the status of a simple N in (40) and (62); whereas it has the status of an N-bar immediately dominating an N in (57) and (63). To underline this fact, we give the structure of the relevant examples in skeletal form in (64) and (65) below:

(64) (a) [N'' a [N' [N' [*N student*] of Physics] with long hair]]

(b) [N'' a [N' [*N student*] of Physics]]

(65) (a) [N'' a [N' [N' [*N student*]] with long hair]]

(b) [N'' a [N' [*N student*]]]

The difference is that when the Noun *student* has an overt Complement like [*of Physics*] (as in (64) above), then it functions only as an N (because the corresponding N-bar is the whole Noun + Complement structure [*student of Physics*]). But when the Noun *student* has no overt Complement (as in (65) above), then it is not only an N, but also an N-bar.

Now, the assumption that *student* is an N in (64) but an N-bar in (65) has far-reaching consequences. We can see this if we look at the predictions the two structures make about the use of the proform *one*. Recall that we argued earlier that *one* in English can function as a pro-N-bar, but not as a pro-N (because proforms do not replace word-level categories). Now, if it is true (as our analysis claims) that *student* is an N-bar in (65), then since *one* is a pro-N-bar, we should expect that *student* can be replaced by *one* in structures like (65); and as (66) below illustrates, this prediction is entirely correct:

(66) (a) The [student] with short hair is dating the *one* with long hair

(b) This [student] works harder than that *one*

It therefore follows that *student* must have the status of N-bar in examples like (65) and (66). But by contrast, we find that *student* cannot be replaced by the proform *one* in examples such as (64) above, as (67) below illustrates:

(67) (a) Which [student] were you referring to? *The *one* of Physics with long hair?

(b) *The [student] of chemistry was older than the *one* of Physics (Lightfoot (1982), p. 54)

Since *student* cannot be replaced by the pro-N-bar *one* here, it therefore

follows that *student* cannot have the status of N-bar in phrases such as (64), but rather must have the simple status of N.

We can use our *one*-pronominalisation test to provide further confirmation of the constituent structure analyses we have posited in (64) and (65) above. For, our proposed analysis also specifies that the sequences [*student of Physics*] in (64) (a), [*student of Physics with long hair*] in (64) (a), [*student of Physics*] in (64) (b), and [*student with long hair*] in (65) (a) are all N-bar constituents; hence we should expect that all four phrases can be proformed by the pro-N-bar *one*. And as (68) below indicates, this prediction is entirely correct:

(68) (a) Which [student of Physics]? The *one* with long hair?

(b) Which [student of Physics with long hair]? This *one*?

(c) Which [student of Physics]? That *one*?

(d) Which [student with long hair]? This *one*?

Thus, *one*-pronominalisation facts provide quite remarkable independent corroboration of our analysis. In particular, they lend strong support to our claim that a Noun which has an overt Complement is simply an N, whereas a Noun which lacks a Complement has the status of N-bar (as well as N).

4.6 More differences between Complements and Adjuncts

Hitherto, we have argued that Determiners, Adjunct PPs and Complement PPs should be generated by the following set of Phrase Structure Rules (cf. (60) above):

(69) (i) N'' → (D) N' [Determiner Rule]

(ii) N' → N' PP [Adjunct Rule: optional]

(iii) N' → N (PP) [Complement Rule]

As we have already seen, these rules specify (amongst other things) that Determiners, Adjuncts, and Complements differ from each other in the following ways:

(70) (a) Determiners are sisters of N' and daughters of N''

(b) Adjuncts are sisters and daughters of N'

(d) Complements are sisters of N and daughters of N'

In this section, we are going to look (rather more briefly) at a number of further arguments in support of the structural distinction between Complement PPs and Adjunct PPs drawn in (70) above.

One such argument is of a semantic nature. Hornstein and Lightfoot (1981a, p. 21) note that the structural differences between Complements and

Adjuncts in (70) correlate in an obvious way with an associated difference in semantic structure. In relation to the pair of sentences in (71) below:

- (71) (a) John is a [N' [N student] of Physics]
 (b) John is a [N' [N' [N student]] with long hair]

they comment:

We also assume that syntactic constituent structure will play a role in determining the semantics of Noun Phrases, and specifically that each N-bar specifies a 'semantic property'. Therefore, to attribute (71) (a) to John is to attribute one property to him, that he studies Physics; to attribute (71) (b) to John is to attribute two properties, that he studies, and that he has long hair. Hence it follows that *John is a student of Physics*, meaning what it does (i.e. denoting only one property), cannot be assigned a structure like (71) (b); conversely, *John is a student with long hair*, meaning what it does (i.e. denoting two properties) cannot have a structure like (71) (a).

(Hornstein and Lightfoot, *Introduction to Explanation in Linguistics* (1981a), p. 21)

A related semantic argument can be formulated with regard to *disambiguation*. It should be obvious that the structural distinction we have drawn between Complement PPs (which modify N) and Adjunct PPs (which modify N-bar) will enable us to provide a principled account of the structural ambiguity of phrases such as:

- (72) a student [*of high moral principles*]

The NP in (72) is ambiguous as between the two interpretations:

- (73) (i) a person who studies high moral principles
 (ii) a student who has high moral principles

And we might characterise this ambiguity in structural terms by saying that on interpretation (73) (i) the bracketed PP (72) is a Complement (hence a sister of the head Noun *student*; whereas on interpretation (73) (ii), the bracketed PP in (72) is an Adjunct, hence a sister of the N-bar headed by the Noun *student*. This would mean that on the first interpretation, (72) would have the skeletal structure (74) (a) below, whereas on the second interpretation it would have the structure (74) (b):

- (74) (a) a [N' [N student] of high moral principles] (= 73(i))
 (b) a [N' [N' [N student]] of high moral principles] (= 73(ii))

Thus, our structural distinction between Complements and Adjuncts enables us to characterise some fairly interesting cases of structural ambiguity.

But let's return to syntactic arguments in favour of our claim that Complement PPs expand N into N-bar, whereas Adjunct PPs expand N-bar into N-bar. An important difference between the Adjunct Rule (69) (ii) above (which introduces Adjunct PPs), and the Complement Rule (69) (iii) (which introduces Complement PPs) is that the Adjunct Rule is *recursive*, whereas the Complement Rule is not: for convenience, we have repeated our earlier rules (69) above as (75) below:

- (75) (i) N" → (D) N' [Determiner Rule]
 (ii) N' → N' PP [Adjunct Rule: optional]
 (iii) N' → N (PP) [Complement Rule]

The Adjunct Rule (75) (ii) is recursive by virtue of the fact that the same symbol N' appears both on the left and on the right of the arrow, whereas the Complement Rule (75) (iii) is non-recursive. Since the rule generating Adjuncts is recursive, it predicts that indefinitely many Adjunct PPs can be 'stacked' on top of each other. But because the rule introducing Complements is not recursive, it does not allow PP Complements to be *stacked* in this way. And in fact, the prediction that PP Adjuncts can be 'stacked' but PP Complements cannot seems to be correct, as we see from the contrast in (76) below:

- (76) (a) the student [*with long hair*] [*with short arms*]
 (b) *the student [*of Physics*] [*of Chemistry*]

Moreover, our analysis predicts that PP Adjuncts can be stacked on top of each other in any order: and this again seems to be true, as examples such as (77) below (where both italicised phrases are Adjunct PPs) illustrate:

- (77) (a) the [N' [N' [N' student] *with long hair*] *in the corner*]
 (b) the [N' [N' [N' student] *in the corner*] *with long hair*]

Furthermore, under our proposed analysis of (77) (a) the sequences [*student*], [*student with long hair*], and [*student with long hair in the corner*] would all be N-bar constituents, so that we correctly predict that all three bracketed strings can be replaced by the pro-N-bar *one* in an appropriate context. And as we see from (78) below, the bracketed sequences can indeed be performed by *one* in each case:

- (78) (a) Which [student]? The *one* with long hair in the corner?
 (b) Which [student with long hair]? The *one* in the corner?
 (c) Which [student with long hair in the corner]? That *one*?

Once again, our analysis turns out to make just the right predictions.

A further syntactic argument in favour of the structural distinction between Complements and Adjuncts which we are assuming here can be formulated in relation to facts about *Ordinary Coordination*. Note that we can coordinate two PPs which are both Complements: cf.

(79) a student [*of Physics*] and [*of Chemistry*]

And likewise we can coordinate two PPs which are both Adjuncts: cf.

(80) a student [*with long hair*] and [*with short arms*]

But we cannot coordinate a Complement PP with an Adjunct PP: cf.

(81) (a) *a student [*of Physics*] and [*with long hair*]

(b) *a student [*with long hair*] and [*of Physics*]

Under the analysis proposed here, we can account for this in structural terms by assuming that Adjuncts and Complements are attached at different levels (Complements are sisters of N, and hence are attached at the N level; whereas Adjuncts are sisters of N-bar, and hence are attached at the N-bar level), and by positing that only constituents attached at the same level can be coordinated. It would then follow that the two Complement PPs in (79) can be coordinated (since both are attached at the N level), as can the two Adjunct PPs in (80) (since both are attached at the N-bar level): but it would also follow that an Adjunct cannot be coordinated with a Complement (as in (81)), since Complements are attached at the N level, whereas Adjuncts are attached at the N-bar level.

Incidentally, we might note in passing that our proposed analysis makes a number of further correct predictions about coordination. For example, since both Complements and Adjuncts are daughters of N-bar (i.e. both Noun + Complement and Noun + Adjunct sequences have the status of N-bar), our analysis correctly predicts that the Noun + Complement sequence [*student of Physics*] and the Noun + Adjunct sequence [*student with long hair*] have the same constituent status of N-bar, and so can be coordinated with themselves and each other in such a way that the whole conjoined sequence forms an N-bar, and thus can be modified by a Determiner such as *the*: and the fact that examples such as (82) below are grammatical shows that this prediction is correct:

(82) (a) the [*students of Chemistry* and *professors of Physics*]

(b) the [*students with long hair* and *professors with short hair*]

(c) the [*students of Chemistry* and *professors with short hair*]

Each of the italicised conjuncts in (82) is thus an N-bar, as indeed is each of the bracketed coordinate structures.

