

# 4

## Phrasal Categories

### 4.1. X' theory

As we saw in our discussion of the structure of the simple S, phrases such as VP are built around heads. In such case, we say that the phrase is a **projection** of the head. In the case of the VP, the head is V. Examination of other phrasal categories suggests that they too are projections of heads. For example, an NP typically contains an N as its head, an AP contains an A as its head, an AdvP contains an Adv as its head, and a PP contains a P as its head. A phrase that contains a head of the same type is called **endocentric**. A phrase that does not contain a head of the same type is called **exocentric**. An open question in syntactic theory is whether all phrases are endocentric.

Phrases of different categories in a given language typically display certain features in common. For example, in Japanese all phrases are **head-final**. Verbs appear at the end of their sentences (or clauses), as in (1a), nouns appear at the ends of their phrases, as in (1b,c), and prepositions follow their complements, as in (1d). The verb *benkyooshite iru* “is studying” follows the direct object *nihongo-o* “Japanese-ACC”, while the preposition (actually postposition) *de* “in” follows its complement *Nihon* “Japan” in these examples.

(1) *Japanese*

- a. *Sumisu-san-wa Nihon-de nihongo-o benkyooshite iru*  
Smith-Mr.-TOP Japan-in Japanese-ACC studying is  
‘Mr. Smith is studying Japanese in Japan.’
- b. *akai kuruma*  
red car  
‘a red car’
- c. *chichi-ga kinoo yonda hon*  
father-NOM yesterday read book  
‘a book which my father read yesterday’

- d. Nihon-e iku kara  
Japan-to go because  
'because I go to Japan'

In French, most phrases are **head-initial**.<sup>1</sup>

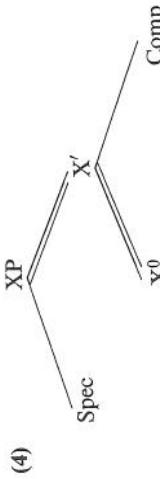
(2) *French*

- a. regardez le chat
- V           NP
- look-at-IMP the cat
- 'Look at the cat.'
- b. le chat noir
- the cat black
- N    Adj
- 'the black cat'
- c. dans la chambre
- in the room
- P    NP
- 'in the room'
- d. si je vais au Japon
- if I go to Japan
- Conj   S
- 'if I go to Japan'

- (3) a. 'The inspectors destroyed the laboratory.  
b. the inspectors' destruction of the laboratory

In both cases, *the inspectors* is understood as the agent of the action and *the laboratory* is understood as the patient.

The apparent similarity between the structures of sentences and noun phrases have led syntacticians to formulate a theory of phrase structure in which uniformity of structure is the rule rather than the exception. This view is called **X' theory**. X' theory takes the structure of any phrase to be a set of projections, all of which are based on the category of the head, as shown schematically in (4). Spec refers to one or more **specifiers** (which precede the head in English), and Comp to one or more complements (which follow the head in English). X' refers to an **intermediate projection** and X<sup>0</sup> refers to the head.<sup>3</sup> The highest projection XP is called the **maximal projection** of X<sup>0</sup>.



In its strongest form, X' theory holds that phrasal structures are uniform across categories and across languages, regardless of superficial appearances to the contrary. The final section of this chapter, section 4.7, sketches out some of the consequences of a strong version of X' theory for the analysis of the structure of sentences and noun phrases.

X' theory reflects a view of phrase structure that takes the observed patterns of phrase structure to follow from general principles of simplicity and naturalness. On one interpretation of these principles, languages are simpler to the extent that they have uniform structures. Other things being equal they will tend towards uniformity of phrase structure. However, deviations from complete uniformity are possible and result in greater complexity. This complexity, measured in terms of deviations from uniformity, might be expected to have consequences for processing, language acquisition, and so on.

The tendency of many languages to be primarily either head-final or head-initial suggests that there may be some degree of **uniformity of structure** in languages that is not accidental, but reflective of general principles of organization of the language faculty. A number of typological studies have shown that languages tend towards uniformity in the ordering of heads and complements across categories.<sup>2</sup> However, complete uniformity is by no means the rule.

Additional tendencies towards uniformity can be seen in the similarities between sentences and NPs. The examples in (3) show a sentence with the verb *destroy* and an NP headed by the related word *destruction*. *Destruction* is called the **nominalization** of the verb *destroy*. The grammatical and conceptual functions of the phrases in the sentence and the corresponding NP are identical. In (3a) *the inspectors* is the subject and precedes the verb. The phrase *the laboratory* is the object and follows the verb. The same pattern appears in (3b), with morphological adjustments that reflect that it is an NP and not a sentence.

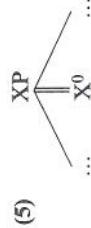
<sup>1</sup> However, some adjectives precede the noun.

<sup>2</sup> Greenberg 1963 and Hawkins 1994 are among the best known.

<sup>3</sup> In the history of X' theory, additional projections above XP were considered. Each level in the structure was annotated by adding another "...", so that there could be X'', perhaps X''' and so on. The 0 on X<sup>0</sup> indicates that it is the lowest element of the phrase of type X, the one with zero "...". In contemporary theory, it is assumed that there are at most three levels within the phrase, as illustrated in (4).

language change, on the assumption that there is in general a pressure to avoid or reduce complexity. We refer to this view as **weak X'** theory.

In our discussion of phrase structure in this chapter we will provide descriptions of the various phrasal categories based on their superficial form, adopting the weak version of X' theory. We assume as we proceed that the structure of a phrase is as flat as possible consistent with the evidence. Thus, we assume only that phrases are endocentric, i.e. that the canonical structure of an English phrase is (5), where XP is the phrase and X<sup>0</sup> is the head.



We will flesh out the details of the structure of each type of phrase as we proceed.

## 4.2. The structure of the verb phrase

We introduced a simple version of the phrase structure rules for the English VP in Chapter 3; now we consider the VP in more detail. A VP in English has the general property that it begins with V. It can be intransitive –

- (6) The bomb exploded.

– or it can be followed by NP, –

- (7) I read [NP a book].

– or by PP, –

- (8) a. We are looking [PP at TV].
- b. We are sitting [PP on the couch].

– or by NP followed by PP.

- (9) I put [NP a book] [PP on the couch].

It is also possible to have two NP arguments following certain verbs –

- (10) Chris gave Sandy a present.

Hence a preliminary rule for VP is

- (11)  $VP \rightarrow V^0(NP)([NP])$

However, there can be more than one PP following V, and there can be adverbs as well in VP – these tend to appear towards the end of the VP.

(12)

The bomb exploded	in the living room	during the commercial
I read a book	last night	surprisingly
We were looking at TV		
We were sitting on the couch		

And the PPs and Advs can be intermixed.<sup>4</sup>

(13)

- a. I read a book [PP in the living room] [Adv quickly] [Adv last night] [PP after the game].
- b. I read a book [Adv quickly] [PP in the living room] [Adv last night] [PP after the game].
- c. I read a book [Adv quickly] [PP in the living room] [PP after the game] [Adv last night].

It is difficult to state a phrase structure rule that allows for PPs and adverbs following V-NP, because there can be any number of each, and they can appear in any order. Consider the rule in (14). We use the notation “” on a category to indicate that there can be one or more of the category in the sequence.

- (14)  $VP \rightarrow V^0(NP)(NP)(PP^*)(Adv^*)$

This rule says that a VP consists of a V, possibly followed by one or two NPs, possibly followed by one or more PPs and one or more adverbs. But it does not account for the fact that the PPs and the adverbs can be mixed in with one another.

In order to keep our exposition relatively simple, we will work with (14) and extend it, keeping in mind the ordering problem just noted. The problem can be resolved in several plausible ways, but exploring them in detail would take us somewhat far afield, so we simply note them here.

- (i) It is possible that rule (14) is essentially correct, and there is an additional mechanism in the language that reorders or “scrambles” the constituents of VP according to independent principles.<sup>5</sup> (Such “reordering” may be related to what is referred to as “scrambling” in so-called free word order languages.)
- (ii) It is possible that the rule for VP is

<sup>4</sup> The situation is even more complicated if we analyze *last night* to be an NP, since then we appear to have the structure [VP V PP Adv NP PP].

<sup>5</sup> For discussion of the ordering preferences in the English VP and the factors that determine them, see Wasow 2002.

(15)  $VP \rightarrow V^0(XP^*)$   
and there are independent principles that determine the actual order in which the various XPs may appear.

(iii) It is possible that there is richer structure in VP. The rules are essentially

- (16) a.  $VP \rightarrow V^0(NP \left( \begin{array}{|c|} \hline PP \\ \hline NP \\ \hline \end{array} \right))$   
b.  $VP \rightarrow VP \left( \begin{array}{|c|} \hline PP \\ \hline Adv \\ \hline \end{array} \right)$

where each PP or Adv is contained within a different VP. The situation illustrated here, whereby a phrase of a certain category contains a phrase of the same category as in rule (16b), is called **recursion**.

As the following examples show, the verb in VP may be followed by a sentence, which we denote as category S –

- (17) I think [s (that) you made a mistake].  
– or by NP followed by S –  
(18) I told you [s (that) you made a mistake].  
– or by PP followed by S.

- (19) I mentioned to Sandy [s (that) you made a mistake].  
VP-final S is somewhat preferred, but it can precede adverbs and PPs.

- (20) a. I mentioned belatedly [that it was my birthday].  
    (?) I mentioned [that it was my birthday] belatedly.  
b. I mentioned belatedly to Sandy [that it was my birthday].  
    (?) I mentioned [that it was my birthday] belatedly to Sandy.  
c. I told Sandy (belatedly) (over the phone) [that it was my birthday].  
    (?) I told Sandy [that it was my birthday] (belatedly) (over the phone).

The examples with (?) are not grossly ungrammatical but infelicitous to some extent.

An extension of rule (14) that places S in VP-final position is the following.

- (21)  $VP \rightarrow V(NP)(NP)(PP^*)(Adv^*)(S)$

This is the rule that we will assume as we proceed, for concreteness. (But note that this rule is unable to account for the fact that S may also precede other constituents of VP.)

The fact that there is a preference for VP-final S is important, because it suggests that the ordering within VP must be accounted for in terms other than simply a phrase structure rule that specifies the sequence of categories. Note that S is a complement of the V in these cases and often alternates with NP, yielding a pattern illustrated in (22).

- (22) a. (?) I mentioned [s that my name is "Robin"] to Sandy.  
    b. I mentioned to Sandy [s that my name is "Robin"].  
    c. I mentioned [NP my name] to Sandy.  
    d. (?) I mentioned to Sandy [NP my name].

Here the preferred position of the NP is before the PP (compare (22c,d)), and the preferred position of the S after the PP (compare (22a,b)). But if the NP is more complex, its appearance after the PP is not problematic – compare (23) and (22d).

- (23) I mentioned to Sandy [NP the name of my lawyer].  
And if the NP is a pronoun, it is excluded from the position after the PP.  
(24) \*I mentioned to Sandy [NP it].

Facts such as these suggest that the ordering preferences in VP are determined at least in part by the syntactic complexity or "weight" of the constituents and not by their syntactic categories or grammatical functions. To summarize this point, we have developed an analysis of the VP that assumes minimal branching structure. Using phrase structure rules to account for the order of constituents in VP runs into difficulties, because the ordering possibilities go beyond what a PSR is able to express.

Section 4.7 discusses an alternative perspective on phrase structure in which there is maximal branching structure, as contrasted with the minimal branching structure that we assume here. In the next few sections, we look at the internal structure of other phrasal categories.

### 4.3. The structure of the noun phrase

Here are a few examples of English NPs.

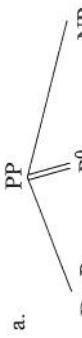
- (25) a. poodles  
    b. furry poodles  
    c. {these the} furry poodles

- d.  $\{ \text{these} \} \{ \text{furry poodles} \} \{ \text{that I own} \}$   
 e.  $\{ \text{the} \} \{ \text{furry poodle} \} \{ \text{in the park} \}$

Superficially, the English NP satisfies the following generalizations:

- (i) It is a projection of N.
  - (ii) A determiner or demonstrative, such as *the/these*, must be initial (e.g. *the poodle*, not *\*poodle the*).
  - (iii) Adjectives typically precede the N (e.g. *furry poodle*, not *\*poodle furry*).
  - (iv) Determiners, quantifiers, and possessives precede the adjectives and the head N in English.
- (26) a. many (black) poodles  
 b. \*black many poodles  
 c. {my } (many) poodles  
 d. \*many {my } Sandy's poodles