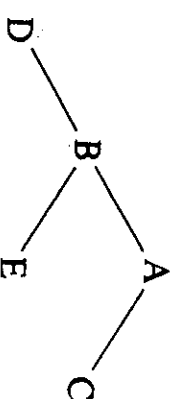
An additional syntactic argument in favour of drawing a structural distinction between Complements and Adjuncts derives from *Extrapolation* facts (we shall discuss this phenomenon more fully in Chapter 8). It appears that PP Adjuncts can be *extrapolated* from their Heads (i.e. separated from their Heads and moved to the end of their Clause) more freely than PP Complements: cf.

(83) (a) a student came to see me yesterday [*with long hair*]

(b) *a student came to see me yesterday [*of Physics*]

It would seem that in some sense PP Complements are more 'inseparable' from their Heads than PP Adjuncts. Once again, our analysis provides us with a principled way of accounting for these differences in purely structural terms. Thus, we might posit that the more closely related a PP is to its Head, the less freely it can be extrapolated. And (to extend the genealogical terminology introduced in Chapter 3), we might say that Complements are *sisters* to their Heads, whereas Adjuncts are *aunts* (an *aunt* being a sister of the mother of a given node). To clarify the term *aunt*, consider a structure such as (84) below:

(84)



We might say that in an abstract tree structure such as (84), E is the sister of D, whereas C is the *aunt* of D. In these terms, a Complement would be a sister of its Head Noun, and hence more closely related to the Head than an Adjunct (which would be an *aunt* of the Head Noun): and we might suppose that it is because there is a greater structural affinity between Heads and Complements than between Heads and Adjuncts, that Complements are more resistant to being extrapolated.

Given that Extrapolation involves *Postposing*, the obvious question to ask is whether Complements and Adjuncts behave any differently with respect to *Preposing*. There is some evidence that this is indeed the case. It would seem that an NP which is the Object of a Preposition heading a *Complement* PP can be preposed more freely than an NP which is the Object of a Preposition heading an *Adjunct* PP: cf. the contrast below:

(85) (a) [*What branch of Physics*] are you a student of?

(b) **[What kind of hair]* are you a student with?

Thus, in (85) (a), the preposed bracketed NP is the Object of the Preposition *of*, and *of* introduces a Complement phrase, so that (85) (a) involves preposing an NP which is part of a Complement PP. But by contrast, the bracketed preposed NP in (85) (b) is the Object of the Preposition *with*, and *with* introduces

an Adjunct, so that the ungrammaticality of (85) (b) suggests that an NP which is part of an Adjunct PP cannot be preposed. Thus, there is an obvious contrast insofar as the Object of a Complement Preposition can be preposed, but not the Object of an Adjunct Preposition.

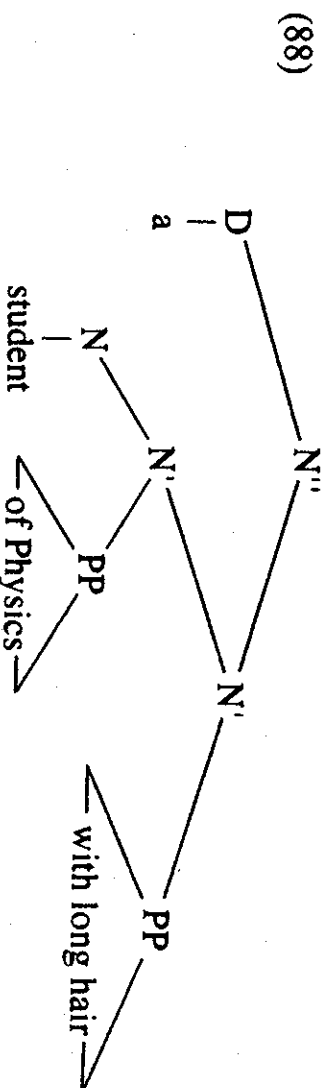
Yet another syntactic argument in support of positing a structural distinction between Complement and Adjunct Phrases relates to *Co-occurrence Restrictions*. In the case of a PP Complement, there are severe restrictions on the choice of P heading the PP; particular Nouns require (or, in the terminology we shall introduce in Chapter 7, *subcategorise*) a PP introduced by a particular Preposition: for example, only some Nouns, not others permit an *of*-phrase Complement: cf.

- (86) (a) a student of Physics
 (b) *a boy of Physics
 (c) *a girl of Physics
 (d) *a teenager of Physics
 (e) *a punk of Physics

By contrast the type of PP which functions as an Adjunct can be used to modify *any* type of head Noun (subject to semantic and pragmatic restrictions), as we see from:

- (87) (a) a student with long hair
 (b) a boy with long hair
 (c) a girl with long hair
 (d) a teenager with long hair
 (e) a punk with long hair

Once again, it seems as if, in some informal sense, Complements are more closely linked to their head Nouns than Adjuncts. And we might argue that the N-bar analysis enables us to define 'closeness' in purely structural terms, in the manner outlined earlier: e.g. we might say that *sisters* are more closely linked to their Heads than *aunts*, and we could posit that subcategorisation restrictions hold only between a Head and its sisters, not between a Head and its more distant relatives (e.g. aunts). Thus, in the case of a structure such as (40) above, repeated as (88) below:



we find subcategorisation restrictions holding between the head Noun *student* and its sister Complement PP [*of Physics*], but not between *student* and its aunt Adjunct PP [*with long hair*]. But, naturally, any such account of *subcategorisation* restrictions presupposes a structural distinction such as that in (70) between *Complements* and *Adjuncts*.

At this point, it might be useful to summarise our discussion in this section. We have argued that there are a vast array of facts (some semantic, and some syntactic) which lend strong empirical support to the claim that Complements are attached at the N-level, and Adjuncts at the N-bar level. More precisely, the key claim we have made is that:

- (89) (i) Complements expand N into N-bar
 (ii) Adjuncts recursively expand N-bar into N-bar

Thus, Complements and Adjuncts are similar in that they are both daughters of N-bar; but they differ in that Complements are sisters of (i.e. modify) N, whereas Adjuncts are sisters of (i.e. modify) N-bar.

Given the arguments we have presented here, PPs such as those italicised in (90) below would be *Complements*:

- (90) (a) your reply [*to my letter*]
 (b) the attack [*on the Prime Minister*]
 (c) the loss [*of the ship*]
 (d) her disgust [*at his behaviour*]
 (e) his disillusionment [*with Linguistics*]

whereas PPs such as those italicised in (91) below would be *Adjuncts*:

- (91) (a) the book [*on the table*]
 (b) the advertisement [*on the television*]
 (c) the fight [*after the match*]
 (d) his resignation [*because of the scandal*]
 (e) a cup [*with a broken handle*]

I leave you to verify this for yourself, applying the various 'tests' we have devised in this section, and previous sections (I bet you won't bother!)

Of course, our discussion here has been limited to postnominal Prepositional Phrases. But the Complement-Adjunct distinction can be shown to be valid for other types of postnominal phrase as well (though we lack the space to do this here). Generally speaking, only Prepositional Phrases and Clauses can function as the Complements of Nouns. For example, the italicised constituents in (90) above are Complement PPs; and the italicised in (92) below are *Complement Clauses* – i.e. the italicised Clause in each case functions as the Complement of the capitalised Noun:

- (92) (a) the SUGGESTION [*that we should abandon cruise missiles*]
 (b) the DEMAND [*for him to resign*]
 (c) the QUESTION [*whether euthanasia is ethical*]

By contrast, a much wider range of constituents can function as postnominal Adjuncts – not just PPs, but also temporal NPs, APs and Clauses (more precisely, Restrictive Relative Clauses). For example, in (93) below, each of the italicised constituents is an Adjunct of the N-bar containing the capitalised constituents:

- (93) (a) the [N' [N' ABOLITION OF TAXES] [NP next year]]
 (b) those [N' [N' STUDENTS OF PHYSICS] [AP absent from class]]
 (c) the [N' [N' KING OF ENGLAND] [S who abdicated]]

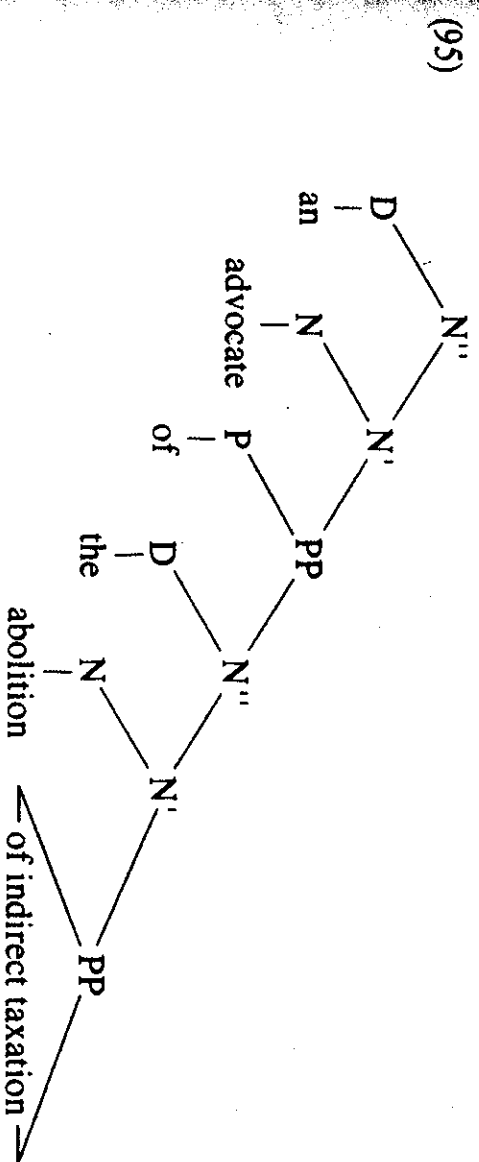
But I guess you've had just about enough of postnominal Phrases by now, so I'll spare you the relevant argumentation ... or rather, leave you to devise some of it for yourself in an appropriate exercise!