(v) PPs and other complex modifiers follow the N. For example,

- (27) a. the poodle [s that I own]  
 b. \*the [s that I own] poodle  
 c. a poodle [PP in the park] poodle  
 d. \*a(n) [PP in the park] poodle  
 e. the poodle [VP sitting by the door]  
 f. \*the [VP sitting by the door] poodle  
 g. the poodle [VP shaved by the groomer]  
 h. \*the [VP shaved by the groomer] poodle
- (29) a. There was a dog [in the room].  
 b. We walked [into the room].  
 c. We walked [ {halfway two feet } all the way ] into the room.  
 d. I was [[this \*(high)] off the ground].  
 e. We walked [ {halfway two feet } in ], and stopped.  
 f. Put the book [down].
- We will assume that the structure of the PP is as follows, where *halfway*, *this high*, etc. are degree phrases (DegP).
- (30) a.   
 b. PP → (DegP P<sup>0</sup>) (NP)

The modifier *that I own* is called a *relative clause* and is of the category S; we consider its internal structure and relationship to the head N in Chapter 9. *Sitting by the door* and *shaved by the groomer* are VPs; they are called *reduced relative clauses* when they are used to modify NPs, because they paraphrase full relative clauses of the form *which is VP*, e.g. *the poodle which is sitting by the door*.

On the basis of the generalizations in (i)–(v) we can characterize in a preliminary way the English NP in terms of the following rules, recognizing that it is possible to have more than one Adj before the N and more than one PP or relative clause after the N.

- (28) NP →  $\left( \begin{array}{l} \text{Det} \\ \{ \text{NPs}_3 \} \end{array} \right) (\text{Adj}^*) \text{N}^0 (\text{PP}^*) (\text{VP}^*) (\text{S}^*)$

We use the \* notation for what follows the head N, since, as in the case of VP, there can be more than one constituent of each type following the head.

Again, this rule does not capture the full range of ordering possibilities of the constituents that follow the head.

#### 4.4. Other phrasal categories

Other phrasal categories are PP, AP, and AdvP. PP appears to have a head-complement structure (29a,b), as well as some quantificational and descriptive modifiers (29c), but no determiners (29d). Moreover, some prepositions can be intransitive – they can appear without complements (29e,f).

The pre-head specifiers of AP and AdvP are degree terms such as *very*, *how too*, *so*, and *this/that* (for example *He was this angry*). We categorize them here as Deg.

- (31) a. Sandy was very angry (at Chris).  
 Sandy walked into the room angrily (\*at Chris).  
 b. Sandy was angry (that Chris was late).  
 Sandy walked into the room angrily (\*that Chris was late).

AP and AdvP are closely related, are based on the same adjectival roots, and have essentially the same structure. However, AdvP does not allow the full range of complements that AP does.

- (32) AP → (Deg) A<sup>0</sup> ([PP]  
          { S })
- (33) AdvP → (Deg) Adv<sup>0</sup>

Phrases such as *very furry poodles*, where *very furry* is an AP, show that what precedes N is AP\* and not simply Adj.

- (34) a [AP very furry] poodle

And an AP can follow the head N, as shown by *a poodle soaking wet from the bath*.

- (35) a poodle [AP soaking wet from the bath]

These observations suggest that rule (28) should be modified as in (28').

- (28') NP → ([ Det ] (NP<sup>s</sup>) (AP<sup>r</sup>) N<sup>0</sup> (AP<sup>t</sup>) (PP<sup>u</sup>)(VP<sup>v</sup>) (S<sup>w</sup>)

These modifications, while motivated by the examples that we have considered, raise additional problems, which are explored in Research question 1 at the end of this chapter.

## 4.5. The English verbal sequence

### 4.5.1. Auxiliary verbs

- (36) S → NP VP  
(37) S → NP V AUX VP
- (38) Sandy would have been sleeping at that time.  
(ii) Each element determines the form of the verb that follows it. In particular

- a. A modal requires that the verb that follows it have the bare form (see (39a)).
- b. Perfect *have* requires that the verb that follows it be a past participle (see (39b)).
- c. Progressive *be* requires that the verb that follows it be a present participle (see (39c)).
- d. Passive *be* requires that the verb that follows it be a past participle (see (39d)).

- (39) a. Sandy will { leave  
                  \*leaves  
                  \*left  
                  \*leaving }.
- b. Sandy has { leave  
                  \*leaves  
                  \*left  
                  \*leaving }.
- c. Sandy is { leave  
                  \*leaves  
                  \*left  
                  \*leaving }.
- d. Sandy was { leave  
                  \*leaves  
                  \*left  
                  \*leaving } by Terry.

- (iii) The modal, *have*, *be* of the progressive, and *be* of the passive must appear in the strict order given by (40), as exemplified in (41).

- (40) Modal have be<sub>progressive</sub> be<sub>passive</sub>

- (41) a. \*Sandy is having left. [cf. Sandy has been leaving.]  
      b. \*Sandy has would leave. [cf. Sandy would have left.]  
      c. \*Sandy is canned go. [cf. Sandy can go; Sandy can be leaving.]

- (iv) Tense is marked on the first verb in a verbal sequence.

- (42) a. Sandy leaves tomorrow.  
      b. Sandy { is leaving  
                  \*be leaves } tomorrow.

On the basis of these patterns, Chomsky (1957), in his seminal *Syntactic Structures*, proposed that the English verbal sequence consists of the following, where Tense may be Present or Past.

- (43) Tense (Modal) (have +en) (be +ing) V ...

In his original analysis, *Tense*, *+en*, and *+ing* are attached to the element immediately to the right of them, through the application of a transformational rule called **Affix hopping**. A transformational rule takes a tree

structure that meets certain conditions and changes it into another tree structure. A sequence of one or more transformations is called a **derivation**. (We will have much more to say about transformations and derivations in subsequent chapters.)

The main advantage of separating the affixes and then attaching them is that it captures the generalization that each affix appears on the word to the right of the verb that is responsible for its appearance. Suppose, for example, that the initial sequence is *Past run*. Affix hopping produces the sequence *run+Past*, which is realized as *ran*. If the initial sequence is *Present /be +ing/ run*, Affix hopping produces the sequence *be+Present run+ing*, that is, *is running*.

$$(44) \text{ Present } \text{be} \text{ +ing } \text{run}$$

If the initial sequence is *Present will /be +ing/ run*, that is, *will be running*

$$(45) \text{ Present } \text{will } \text{be} \text{ +ing } \text{run}$$

And so on.