However, there's one additional complication which we'll touch upon briefly. So far, all the Noun Phrases we've looked at have been *simple* NPs comprising a head Noun with or without an optional Determiner, Complement, or Adjunct. What we have not considered is the structure of *complex* NPs such as those in (94) below:

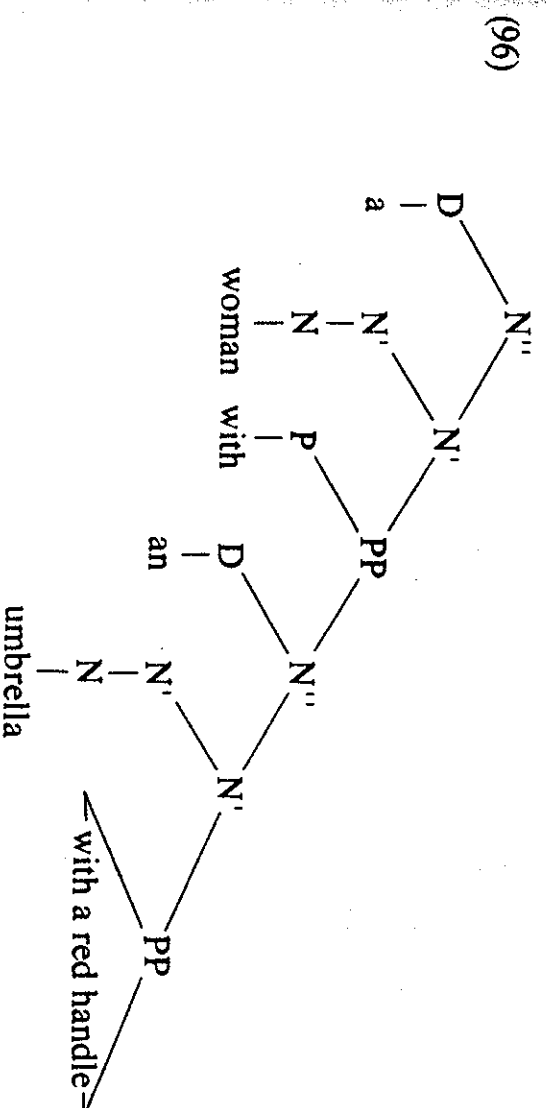
- (94) (a) an *advocate* of the *abolition* of indirect taxation
 (b) a *woman* with an *umbrella* with a red handle
 (c) her *dislike* of men with big egos
 (d) a *girl* with a *dislike* of macho men

For reasons which should now be familiar, the *of*-phrases in these examples are all Complement PPs (hence sisters of N), whereas the *with*-phrases in each case are all Adjunct PPs (hence sisters of N-bar). But the crucial point that we want to make here is that although all the examples contain two PPs, the first PP in each case modifies the first italicised nominal, while the second PP modifies the second italicised nominal. To make matters clearer, let's briefly look in rather more detail at the internal structure of each of the NPs in (94) (omitting the relevant argumentation for the sake of brevity).

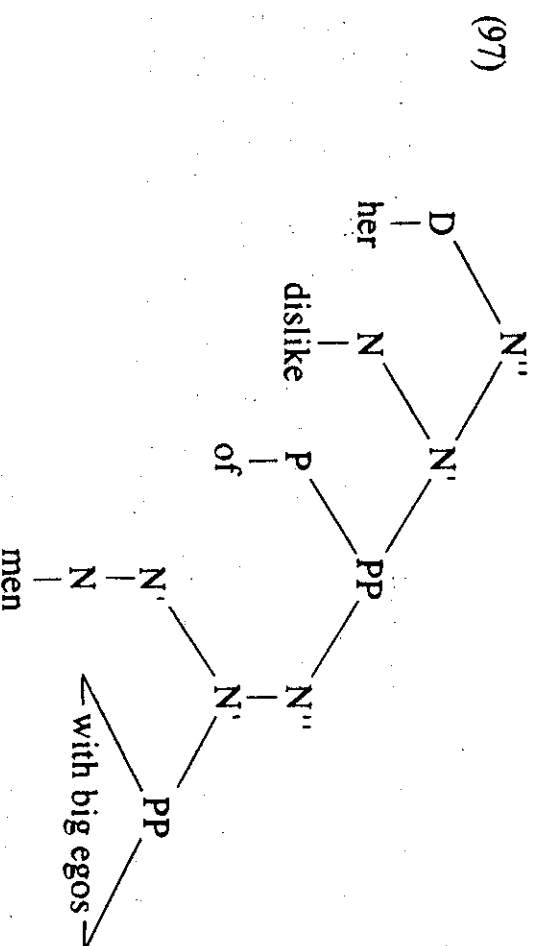
In (94) (a), both *of*-phrases are Complement PPs: but they are Complements of different head Nouns. More precisely, the first *of*-phrase is a Complement of the Noun *advocate*, whereas the second one is a Complement of the Noun *abolition*. Given our earlier arguments that Complements are sisters of N, then (94) (a) will have the structure (95) below:



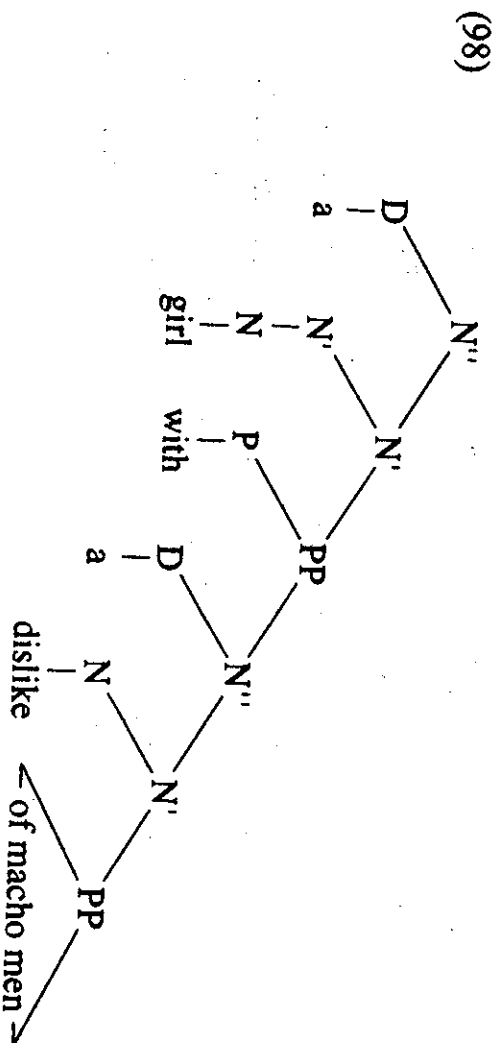
Conversely, in (94) (b) both *with*-phrases are Adjunct PPs, and hence (given our earlier arguments) both sisters of N-bar. But the crucial point is that they are Adjuncts of different N-bar constituents: the first *with*-phrase modifies the N-bar *woman* whereas the second modifies the N-bar *umbrella*, so that (94) (b) has the structure (96) below:



In (94) (c), the *of*-phrase is a Complement PP whereas the *with*-phrase is an Adjunct PP (recall that Complements are sisters of N, and Adjuncts are sisters of N-bar). However, whereas the *of*-phrase modifies the N *dislike*, the *with*-phrase modifies the N-bar *men*, so that (94) (c) has the structure (97) below:



In (94) (d) we have a rather different situation: the first PP (= the *with*-phrase) is an Adjunct (hence a sister of N-bar), whereas the second PP (= the *of*-phrase) is a Complement (hence a sister of N). But whereas the *with*-phrase modifies *girl*, the *of*-phrase modifies *dislike*, so that (94) (d) has the structure (98) below:



Thus, in more complex cases of postnominal modification we have to be concerned not only with the question of whether a given postmodifier is a Complement or an Adjunct, but also with the question of which particular nominal it modifies. Not surprisingly, therefore, we find cases of structural ambiguity such as the following:

- (99) a woman with three children with ginger hair

where the Adjunct PP [*with ginger hair*] might be taken to modify either the N-bar [*woman with three children*], or the N-bar *children*: in other words, it might be either the woman or the children who have ginger hair. And on that colourful note, we'll conclude our discussion of postnominal modifiers!

You should now be able to tackle exercises I, II, III, IV, and V

4.7 Nominal premodifiers

So far, our discussion has been limited to the syntax of *postnominal* modifiers. But what about *prenominal* modifiers? We shall argue that there are three structurally distinct classes of nominal premodifier, namely (i) *Determiners*, (ii) *Complements*, and (iii) *Attributes* (this last term is borrowed from Bloomfield 1935, p. 195). We shall further argue that these three different classes of premodifier have the different structural properties described in (100) below:

- (100) (i) *Determiners* expand N-bar into N-double-bar

- (ii) *Attributes* recursively expand N-bar into N-bar
 (iii) *Complements* expand N into N-bar

Since both *Attributes* and *Adjuncts* recursively expand N-bar into N-bar, it seems clear that the two have essentially the same function, so that *Attributes* are simply prenominal Adjuncts (though we shall continue to follow tradition and refer to attributive premodifiers as *Attributes* rather than *Adjuncts*). For the time being, we shall concentrate on the distinction between *Complements* and *Attributes*: and more specifically, we shall concentrate on the distinction between Complement NPs and Attribute NPs.

In this connection, consider the following Noun Phrase:

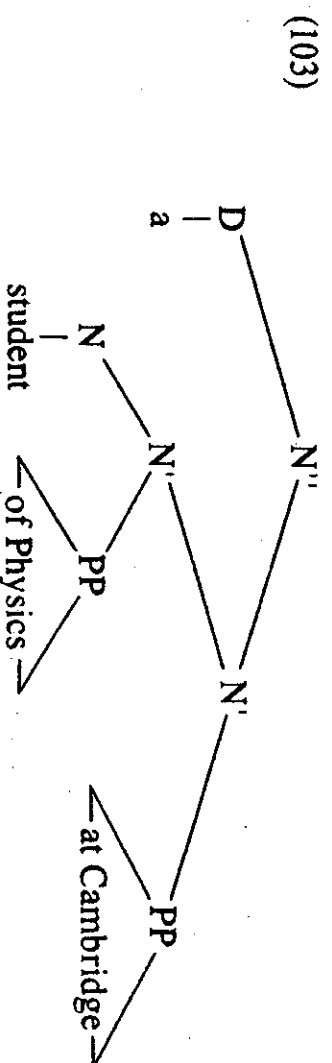
- (101) a [Cambridge] [Physics] student

Clearly, (101) is ambiguous, between the two interpretations which can be paraphrased as in (102) below:

- (102) (i) a student of Physics (who is) at Cambridge
 (ii) a student of Cambridge Physics (i.e. the particular brand of Physics taught at Cambridge, as opposed to *Oxford Physics*)

In our discussion here, we'll concern ourselves solely with the first and most natural interpretation, namely (102) (i): this is purely for didactic purposes, to make our exposition as simple and concise as possible (our analysis can be extended straightforwardly to deal with the second interpretation (102) (ii), in ways that I'll leave you to work out for yourself).