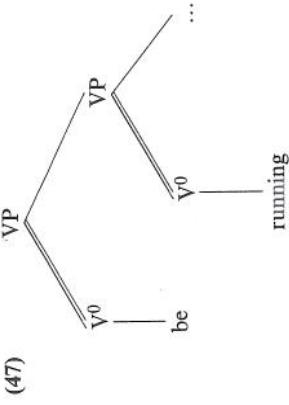
#### 4.5.1.2. Structure in the verbal sequence

Affix hopping in general is no longer accepted as part of the analysis of the English verbal sequence, although we will see that it may continue to play a useful role if restricted to the distribution of finite tense. The rigid restrictions on the sequence of verbal forms suggests that the modals and the verbs *have* and *be* select the form of the verbs that follow them. We will have much more to say about selection in Chapter 5. The general idea that we work with here is that a head, in virtue of its lexical specification, combines only with a complement that has a certain property or properties.

Assuming that verbs are heads of VPs, we can characterize the selection in this case in terms of the morphological properties of the complement of each verb in the sequence. First, the following is a possible phrase structure rule for English. It allows for each auxiliary verb to take a VP as its complement.

$$(46) \text{ VP} \rightarrow \text{V}^0 \text{ VP}$$

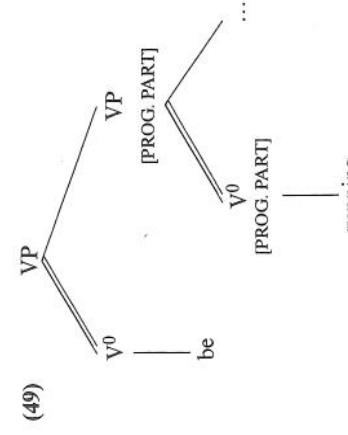
The verb that follows an auxiliary verb is the head of the VP complement of that auxiliary verb. For example, *be running* will have the structure



Second, for each *V<sub>AUX</sub>*, we must specify the properties of its complement VP. Furthermore, since a VP is a projection of V, the complement VP and its head share certain properties. (This relationship between the head and its projection is called the **head feature principle**.<sup>6</sup>) In particular, if the VP is required to have a property, such as perfect or progressive morphology, the VP passes its properties down to its head. For *be running* we then have the following.

$$(48) \text{ progressive } \text{be} \text{ selects a } \text{VP}[\text{PROG.PART}]. \text{ The head of this VP is } \text{V}[\text{PROG.PART}].$$

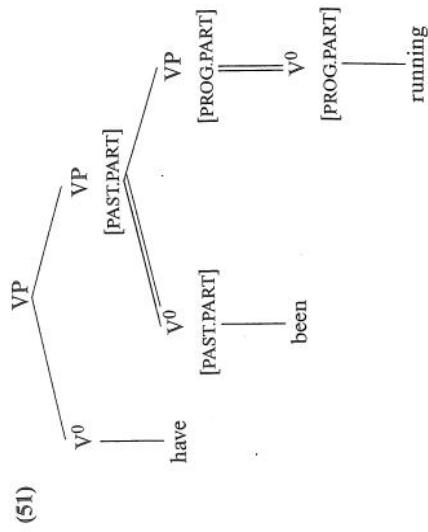
The structure is



- Similarly, the selectional properties of the other auxiliary verbs are
- (50) perfect *have* selects a *VP[PAST.PART]*. The head of this VP is *V[PAST.PART]*.
  - passive *be* selects a *VP[PAST.PART]*. The head of this VP is *V[PAST.PART]*.

<sup>6</sup> The head feature principle was originally formulated in Head-driven Phrase Structure Grammar (HPSG); see Pollard and Sag 1994.

If there is more than one auxiliary verb in a verbal sequence, the structure is correspondingly more complex. The structure in (51) illustrates for *have* and progressive *be*



Consider next the modals, such as *will* and *can*. There is a detail that needs to be addressed before we move on, which is that unlike *have*, *be*, and main verbs, the modals do not show agreement in the present tense. The English verbal paradigm distinguishes this form overtly: *do ~ does*, *have ~ has*, *am ~ is*, *sleep ~ sleeps*. But there is no such alternation in the case of the modals.

- (52) a. Sandy {will \*wills} leave.  
 b. Kim {can \*cans} swim.

Given that the modal forms are fixed, it is reasonable to ask whether there is any evidence that they are in fact marked for finite tense. The evidence that bears on this question involves **reported speech**. If John says “I am not feeling well” and we want to report later what John said, we can quote John literally, or we express what John said as a sentential complement. Notice what happens to the form of *am* when we do this.

- (53) a. John said “I am not feeling well.”  
 b. John said that he was not feeling well.

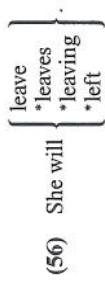
The present tense in a report about past speech shifts to the past tense.

We can use this observation to analyze what happens when there is a modal in the reported speech.

- (54) a. Mary said “I will never vote for that guy again.”  
 b. Mary said that she would never vote for that guy again.  
 (55) a. Mary asked “Can you help me with my homework?”  
 b. Mary asked whether I could help her with her homework.

For *will* and *can*, then, it appears that there are corresponding present and past forms, *will/would* and *can/could*. There are some complexities that arise when we consider other modals, but since these do not affect the main point we leave them to Problem 2.

Let us now consider the interaction between modals, tense, and other verbs. We have already observed that the verb that immediately follows a modal is in the “bare” form. That is, it lacks morphological inflection, as seen in (56).



This suggests that modals select VPs with no morphological features. Moreover, in addition to points (i)–(iv) above we have the following observation.

- (v) When a sentence with a modal is negated with *not*, *not* appears between the modal and the VP.

- (57) a. Sandy will leave.  
 b. Sandy will not leave.  
 c. \*Sandy not will leave.  
 d. \*Sandy will leave not.

#### 4.5.2. Some generalizations

Let us put what we have observed about English verbal sequences with several other observations. We have seen that

- only the first verb in the sequence is tensed;
- there is a strict order of verbal elements: modal precedes *have*, which precedes *be*,
- which precedes the main verb;
- modal precedes *not* in negative sentences.

Note now that when there is no modal, tensed *have* or tensed *be* precedes *not*.

- (58) a. I have not been thinking about the terms of the proposal.  
 b. We are not staying in this rat-infested dump.

This fact suggests that *have* and *be* are also instances of *V<sub>AUX</sub>*, and they may be tensed. Note also that in questions the part of the sequence that appears before the subject NP is in fact the tensed *V<sub>AUX</sub>*.

- (59) Will Sandy leave?

Has Sandy left?

Is Sandy leaving?