In analysing (101) (on interpretation (102) (i)), we might like to bear in mind the principle of 'structural symmetry' which Rulon Wells invoked in his analysis of *the king of England* (recall that he wanted to treat this as structurally parallel to *the English king*). What this means is that we'd like to make our analysis of (101) *a Cambridge Physics student* as close to our analysis of (102) (i) *[a student of Physics (who is) at Cambridge]* as possible. So, let's start by looking at the internal structure of (102) (i), ignoring the material in parentheses. Given all the arguments we put forward in the previous section, (102) (i) will have the structure (103) below:

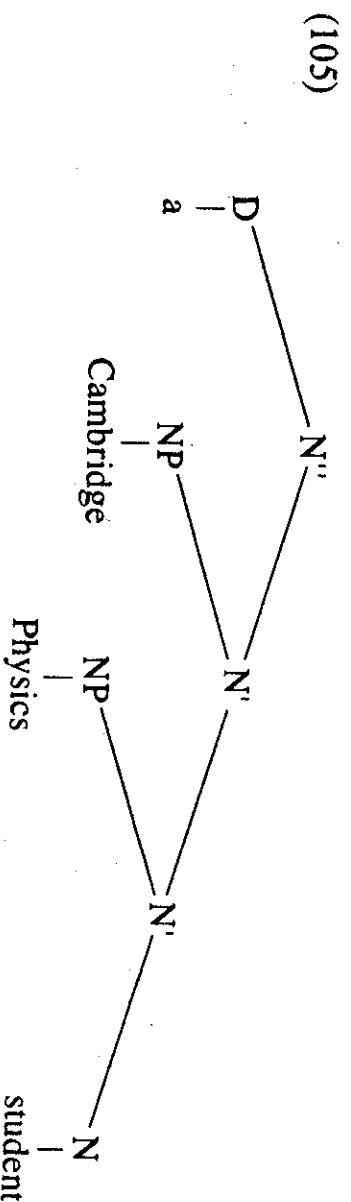


And it should (by now!) be obvious to you that the PP [*of Physics*] in (103) is a Complement (hence modifies N), whereas the PP [*at Cambridge*] is an Adjunct (hence modifies N-bar). We can provide some empirical support for the analysis in (103) by standard constituent structure 'tests': for example, (103) specifies that *student* is an N, [*student of Physics*] is an N-bar, and [*student of Physics at Cambridge*] is also an N-bar. Therefore, the analysis predicts that the latter two constituents (but not the former) can be replaced by the pro-N-bar *one*: and as (104) below illustrates, this is indeed the case:

- (104) (a) Which [student of Physics]? The *one* at Cambridge?
 (b) Which [student of Physics at Cambridge]? This *one*?
 (c) Which [student]? *The *one* of Physics at Cambridge?

So, the analysis in (103) above seems to produce the right results.

Now, if we want to attain maximal structural symmetry between (101) [*a Cambridge Physics student*] and (103) [*a student of Physics at Cambridge*], then the natural suggestion to make is that *Physics* in (101) should be analysed as a Complement, and *Cambridge* as an Attribute (recall that Attributes are the prenominal counterpart of Adjuncts). In other words, our *structural symmetry* principle would suggest that (101) should be assigned the structure (105) below:



(For didactic reasons, we use the label NP for Noun Phrases whose internal structure is not the focus of our interest, and which we choose not to represent, and N'' for Noun Phrases whose structure we want the reader to concentrate on, and which we show in some detail: but recall that from a theoretical viewpoint, NP and N'' are equivalent terms.) Given the structure (105), then *Physics* would be a Complement because it is the sister of the N *student*, whereas *Cambridge* would be an Attribute, because it is the sister (and daughter) of an N-bar. A structure such as (105) could be generated by a set of Phrase Structure Rules such as (106) below:

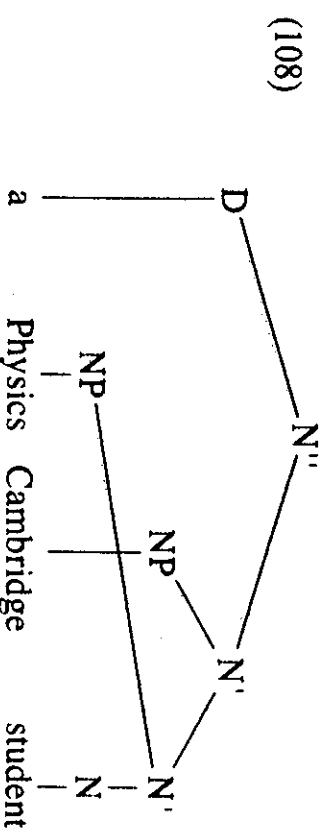
- (106) (i) N'' → (D) N' [Determiner Rule: cf. (75) (i)]
 (ii) N' → NP N' [Attribute Rule: optional]
 (iii) N' → (NP) N [Complement Rule]

We make the Attribute Rule (106) (ii) optional because not all Noun Phrases contain Attributes: and we make the NP Complement in (106) (iii) optional because not all head Nouns have NP Complements.

However, while it would obviously be extremely satisfying if we were to be able to establish structural symmetry between the prenominal and postnominal Phrases in (103) and (105) above, clearly we need to base our analysis in (105) on some firmer foundation than a mere desire to find structural symmetry. So, what evidence is there that (105) is the right analysis for (101) [*a Cambridge Physics student*]? Well, part of the evidence comes from word-order facts. For, we have already argued that Complements must always come closer to their head Noun than Adjuncts (if we are to avoid 'crossing branches'). And if *Attributes* are the prenominal counterparts of Adjuncts, then we should expect that Complements must also come closer to their Head Noun than Attributes. And this does indeed turn out to be the case. For as we see from (107) below, the Complement NP *Physics* must come closer to the head Noun *student* than the Attribute NP *Cambridge*:

- (107) (a) a [*Cambridge*] [*Physics*] student
 (b) *a [*Physics*] [*Cambridge*] student

Now, if we posit that Complement NPs are generated to the left of N (cf. the Complement Rule (106) (iii) above) whereas Attribute NPs are generated to the left of N-bar (cf. the Attribute Rule (106) (ii) above), then it should be obvious why (107) (b) is ungrammatical: for, the only way in which we can generate a structure like (107) (b) in which the Attribute NP is closer to the Head Noun than the Complement NP is to allow 'crossing branches' as in (108) below:



But a structure such as (108) is ill-formed because it violates our condition that branches should not be allowed to cross. By contrast, there is no violation of the 'crossing branches' condition in (105) above, so that we correctly predict that only the Attribute + Complement order found in (105) is possible, not the Complement + Attribute order found in (108).

A second argument in support of the analysis in (105) can be formulated in relation to *one*-pronominalisation facts. For note that our analysis in (105)

specifies that both [*Physics student*] and [*Cambridge Physics student*] are N-bar constituents, whereas *student* is not (it is simply an N). Given our assumption that *one* is a pro-N-bar, we therefore predict that the first two of these expressions can be proformed by *one*, but not the third. And as (109) below illustrates, this is indeed the case:

- (109) (a) Which [*Physics student*]? The Cambridge *one*?
 (b) Which [*Cambridge Physics student*]? This *one*?
 (c) Which [*student*]? *The Cambridge *Physics one*?

So, *one-pronominalisation* facts lend strong empirical support to our analysis.

A third argument in favour of (105) comes from facts about *Simple Coordination*. Given that both the sequences [*Physics student*] and [*Cambridge Physics student*] in (105) are assigned the status of N-bar, then we should expect that both can be coordinated with another N-bar such as [*hockey player*]: and as (110) below shows, this is indeed the case:

- (110) (a) a Cambridge [*hockey player*] and [*Physics student*]
 (b) a [*hockey player*] and [*Cambridge Physics student*]

Moreover, while we can coordinate two Complement NPs (as in (111) (a) below) or two Attribute NPs (as in (111) (b)), we cannot coordinate a Complement NP with an Attribute NP (hence the ungrammaticality of (111) (c)), or an Attribute NP with a Complement NP (cf. *(111) (d)):

- (111) (a) several [*Physics*] and [*Chemistry*] students
 (b) several [*Oxford*] and [*Cambridge*] students
 (c) *several [*Physics*] and [*Cambridge*] students
 (d) *several [*Cambridge*] and [*Physics*] students

So, it seems that Coordination facts provide strong support for our analysis.

A fourth argument can be based on the different properties of the rules introducing Complement NPs on the one hand, and Attribute NPs on the other. The rules which we gave earlier in (106) above are repeated in (112) below:

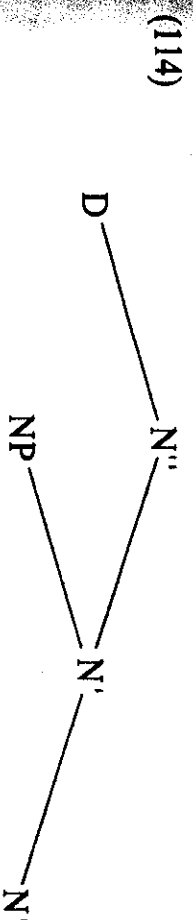
- (112) (i) $N'' \rightarrow (D) N'$ [Determiner Rule]
 (ii) $N' \rightarrow NP N'$ [Attribute Rule: *optional*]
 (iii) $N' \rightarrow (NP) N$ [Complement Rule]

Note that the Attribute Rule (112) (ii) is recursive (since it has the symbol N-bar both in its input and in its output): thus, the rule predicts that indefinitely many Attribute NPs can be stacked on top of each other. For

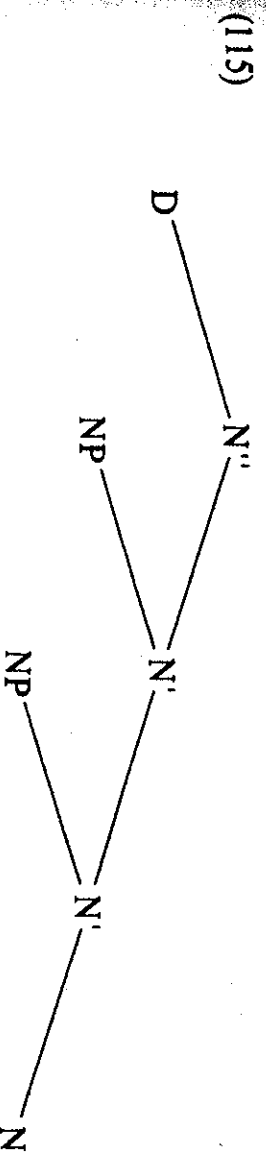
example, if we apply the Determiner Rule (112) (i), we generate the structure (113) below:



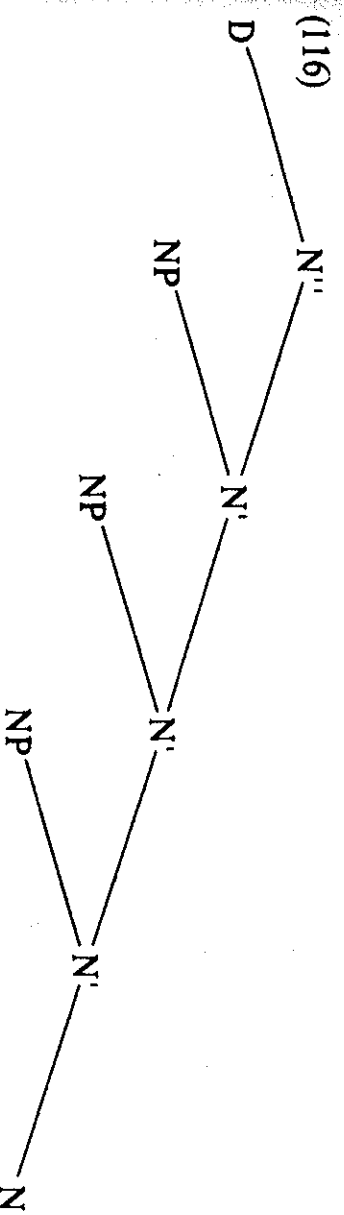
If we now apply the optional Attribute Rule (112) (ii) to expand the N-bar in (113), we derive:



But we can now re-apply the same Attribute Rule (112) (ii) to expand the N-bar at the bottom of the tree in (114), yielding:

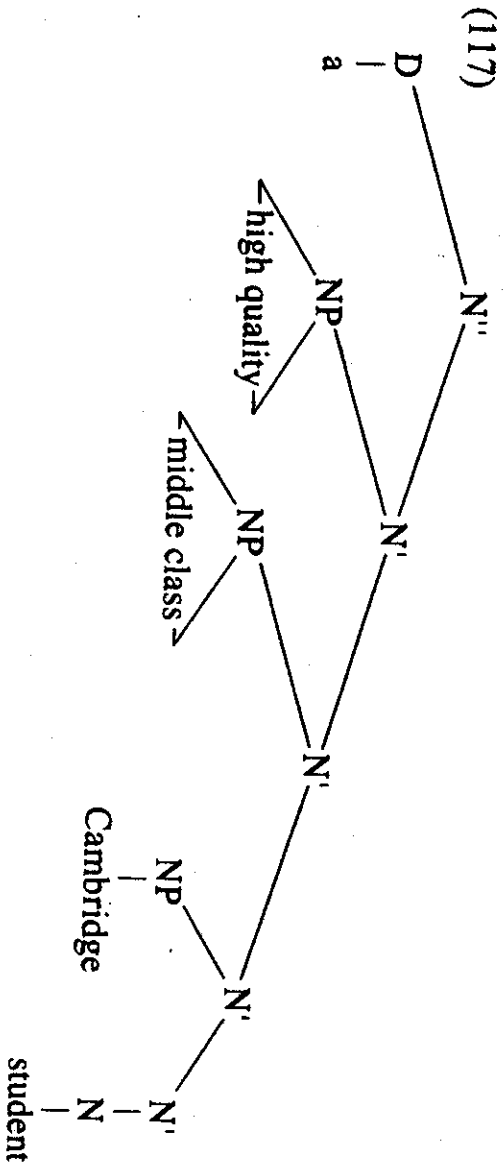


And we can even re-apply the same Attribute Rule once more, again expanding the lowest N-bar, thereby deriving:



However, let's assume that at this point we get tired of playing the game of repeatedly re-applying the same recursive rule, and instead choose to skip the Attribute Rule (112) (ii) this time and pass on to the Complement Rule (112) (iii). Now, if we choose to omit the optional NP Complement and instead choose to expand the lowest N-bar in (116) only as N, the resulting

structure will be (117) below (assuming insertion of appropriate items):



Each of the NPs in (117) is an Attribute: and we should expect that they can be freely stacked on top of each other in any order (subject to stylistic, etc. restrictions). And as (118) below shows, this is indeed the case:

- (118) (a) a [Cambridge] [high quality] [middle class] student
 (b) a [Cambridge] [middle class] [high quality] student
 (c) a [high quality] [Cambridge] [middle class] student
 (d) a [high quality] [middle class] [Cambridge] student
 (e) a [middle class] [high quality] [Cambridge] student
 (f) a [middle class] [Cambridge] [high quality] student

So, our recursive Attribute Rule seems to make precisely the right predictions (I leave to you the task of working out in how many different ways the NPs in (118) above can be pronominalised by the pro-N-bar one!).

But now let's compare the Attribute Rule with the Complement Rule (112) (iii), repeated as (119) below:

- (119) N' → (NP) N [Complement Rule]

We see from (119) that the Complement Rule is not recursive, so that we predict that Complement NPs cannot be recursively stacked: and (120) below suggests that this is indeed the case:

- (120) *a [Physics] [Economics] [Agriculture] student

So, our analysis correctly predicts that Attributes can be recursively stacked (cf. (118) above), but not Complements (cf. (120) immediately above).

There seems little point in cataloguing more and more empirical evidence in support of our proposal that pronominal Complement NPs are sisters of N and daughters of N-bar, whereas pronominal Attribute NPs are both sisters and daughters of N-bar. If I haven't convinced you by now, I'm obviously not

going to! Instead, let's comment briefly on some aspects of the rules in (112) which we have used to generate Complement and Attribute NPs: these rules are repeated in (121) below:

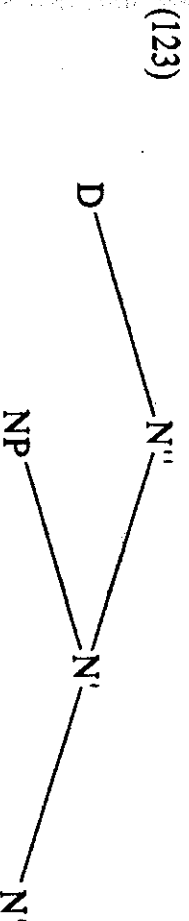
- (121) (i) N'' → (D) N' [Determiner Rule]
 (ii) N' → NP N' [Attribute Rule: optional]
 (iii) N' → (NP) N [Complement Rule]

The rules in (121) specify that Determiners, Attributes, and Complements are all optional constituents of a Noun Phrase: i.e. they tell us that the only constituent which an NP must contain is a head Noun. Let's see how we can use our rules in (121) to generate first an NP containing an Attribute but no Complement, and secondly an NP containing a Complement but no Attribute; and let's examine the different structures assigned by the rules in these two cases.

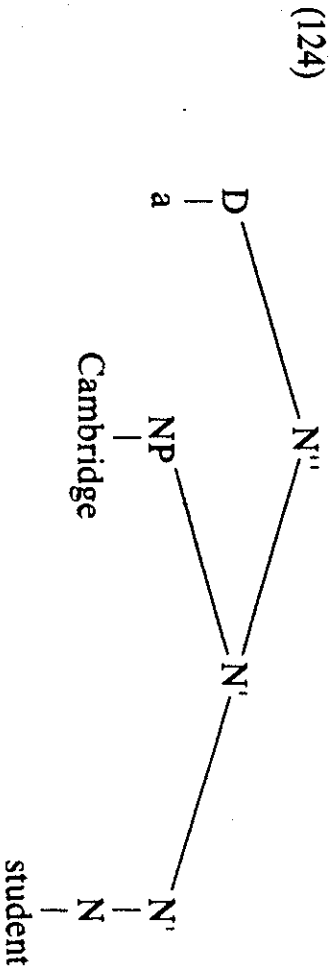
If we apply the Determiner Rule (121) (i) – selecting the optional Determiner – we generate the substructure (122) below:



If we now apply the optional Attribute Rule (121) (ii) to (122), we derive:



And if we subsequently apply the Complement Rule (121) (iii) – omitting the optional complement NP – we derive the structure (124) below (we have inserted appropriate lexical items for the sake of clarity):

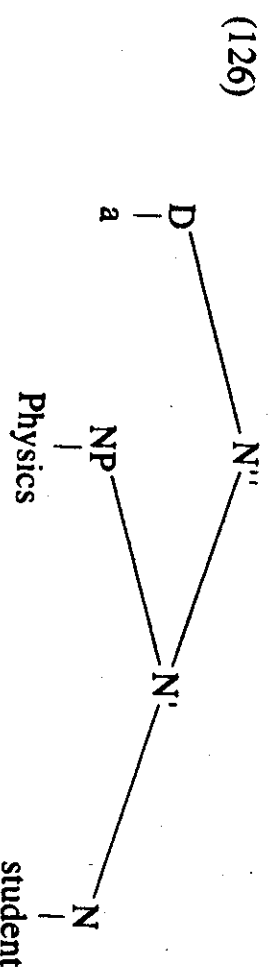


Given our earlier definition of an *Attribute* as a sister and daughter of N-bar, then it is clear that *Cambridge* in (124) functions as an Attribute. Note that both *Cambridge student* and *student* in (124) are assigned the status of N-bar, so that we correctly predict that both expressions can be proformed by the pro-N-bar one, as in:

- (125) (a) Which [Cambridge student]? This one?
 (b) Which [student]? The Cambridge one?