This construction is called **subject-AUX inversion** or simply **inversion**. The rest of the sequence is precisely what we find in a non-inversion construction.

- (60) a. Will Sandy  $\left[ \begin{array}{c} \text{leave} \\ *\text{leaves} \\ *\text{left} \\ *\text{leaving} \end{array} \right]$   
 b. Has Sandy  $\left[ \begin{array}{c} *\text{leave} \\ \text{leaves} \\ \text{left} \\ *\text{leaving} \end{array} \right]$   
 c. Is Sandy  $\left[ \begin{array}{c} *\text{leave} \\ *\text{leaves} \\ *\text{left} \\ \text{leaving} \end{array} \right]$   
 d. Was Sandy  $\left[ \begin{array}{c} *\text{leave} \\ *\text{leaves} \\ *\text{left} \\ \text{leaving} \end{array} \right]$

We can capture these facts by simply putting tensed *V<sub>AUX</sub>* before the subject NP. We use the notation [TENSE] to indicate that *V<sub>AUX</sub>* is inflected.

- (61) S → NP V<sub>AUX</sub>[TENSE] VP

#### 4.5.3. Accounting for the sequence

Having established that a modal is properly analyzed as being inflected for tense, we look again at the fact that only the first element is marked for tense. But if tense is marked on an auxiliary verb, how do we account for its appearance on the main verb when there is no auxiliary verb? Crucially, the main verb cannot precede *not*, it must follow *not* –

- (62) \*Sandy left *not*.  
 [cf. Sandy didn't leave.]

– and, in inversion, the main verb cannot precede the subject.

- (63) \*Left Sandy?  
 [cf. Did Sandy leave?]

We can't have one rule that puts tense on the auxiliary verb and another rule that puts tense on the main verb, because that would cause a conflict in sequences that have auxiliaries.

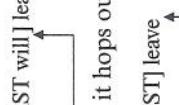
- (64) \*Sandy will leaves.

It has been argued in the literature that the least problematic solution is one that retains Affix hopping.<sup>7</sup> Our variant of this analysis assumes that what precedes VP is not simply tensed *V<sub>AUX</sub>* but the node *AUX* that may contain just the element TENSE, as well as an uninflected auxiliary verb, as in (65).

- (65) a. S → NP AUX (not) VP  
 b. AUX → TENSE (V<sub>AUX</sub>)  
 Sandy [AUX PAST will] leave

TENSE then “hops” on the verbal element immediately to the right of it. If there is an auxiliary verb, TENSE hops onto it –

(66) Sandy [AUX PAST will] leave



– and, if there isn't, it hops out of AUX onto the main verb.

(67) Sandy [AUX PAST] leave



When *V<sub>AUX</sub>* is *have*, the VP that is selected will have the feature [PAST.PRT], and when *V<sub>AUX</sub>* is *be*, the VP will have the feature [PROG.PART]. Because *V<sub>AUX</sub>* may be a modal, *have*, or *be*, any of these may function as the AUX and therefore precede *not* and undergo inversion. In section 4.5.4 we look at several other uses of *have* and *be* and their distribution.

Now we come to a problem, and an interesting solution. We have seen that inversion puts AUX before the subject. If AUX happens to lack an auxiliary verb, the structure will be something like the following.

- (68) [AUX PAST ] [NP Sandy] [VP leave]

By assumption, TENSE hops onto the verbal element that immediately follows it. But, in this case, there is no such verbal element. If something

<sup>7</sup> Lasnik 1999.

intervenes between TENSE and the verb, TENSE cannot hop. The problem is, since TENSE is an affix, there must be something that TENSE attaches to.

The solution to this problem is based on the observation that *do* appears as an auxiliary verb in English exactly in those contexts where there is no verb that can have TENSE hopped onto it. One such context is shown in (68); others are those where the verb is simply missing, or the VP is not adjacent to AUX.

The generalization about *do* is that *do* has to appear in AUX when TENSE is not immediately adjacent to a verb, so that there is something for TENSE to hop on to. This phenomenon is called *do support* – if there is no verbal element, then it is necessary to insert *do* to “support” TENSE. (69) shows some of the possibilities for attachment of TENSE. Note in particular the introduction of *do* in (69d–f).

- (69) a. Sandy [AUX PRESENT will] leave → Sandy will[PRES] leave  
‘Sandy will leave.’
  - b. Sandy [AUX PAST be] sleeping → Sandy be[PAST] sleeping  
‘Sandy was sleeping.’
  - c. Sandy [AUX PAST will] have left → Sandy will[PAST] have left  
‘Sandy would have left.’
  - d. Sandy [AUX PRESENT] not smoke → Sandy [AUX PRESENT do] not smoke  
→ Sandy do[PRES] not smoke  
‘Sandy does not smoke.’
  - e. [AUX PAST] Sandy leave → [AUX PAST do] Sandy leave  
→ do[PAST] Sandy leave  
‘Did Sandy leave.’
  - f. They said Sandy would leave, and [vp leave] Sandy [AUX PAST]
- They said Sandy would leave, and [vp leave] Sandy [AUX PAST do]
- They said Sandy would leave, and [vp leave] Sandy do[PAST]
- ‘They said Sandy would leave, and leave Sandy did.’

Thus, *do* will appear if *not* appears between AUX and VP, if AUX is moved away from VP, if VP is moved away from AUX, or if the V is absent.

*do support*

$$\begin{array}{l} S \rightarrow NP\, AUX\, (not)\, VP \\ AUX \rightarrow TENSE\, (V\, AUX) \end{array}$$

1. Insert *do* if TENSE is not adjacent to a verbal element.
2. TENSE hops onto the adjacent verbal element (Affix hopping).

Exercise 4 asks you to derive a number of verbal sequences with and without *do*.

#### 4.5.4. Have and be

*Have* and *be* function not only as auxiliary verbs but as main verbs.

- (70) a. You have a cold.
- b. You are not well.

In the case of main verb *have* we get *do* support (71a), but not in the case of main verb *be* (71b).

- (71) a. Do you have some money?
- b. \*Do you be well?

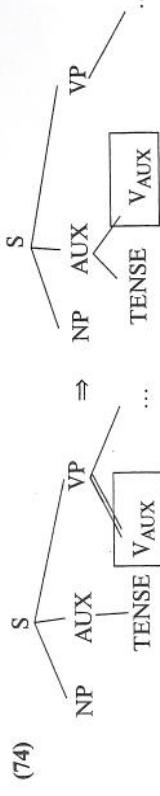
Inversion shows that main verb *have* also functions as an auxiliary verb in AUX in British English and in limited cases in American English (72a,b), while main verb *be* must be in AUX – compare (72c) and (71b).