So, our analysis seems to have strong empirical support.

But now let's use our rules in (121) to generate a rather different type of structure. As before, we first apply the Determiner Rule (121) (i) to generate the substructure (122) above. But this time, we 'skip' the Attributive Rule (121) (ii), and go straight on to the Complement Rule (121) (iii): if we select the optional NP Complement, then from (122) by application of the Complement Rule we will derive the structure (126) below (assuming insertion of the relevant lexical items):



Note that the sequence [*Physics student*] in (126) has the status of N-bar, but not *student* (which is only an N). Hence, we correctly predict that only the former and not the latter can be performed by the pro-NP one: cf.

- (127) (a) Which [*Physics student*]? This one?
 (b) Which [*student*]? *The *Physics one*?

Thus, our analyses in (124) and (126) show that the NPs [*a Cambridge student*] and [*a Physics student*] are similar insofar as both the sequences [*Cambridge student*] and [*Physics student*] have the status of N-bar; but they differ in that *student* in the case of [*a Physics student*] has the status of N, whereas *student* in the case of [*a Cambridge student*] has the status of N-bar. This follows from the observation we made earlier that an N which has an overt Complement has the status of N, whereas an N which lacks a Complement has the status of an N-bar dominating an N. And we have already seen that our analyses in (124) and (126) make precisely correct predictions about one-pronominalisation facts.

In this section, we have argued that just as some postnominal PPs function as Complements to Nouns, and others as Adjuncts, so too some prenominal NPs function as Complements to Nouns, and others as Attributes. In fact, the parallel between *postnominal PPs* and *prenominal NPs* is a very close one. For example, all the postnominal PP Complements in the (a) examples below have prenominal NP Complement counterparts in the corresponding (b) example:

- (128) (a) the ban [*on pornography*]
 (b) the [*pornography*] ban

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- (129) (a) recruitment [*of personnel*]
 (b) [*personnel*] recruitment
- (130) (a) the appeal [*for charity*]
 (b) the [*charity*] appeal
- (131) (a) relief [*from famine*]
 (b) [*famine*] relief
- (132) (a) damage [*to the brain*]
 (b) [*brain*] damage
- (133) (a) the investigations [*into fraud*]
 (b) the [*fraud*] investigations
- (134) (a) a fan [*of Debbie Harry*]
 (b) a [*Debbie Harry*] fan
- (135) (a) the allegations [*of treachery*]
 (b) the [*treachery*] allegations

And in much the same way, the postnominal PP Adjuncts in the (a) examples below all have prenominal NP Attribute counterparts in the corresponding (b) example:

- (136) (a) the shop [*on the corner*]
 (b) the [*corner*] shop
- (137) (a) the strike [*in the shipyard*]
 (b) the [*shipyard*] strike
- (138) (a) the lady [*of iron*]
 (b) the [*iron*] lady
- (139) (a) the bridge [*over the river*]
 (b) the [*river*] bridge
- (140) (a) a keyboard [*for a typewriter*]
 (b) a [*typewriter*] keyboard
- (141) (a) a sauce [*with cream*]
 (b) a [*cream*] sauce
- (142) (a) tea [*from China*]
 (b) [*China*] tea
- (143) (a) the weather [*in winter*]
 (b) the [*winter*] weather

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It thus seems clear that prenominal NPs are the natural counterpart of post-nominal PPs.

The two are not completely equivalent however. There are obvious syntactic differences between the two: premodifiers have the status of NP and precede the N-bar they modify, whereas postmodifiers have the status of PP and follow the N-bar they modify. Moreover, this syntactic difference is reflected in parallel semantic differences. To be more precise, the semantic relation between a prenominal NP and the N-bar it modifies is much more *vague* (and has to be inferred from pragmatic clues) than in the case of a postnominal PP. By way of example, consider a phrase such as the following:

- (144) the [*proportional representation*] campaign

The bracketed prenominal NP in (144) has two very different postnominal PP counterparts: cf.

- (145) (a) the campaign [*for proportional representation*]
(b) the campaign [*against proportional representation*]

The difference between (144) and (145) is that the postnominal modifier in (145) contains a Preposition whose semantics specifies the relation between the Head Noun and the NP [*proportional representation*]: but in (144) there is no Preposition, and hence no additional semantic information, so that the exact relationship between [*proportional representation*] and *campaign* has to be inferred on the basis of pragmatic clues (i.e. knowledge of the way the world is). Thus, the two bracketed NPs in (146) below are likely to be interpreted very differently:

- (146) (a) Nancy Reagan's [*drugs*] campaign
(b) Ronald Reagan's [*re-election*] campaign

Our knowledge of the views of the individuals concerned helps us interpret the N-bar [*drugs campaign*] as paraphrased by 'campaign *against* drugs' in (146) (a), but 'campaign *for* re-election' (e.g. of his own party) in (146) (b). And *your* knowledge of Syntax should (by now) enable you to work out for yourself whether the bracketed Phrases in (144–6) above are Complements, Attributes, or Adjuncts!

There are also other important differences between nominal premodifiers and postmodifiers. For example, generally speaking it seems to be that an NP which is part of a postnominal PP can alternatively be positioned in front of the nominal which it modifies. Thus, the italicised NP contained within the bracketed PP Complement in (147) (a) below can alternatively be positioned prenominally, as in (147) (b):

- (147) (a) a lover [pp of [NP *classical music*]]
(b) a [NP *classical music*] lover

But let's see what happens if we try to do the same in the case of the italicised NP in (148) below:

- (148) a lover [pp of [NP *the opera*]]

What we'd expect to get is (149) below:

- (149) *a [NP *the opera*] lover

But, as you can see, we don't get this: instead, we have:

- (150) an [NP *opera*] lover

Why? What's going on here? Well, there seems to be some restriction to the effect that prenominal NP Complements cannot contain a Determiner. Moreover, examples such as (151) below suggest that the same restriction operates in the case of Adjuncts and Attributes:

- (151) (a) a/the/this strike [pp in [NP *the shipyard*]]
(b) *a/the/this [NP *the shipyard*] strike
(c) a/the/this [NP *shipyard*] strike

The exact nature of the restriction is anything but clear. It seems that only *some* kinds of Determiner are barred from occurring in Attribute NPs, and that *others* can indeed be used in this function. Thus, in the following examples:

- (152) (a) the [*All*] India] radio station
(b) an [*all* points] bulletin
(c) a [*half* frame] camera
(d) the president's [*no compromise*] policy
(e) an [*each* way] bet
(f) an [*any* topic] discussion
(g) an [*every* weekend] girl

the italicised constituents might be argued to be Determiners, so discounting the possibility of a 'blanket restriction' against the use of Determiners in pre-nominal NPs. It would seem that Articles (*a*, *the*) and Demonstratives (*this*/*that*/*these*/*those*) are barred from occurring in attribute NPs, whereas Quantifiers like *every/each/all/both/half/any/some/no*, etc. are not. Quite why this should be is not a question which need concern us here (OK... I'll admit that I always say that when I don't know the answer to my own question!)

You should now be able to tackle exercise VI

4.8 Adjectival premodifiers

Thus far, all the examples of Attributes which we have considered have involved attributive NPs. But other categories can be used in an attributive function as well. The commonest class of Attributes are APs (Adjectival Phrases): for example, the bracketed expressions in (153) below are attributive APs:

- (153) (a) a [*really excellent*] film
 (b) a [*most entertaining*] evening
 (c) a [*delightfully mysterious*] stranger
 (d) a [*patently obvious*] lie

In many cases, attributive APs alternate with attributive NPs: for example, each of the (a) examples below involves an NP attribute which has an AP attribute counterpart in the corresponding (b) example:

- (154) (a) the [*England*] football players
 (b) the [*English*] football players
- (155) (a) a [*Paris*] nightclub
 (b) a [*Parisian*] nightclub
- (156) (a) a [*metal*] finish
 (b) a [*metallic*] finish
- (157) (a) a [*prestige*] project
 (b) a [*prestigious*] project
- (158) (a) the [*winter*] weather
 (b) the [*wintery*] weather

Moreover, the following example (taken from confidential University papers!) shows that an attributive AP can be conjoined with an attributive NP:

- (159) Any change is bound to have numerous [*AP academic*] and [*NP cost*] implications

So, there does seem to be an apparent parallelism between attributive NPs and attributive APs.