- (72) a. (Brit.) Have you some money?
- b. Have you any idea how much that sofa costs?
- c. Are you well?

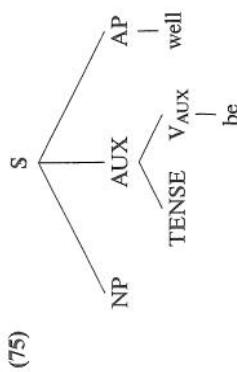
The distribution of *not* is consistent with this structure.

- (73) a. I haven’t a clue how much that sofa costs.
- b. You aren’t really well.

Since *have* and *be* can function as AUX with respect to inversion and still select complements as though they were heads of VP, one might assume that they are restructured from VP into AUX when there is no V AUX in AUX, as sketched in (74).



However, a more direct solution that does not require a special restructuring operation is to simply say that *have* and *be* correspond to V AUX in AUX, and that the complements that they select are not in VP but attached directly to S. For example, if the complement of *be* is an AP such as *well*, the structure would be that of (75).



The key is to specify in the lexical entry of *be* that it is always V<sub>AUX</sub> and the lexical entry of *have* that it is V<sub>AUX</sub> under certain circumstances.

The correspondence that specifies the position of the auxiliary verb is the following.

(76) The leftmost V<sub>AUX</sub> in the sequence appears in AUX.

In order for such a solution to work, the AUX will have to be treated as a head with the selectional properties of the auxiliary verb. The auxiliary verb must be able to select its complement (e.g. AP in the case of *be*) even if both are dominated by S and not VP. We assume both points here. Note also that, on this analysis, the complement is not a VP.

#### 4.6. Rule summary

The following are the phrase structure rules for English that we have developed thus far.

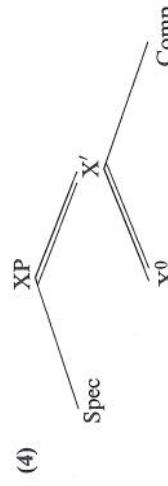
- (77)
- $S \rightarrow NP\ AUX\ (not)\ VP$
  - $AUX \rightarrow TENSE\ (V_{AUX})$
  - $VP \rightarrow V^0(NP)(NP)(PP^*) (Adv^*)(S)$
  - $NP \rightarrow \left( \begin{array}{l} \text{Det} \\ \text{NP}_S \end{array} \right) (AP^*) N^0 (AP^*) (PP^*) (VP^*) (S^*)$
  - $PP \rightarrow (\text{Deg}P) P^0 (NP)$
  - $AP \rightarrow (\text{Deg}) A^0 \left( \begin{array}{l} PP \\ S \end{array} \right)$
  - $AdvP \rightarrow (\text{Deg}) Adv^0$

These rules specify the position of the head in the phrase and the relative ordering of specifiers, arguments, and adjuncts. Moreover, they suggest that phrases have flat structure, in the sense that all of the constituents are sisters of one another. The flat structure hypothesis is the weakest version of

X' theory, one in which there are only two levels of structure, X<sup>0</sup> and XP. It is also the simplest hypothesis, in the sense that it makes minimal assumptions about structure. The alternative view, that phrases are maximally structured, is taken up in section 4.7.

#### 4.7. \*Applications of strong X' theory

As noted in section 4.1, mainstream generative grammar has adopted a very strong version of X' theory, expressed in terms of the X' schema (4), with the additional assumption that all branching is binary, so that Spec and Comp each consist of exactly one constituent. This assumption of **uniform binary branching** is a standard assumption of mainstream approaches (but not, for example, in the approach taken in this book; see Chapters 3 and 4).

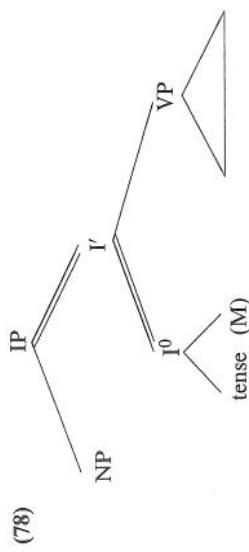


In this section we explore some of the consequences of these assumptions, without necessarily endorsing them.

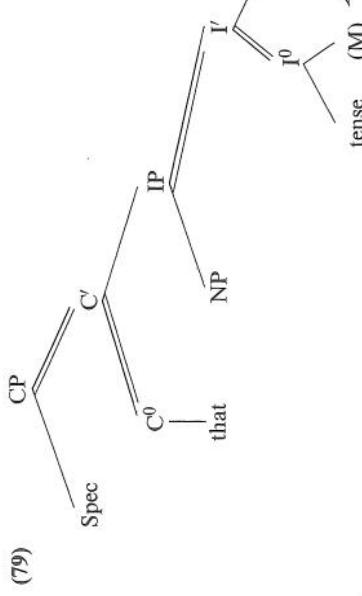
##### 4.7.1. IP and CP

We consider first the question of what the structure of S is if we assume uniform endocentricity of all phrases, in conformity with strong X' theory. Assume that the X' schema in (4) applies to S. Furthermore, assume that all branching is binary. Based on our discussion in section 4.5, AUX is a plausible candidate for the head of the sentence, where Spec is the subject and Comp is the VP.<sup>8</sup> Since AUX contains the tense inflection, it is standardly referred to as Infl, or I<sup>0</sup>.

<sup>8</sup> On a strict application of X' theory, the auxiliary verbs *have* and *be* will always originate as heads of VP, hence I<sup>0</sup> will contain at most Tense and the modal.



Assuming strong X' theory, it is standardly assumed that the complementizer *that* is also a head and that its projection is a complement S. The complementizer is referred to as C<sup>0</sup>, and its projection is CP.



We consider evidence for this structure in Chapter 9. The most important type of evidence is that Spec of CP appears to be the position in which wh-phrases appear in wh-questions such as *What are you looking at*, while C<sup>0</sup> is the position of the inverted auxiliary.

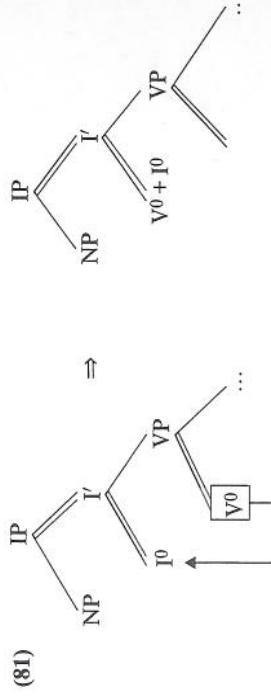
The structure in (78) is assumed in mainstream syntactic theory to be correct for languages that show inflection in finite sentences. A major difference between such languages and English is that it appears that, in languages such as French and German, all inflected verbs behave as though they are in I<sup>0</sup>, in that they precede negation and undergo inversion. For example, in French we find the following.

- (80) *French*
- a. Marie ne regarde pas la télévision.  
Marie NE look-at NEG the television  
Lit. 'Marie watches not the television,'  
'Marie isn't watching television.'

- b. \*Marie ne pas regarde la télévision.  
Marie NE NEG look-at the television.
- c. Regarde-t-elle la télévision?  
watches-she the television  
'Does she watch television?'

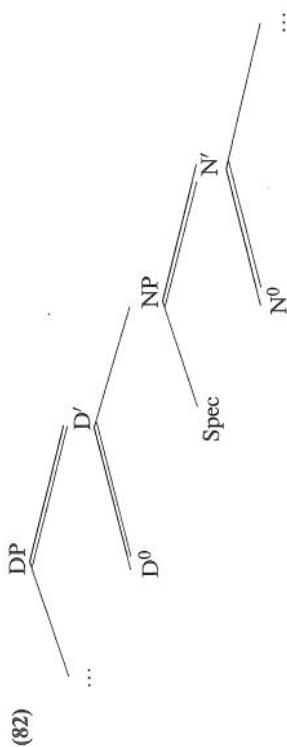
In comparison, in English only the tensed auxiliary verbs precede negation and undergo inversion.

The similarities between the behavior of main verbs in French (and other languages) and auxiliary verbs in English can be captured by taking the inflection, that is, TENSE, to be the head of the sentence. Since V is the head of VP, assuming that structure (78) is uniform across all languages leads to an analysis in which the verb is raised from VP to I<sup>0</sup> by an operation called V-raising, illustrated in (81).



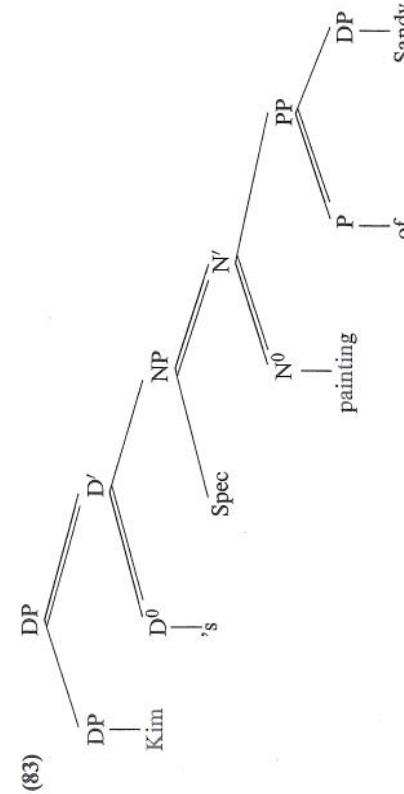
On the assumption that (78) is the correct structure for IP(=S), and assuming that it is important to maximize uniformity of structure across categories, a similar structure becomes plausible for the NP. Recall that the subject of IP is external to I<sup>0</sup> – it is a sister of the first node above I<sup>0</sup>. The complement of I<sup>0</sup> is VP, which contains V and its complements.

By analogy, the specifier of an NP would be external to a head whose complement is the noun and its complements. Call this head D(et)D<sup>0</sup>, then what we have been thinking of as an NP is a DP, that is, a determiner phrase.



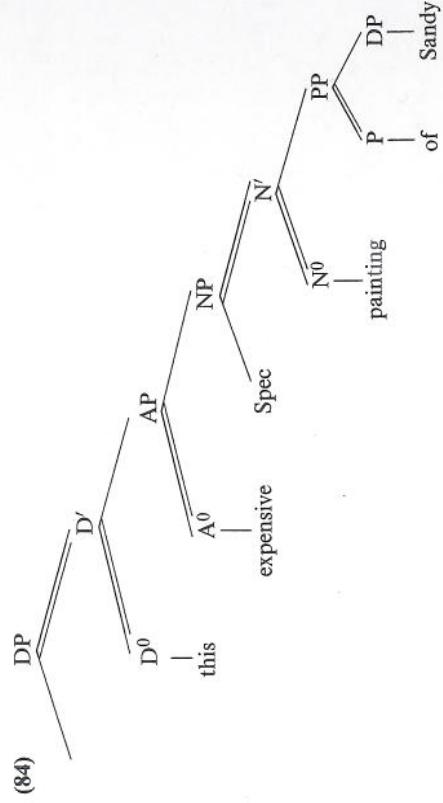
The head  $D^0$ , the counterpart of the head  $I^0$ , is a member of the class of **functional heads**, which also includes  $C^0$ . This class is contrasted with the **lexical heads**, that is,  $N^0$ ,  $V^0$ ,  $A^0$ , and  $P^0$ . The projection DP is called a **functional projection**, as are IP and CP.

The functional head  $D^0$  is the position of a number of pronominal elements, including the possessive inflection 's, the determiners *the* and *a*, and demonstratives such as *this* and *these*.



This structure does raise certain difficult questions, though, which we can only note here. First, while the subject position (that is, Spec of IP) must be occupied in the sentence, the corresponding position (that is, Spec of NP) does not have to be occupied in NP. Why is this, and when is it possible for a position to be empty? The answer given in the framework of strong  $X'$  theory is that some heads have features associated with them that require that there be a matching constituent in their Spec. One such head would be the genitive 's, which requires that there be a DP in Spec. By contrast, *this* has features that require Spec to be empty.

Second, what is the status of *adjectival modifiers*? Are they heads, or are they specifiers, or are they adjuncts? The most uniform analysis treats them as heads. If they are heads, and precede the NP, then they too must be heads of projections that can be complements of  $D^0$ , as illustrated in (84).



Moreover,

- what is the internal structure of a proper noun phrase, such as *Sandy*? Is *Sandy* an  $N^0$ , and, if so, what is the structure of the DP?
- what is in the Spec of NP?
- what is the internal structure of expressions such as *very expensive* that contain degree modifiers?
- how are the head features of  $N^0$  transmitted to DP, and to what extent are the head features of  $A^0$  transmitted to DP?
- what is the internal structure of a determinerless phrase such as *expensive paintings*? Is it a DP?