Now, if attributive NPs are generated by rule (121) (ii) above, repeated as (160) below:

- (160) $N' \rightarrow NP \ N' [Attribute \ Rule: \ optional]$

and if attributive Adjectival Phrases seem to be structurally parallel to attributive Noun Phrases, then we might propose to generate Attributive APs by a parallel rule such as (161) below:

- (161) $N' \rightarrow AP \ N' [Attribute \ Rule: \ optional]$

Moreover, it may well be that we can conflate our two Attribute Rules (160) and (161) above into a single rule. How? Well, recall that in Chapter 3 we argued that categories are analysable into matrices (= sets) of syntactic features, so that (e.g.):

- (162) Noun = [+N, -V] Adjective = [+N, +V]

Thus, Noun and Adjective might be argued to form a supercategory of [+N] elements. And in the same way, we might say that NP and AP form a corresponding phrasal supercategory which we might designate as [+NP] (i.e. a phrasal constituent with a [+N] head). Given these assumptions, then our two Attribute Rules (160) and (161) could be conflated as (163) below:

- (163) $N' \rightarrow [+NP] \ N' [Attribute \ Rule: \ optional]$

If we incorporate our generalised Attribute Rule (163) into our earlier system of rules in (121) above, our revised set of rules becomes (164) below:

- (164) (i) $N'' \rightarrow (D) \ N' [Determiner \ Rule]$
 (ii) $N' \rightarrow [+NP] \ N' [Attribute \ Rule: \ optional]$
 (iii) $N' \rightarrow (NP) \ N [Complement \ Rule]$

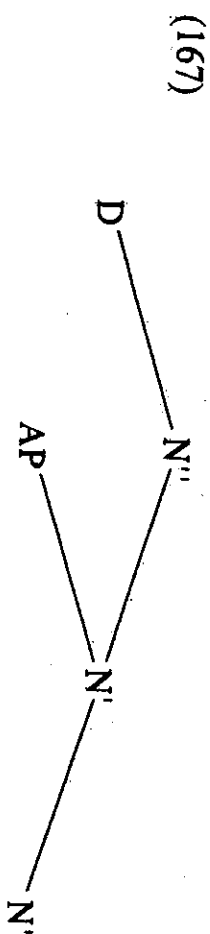
Now, since our revised Attribute Rule (164) (ii) is recursive, it predicts (amongst other things) that Noun Phrases can contain indefinitely many stacked attributive APs: and this does indeed seem to be the case, as (165) below illustrates (where each of the bracketed constituents is an attributive AP):

- (165) (a) a [*handsome*] stranger
 (b) a [*dark*] [*handsome*] stranger
 (c) a [*tall*] [*dark*] [*handsome*] stranger
 (d) an [*intelligent*] [*tall*] [*dark*] [*handsome*] stranger
 (e) etc.

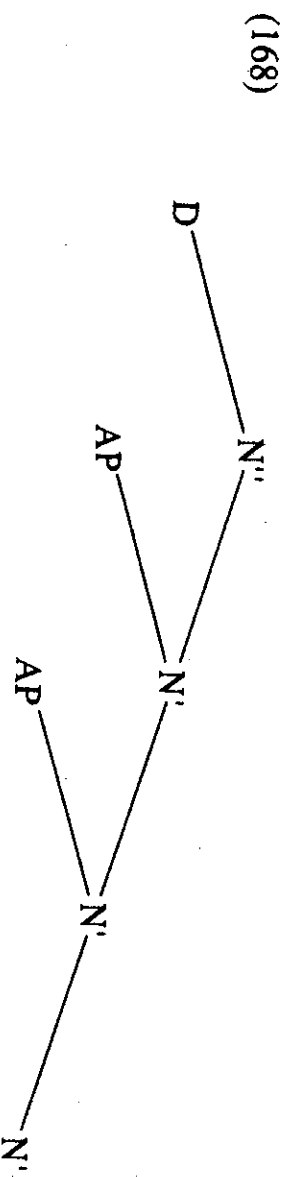
By way of illustration, let's see how our rules (164) would generate a Noun Phrase such as (165) (c) [*a tall dark handsome stranger*]. Applying the Determiner Rule (164) (i) and selecting the Determiner option would generate the structure (166) below:

- (166)
- $$D \quad \swarrow \quad \searrow \quad N'' \quad \swarrow \quad \searrow \quad N'$$

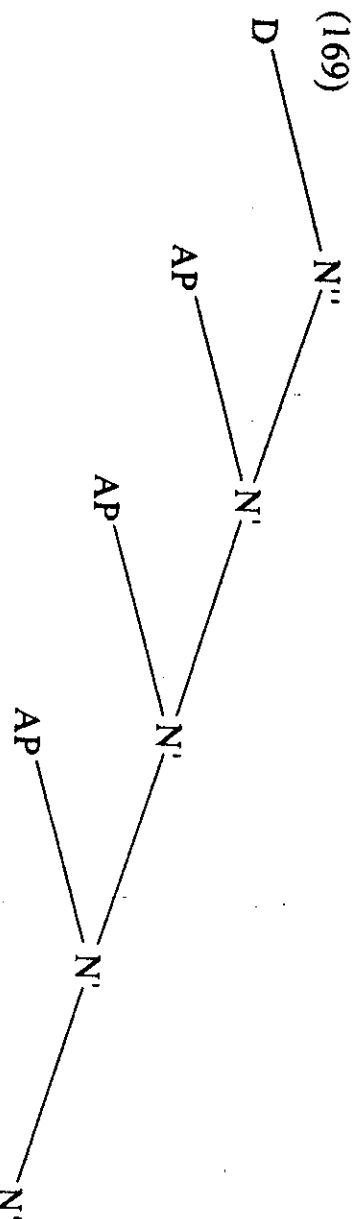
Applying the Attribute Rule (164) (ii) to (166), and selecting AP as our [+NP] category, will yield (167) below:



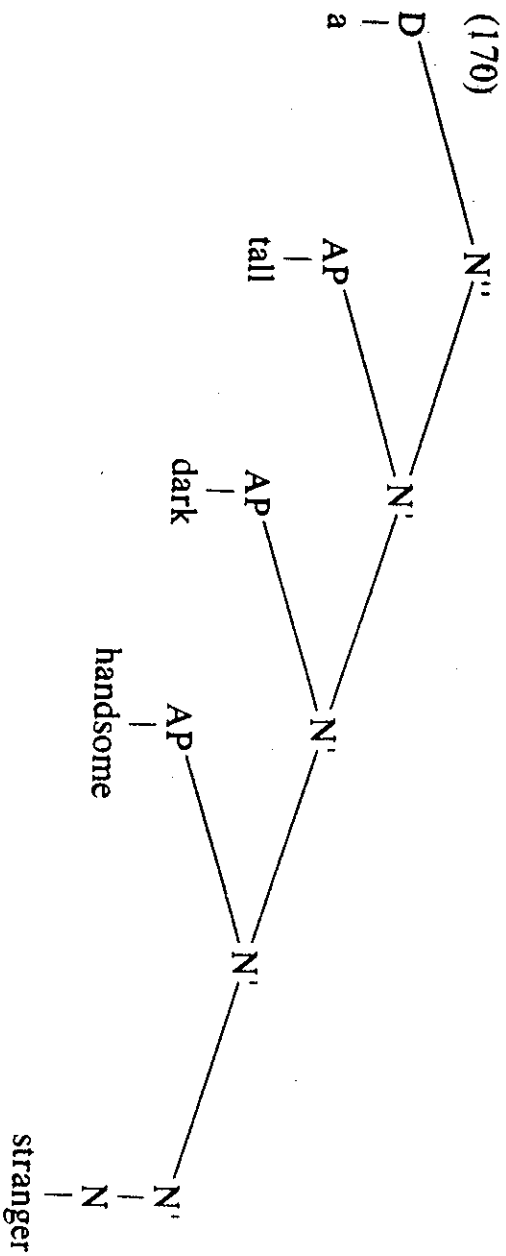
Reapplying the same rule in the same way to the lower N' in (167) will then derive (168) below:



Applying the same Attribute Rule in the same fashion once more to expand the lowest N-bar in (168) will give us (169) below:



Finally, if we apply the Complement Rule (164) (iii) to expand the lowest N' in (169) into N, the result will be (170) below (we have inserted the relevant words for illustrative purposes; of course, AP will have further internal structure, but this need not concern us for the time being):



Now, the structure (170) predicts that the sequences *stranger*, [*handsome stranger*], [*dark handsome stranger*], and [*tall dark handsome stranger*] are all N-bar constituents. Among the predictions we therefore make is that each of these can be performed by the pro-N-bar *one*: and (171) below shows us that this prediction is exactly correct:

- (171) (a) Which [*stranger*]? The tall dark handsome *one*?
 (b) Which [*handsome stranger*]? The tall dark *one*?
 (c) Which [*dark handsome stranger*]? The tall *one*?
 (d) Which [*tall dark handsome stranger*]? This *one*?

So, it would appear that the structural parallels between attributive NPs and attributive APs are quite striking: both can be used to recursively expand N-bar into N-bar.

Now, if we are correct in positing that both NPs and APs can be used as Attributes (hence can recursively expand N-bar into another N-bar), then it follows that we should expect that two different kind of Attributes can be recursively stacked on top of each other in any order. We can demonstrate this by the free relative ordering of the NP and AP Attributes in (172) below:

- (172) (a) a [AP *Japanese*] [NP *toy*] [NP *plastic*] duck
 (b) a [AP *Japanese*] [NP *plastic*] [NP *toy*] duck
 (c) a [NP *toy*] [AP *Japanese*] [NP *plastic*] duck
 (d) a [NP *toy*] [NP *plastic*] [AP *Japanese*] duck
 (e) a [NP *plastic*] [AP *Japanese*] [NP *toy*] duck
 (f) a [NP *plastic*] [NP *toy*] [AP *Japanese*] duck

Thus, word order facts provide striking support for our analysis: they are exactly as predicted. I leave you to verify for yourself how many different ways [*a Japanese toy plastic duck*] can be pronominalised by *one*: think about it, next time you play with your toy duck in the bath (if you don't have a toy duck, a toy boat etc. will do just as well).

We have argued in this section that APs can function as prenominal Attributes: but recall that we argued at the end of section 3.6 above that APs can also be used as postnominal Adjuncts. Indeed, in certain types of construction, APs of a given class can be positioned either pre- or post-nominally: cf. the following examples from Quirk *et al.* (1985, pp. 418–29):

- (173) (a) the best [*possible*] use
 (b) the best use [*possible*]
 (174) (a) the greatest [*imaginable*] insult
 (b) the greatest insult [*imaginable*]

- (175) (a) the best [available] person
 (b) the best person [available]
- (176) (a) the only [suitable] actor
 (b) the only actor [suitable]

But there are extremely complex restrictions on when APs can or cannot be used prenominally, and when they can or cannot be used postnominally: the examples below illustrate some of the restrictions concerned:

- (177) (a) He has a [similar] car
 (b) *He has a car [similar]
- (178) (a) He has a [similar though subtly different] car
 (b) He has a car [similar though subtly different]
- (179) (a) He has a [similar enough] car
 (b) He has a car [similar enough]
- (180) (a) He has a [fairly similar] car
 (b) He has a car [fairly similar]
- (181) (a) *He has a [very similar indeed] car
 (b) He has a car [very similar indeed]
- (182) (a) *He has a [similar to mine] car
 (b) He has a car [similar to mine]
 (c) He has a [similar] car [to mine]

We are not here going to attempt to unravel the complex syntactic and stylistic factors which determine the position of APs used to modify N-bars: the interested reader should consult a good reference grammar such as Quirk *et al.* (1985).

Well, I know you'd want me to end the chapter on a high, so I'll conclude with an argument of your favourite type – relating to *structural ambiguity*. No, don't groan – this one is quite straightforward. Consider the Noun Phrase in (183) below:

- (183) an English teacher

This is ambiguous in a fairly obvious way between the two interpretations represented by the paraphrases in (178) below:

- (184) (i) someone who teaches English
 (ii) someone who teaches, and who is English

Now, it seems plausible to assume that the source of the ambiguity of (183) is *structural* in nature, and that part of the ambiguity relates to the fact that

English has two different categorial functions in (183). On the first interpretation (= someone who teaches English), *English* functions as a Noun, and hence can be modified by an Adjective, as in (185) below:

- (185) (a) an [NP *Old English*] teacher
 (b) a [NP *Middle English*] teacher
 (c) a [NP *New English*] teacher

On the second interpretation (= a teacher who is English), *English* functions as an Adjective, and hence can be modified by an Adverb, as in (186) below:

- (186) (a) a [AP *typically English*] teacher
 (b) a [AP *very English*] teacher
 (c) a [AP *disappointingly English*] teacher

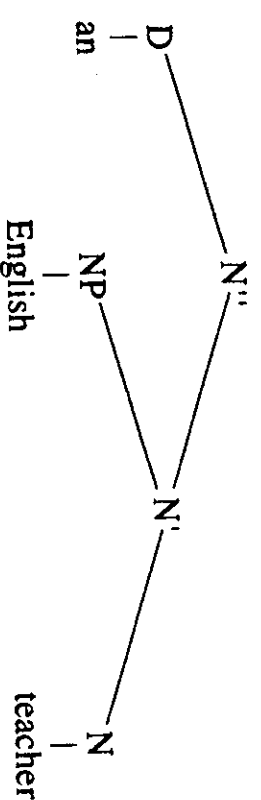
So, part of the ambiguity of [*an English teacher*] lies in the categorial status of *English*, which can either be a prenominal NP, or a prenominal AP: cf.

- (187) (a) an [NP *English*] teacher (= someone who teaches English)
 (b) an [AP *English*] teacher (= a teacher who is English)

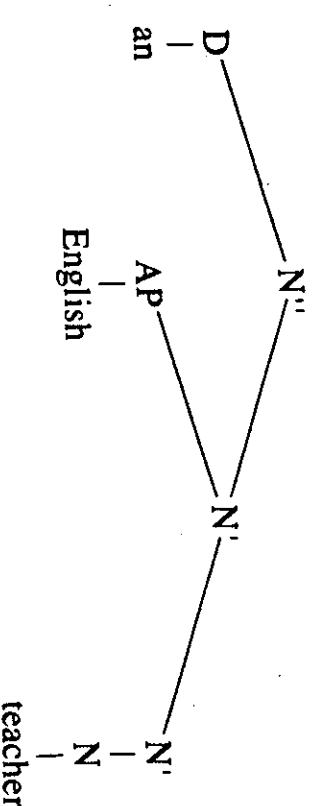
But this is only part of the story. I suppose you'd already guessed that the answer couldn't be that simple! But why not?

Well, what we're going to argue is that when [*an English teacher*] means 'someone who teaches English', then the prenominal NP *English* is a Complexment; but when the NP means 'a teacher who is English', the prenominal AP *English* is an Attribute. Now, if I'm right (am I ever wrong?), then it follows that the NP [*an English teacher*] could have either of the two structures in (188) below:

- (188) (a) [= a person who teaches English]



- (b) [= a person who teaches, and who is English]



(I leave you to work out for yourself which of our rules in (164) apply to generate each of the structures in (188).) Now, the analysis in (188) has a certain amount of *semantic* plausibility. After all, if we accept the claim (cited earlier) by Hornstein and Lightfoot (1981a, p. 21) that 'each N-bar specifies a *semantic property*', then from the fact that (188) (a) contains only the single N-bar [*English teacher*], it follows that (188) (a) will attribute only one semantic property to the person concerned, namely that (s)he teaches English. But by the same token, the fact that (188) (b) contains two N-bar constituents, namely [*teacher*] and [*English teacher*], entails that (188) (b) will attribute two properties to the individual concerned, namely (i) that (s)he teaches, and (ii) that (s)he is English.

However, the proposed analysis also has independent *syntactic* support. Well, I won't bore you with a whole battery of syntactic arguments in support of our analysis. Let's just look at one such argument, relating to *word-order* facts. Consider a sentence such as the following:

(189) I think it would be crazy to employ [*la French English teacher*]

Just think about what (189) means: does it mean (190) (i) below, or (190) (ii)?

(190) (i) I think it would be crazy to employ a French person to teach English

(ii) I think it would be crazy to employ an English person to teach French

Well, I think it's pretty clear that the NP [*la French English teacher*] can only be interpreted along the lines of (190) (i) as 'a French person who teaches English', and not along the lines of (190) (ii) as 'an English person who teaches French'. But if you think about it, that's exactly what our analysis in (188) predicts. For, as we have noted many times, our rules specify that Complements always come closer to their Heads than Attributes/Adjuncts. This means that when we have a prenominal Attribute and a prenominal Complement associated with the same Head Noun, they will occur in the order:

(191) Attribute + Complement + Noun

Thus, in a sequence such as [*French English teacher*], since *English* is closer to the Head Noun *teacher*, it must be a Complement; and since *French* is further away from *teacher*, it must be an Attribute. Hence, we correctly predict that the only possible interpretation for [*la French English teacher*] is 'a person who teaches English who is French'. So our analysis not only has semantic plausibility; but in addition it has independent syntactic support.

But what is even more exciting is that there is also *phonological* evidence in

support of the structural ambiguity represented in (188) above. For, just as differences of syntactic structure correlate with differences of semantic structure (i.e. meaning), so too we might expect them to correlate with *phonological* differences. And this is precisely what we find. For if you think about it, you'll realise that the phrase [*an English teacher*] has two different stress patterns, namely those represented in (192) below (where the syllables receiving primary stress are CAPITALISED):

(192) (i) an ENGLISH teacher

(ii) an ENGLISH TEACHER

And if you think even harder, you'll realise that the two different stress patterns correspond to the two different interpretations in (184) above: that is, (192) (i) means 'someone who teaches English', whereas (192) (ii) means 'a teacher who is English'.

Now, why should the two different stress patterns in (192) be associated with two different meanings? Well, let's assume that just as each N-bar in a sentence is a *semantic unit* (recall Hornstein and Lightfoot's (1981a, p. 21) observation that 'each N-bar specifies a *semantic property*'), so too each N-bar is a *phonological unit*. More specifically, let's assume that the rule for primary stress assignment in English is along the lines given very informally in (193) below:

(193) Assign a separate primary stress to each separate N-bar (i.e. to an appropriate syllable of an appropriate word in each N-bar)

If we look at the two structures assigned to [*an English teacher*] in (188) above, we see that the N-bar constituents which each contains are as in (194) below:

(194) (a) an [N' *English teacher*] (= Complement = 'someone who teaches English')

(b) an [N' *English* [N' *teacher*]] (= Attribute = 'someone who teaches who is English')

And our Stress Rule (193) above will accordingly assign primary stress only to the (first syllable of the) word *English* in (194) (a), but to (the first syllable of) both the words *English* and *teacher* in (194) (b). Thus, it seems clear that phonological facts provide strong independent empirical support for our claim that [*an English teacher*] exhibits the structural ambiguity characterised in (188) above. So, it's nice to find that an analysis which has syntactic and semantic plausibility turns out to have independent phonological motivation.

You should now be able to tackle exercises VIII – XVI

4.9 Summary

The general aim of this chapter has been to provide empirical support for the claim that there is a type of nominal constituent which is larger than the Noun but smaller than the Noun Phrase. In 4.2 we examined Rulon Wells' claim in 1947 that the NP [*the king of England*] has as one of its immediate constituents just such a 'small nominal phrase', [*king of England*]; and we proposed to adopt Chomsky's *bar-notation* for such cases, whereby *king* is an N, [*king of England*] is an N-bar, and [*the king of England*] is an N-double-bar. In 4.3 we produced empirical evidence in support of the proposed analysis, based on Coordination and *one-pronominalisation* facts. In 4.4, we argued that N-bar has a crucial role to play in differentiating two different classes of postnominal modifier – *Complement PPs* (which are sisters of N and daughters of N-bar), and *Adjunct PPs* (which are both sisters and daughters of N-bar). In 4.5 we looked at how to deal with the optionality of Determiners, Adjunct PPs, and Complement PPs in Noun Phrases. In 4.6 we presented further evidence in support of the structural distinction drawn between postnominal PP Complements and PP Adjuncts. In 4.7 we argued in favour of positing a parallel structural distinction for premodifiers between Complement NPs (which expand N into N-bar), and Attribute NPs (which recursively expand N-bar into N-bar). In 4.8 we argued that not only NPs, but also APs can function as Attributes, and accordingly we generalised our Attribute Rule to allow [+NP] phrases (i.e. NPs and APs) to function as Attributes.

We have summarised the various rules we have posited in this chapter in (195) below, for your convenience:

- (195) (i) $N'' \rightarrow (D) N'$ [Determiner Rule]
 (ii) (a) $N' \rightarrow N' PP$ [Adjunct Rule: *optional*]
 (b) $N' \rightarrow [+NP] N'$ [Attribute Rule: *optional*]
 (iii) (a) $N' \rightarrow N (PP)$ [PP Complement Rule]
 (b) $N' \rightarrow (NP) N$ [NP Complement Rule]

As we have already seen, the Determiner Rule (195) (i) has to apply, if we want to generate a Noun Phrase; the Adjunct Rule (195) (ii) (a) and the Attribute Rule (195) (ii) (b) are optional; and one of the two Complement Rules (195) (iii) (a) or (b) must also apply if we are to generate a properly terminated subtree (i.e. an NP which terminates in an N-node).