For discussion of a range of questions bearing on the internal structure of DP, see Abney 1987 and the papers in Alexiadou and Wilder 1998.

### 4.7.3. VP internal subjects

Introduction of IP allows MGG to address a puzzle concerning the application of strong X' theory to the VP. Although the strong X' schema suggests that VP should have a specifier, there is no obvious candidate for this position. At the same time, the subject of a sentence (in English at least) is in the specifier position of IP. If all phrases conform to the X' schema, then VP should allow a DP in its specifier position. But, on the face of it, this appears to be impossible, as examples like the following show.

(85) \*Sandy will Terry read the book.

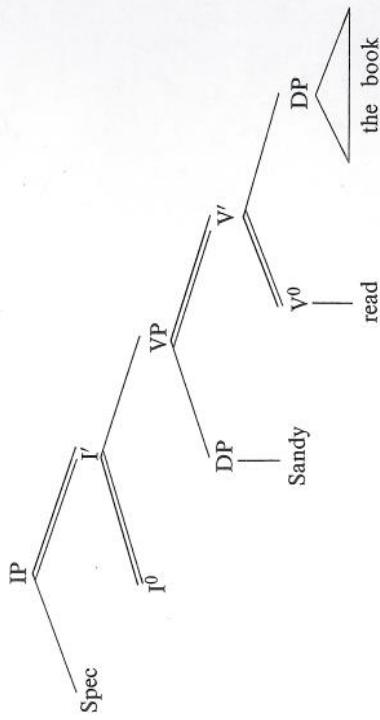
The problem is that *Terry* has no role in this sentence; it is completely superfluous.

A solution that reconciles the requirement that VP obey the X' schema with the ungrammaticality of (85) starts from the observation that, although the subject of a sentence is in Spec of IP, it gets its semantic role from the verb. For example, in *Sandy will read the book*, Sandy is the Agent of *read*. But *Sandy* is not in the VP headed by *read*, so it is not clear how it gets this role. (Of course, this problem arises precisely because it is assumed that there is an IP above VP, in contrast to the flatter structure that we assume earlier in this chapter.)

One possible resolution of this problem that has been widely assumed is that there is some rule of predication by which the verb must assign to its subject is transmitted from the VP to the Spec of IP. Such a rule is needed in any analysis in which the subject is external to the VP, including the one given earlier in this chapter, where the subject may be the sister of a VP that contains a number of auxiliary verbs, e.g. *Sandy would /VP have /VP been /VP sleeping //*.

But the solution in MGG is to say that the subject of the sentence is a constituent of the VP, and in fact that it is the specifier. This step would solve the problem of making VP conform to the X' schema, as shown in (86).

(86)



This analysis is called the **VP internal subject hypothesis** (VPISH).

There are a number of problems raised by this analysis. Not the least is that the subject of a sentence in English does not appear to the right of the I<sup>0</sup> head but to the left of it in a normal declarative. So, if this analysis is correct, the DP in Spec of VP must move to the Spec of IP. Why does it move, and what happens if it does not move? Moreover, what happens if there are several auxiliaries, each of which is the head of its own VP? In such cases, there are presumably many Spec positions (one for each VP), and the subject must move up through each of them. Such questions do not arise in an account that does not assume a strict X' analysis of the sentence. But given the prominent position of the VPISH analysis, these are questions that we need to recognize. We return to them in Chapter 6. Finally, assuming a uniform X' configuration for all projections, the structure in (86) generalizes to DP. The possessive is the Spec of NP, and raises to Spec of DP, where it shows the possessive morphology, as in (83).

### Exercises

1. Some of the following verb phrases are compatible with rule (14) in the text and some are not. Say which are and which are not, and why. To do this, you must show that a particular phrase fits or fails to fit the requirements of this rule.

- (1) a. (We should really) [vp give back the money].
- b. (I) [vp bet Sandy ten dollars that it would rain].
- c. (Pat) [vp hung a copy of the Mona Lisa on the wall].
- d. (Sandy) [vp said in a very loud voice that it was time to leave].

- e. (Kim) [vp tried very hard to ignore what was happening].  
 f. (You never should have) [vp put the food back in the refrigerator].

[§4.2.]

2. The head of the verb phrase is underlined in the following sentence:

- (1) Cathy put a picture of Elvis on the wall of her bedroom last night.  
 i. Explain why we say that *put* is the head.  
 ii. Is *on the wall of her bedroom* a complement or an adjunct? Why?  
 iii. Is *last night* a complement or an adjunct? Why?

[§4.2.]

3. Some of the following noun phrases are compatible with rule (28) and some are not. Say which are and which are not, and explain your answer. To do this, you must show that a particular phrase fits or fails to fit one or more requirements of this rule.

- (1) a. two left feet  
 b. people angered by the decision  
 c. expensive paintings of rural scenes  
 d. space, the final frontier  
 e. a great place to work  
 f. an unforgettable little black poodle

[§4.3.]

4. Show the derivation of the following verbal sequences in English. To do this, give the original sequence and show each step, following the model of (69) in the text.

- (1) a. would have been sleeping  
 b. could not be reading  
 c. might have seen  
 d. did not realize  
 e. ... and [vp suffer] they did  
 [cf. ... and [vp suffer] they will  
 f. ... and they do.  
 [cf. ... and they will.]

[§4.5.]

5. Following the pattern of (51) in the text, draw trees for the verbal sequences in (1a-d) in Exercise 4. Show all verbal features such as [PAST.PRT] as appropriate.

[§4.5.]

6. Put brackets around every phrase in each of the following sentences and label it with its category. Use [s...] for the category S, and [NP...] for the category NP, and so on for the other categories. Remember, there have to be matching left and right brackets, and the label goes on the left bracket. For example, [NP my picture [pp of [NP Sandy]]]. (Hint: You might find it easier to draw the tree first, and then translate it into labeled brackets.)

- (1) a. Your resistance to advice is legendary.  
 b. Cathy put a picture of Elvis on the wall of her bedroom last night.

- i. The quick brown fox jumped over the lazy dog.

- d. We introduced a simple version of the phrase structure rules for the English

VP in Chapter 3.

- e. You have a very good reason for your distrust of George.

[§4.6.]

7. Use the rules in (1), and draw the trees for each of the phrases in (2). Assume the categories given in (3).

- (1) NP →  $\left( \{ \text{Det} \} \cup \{ \text{NP}_S \} \right) (\text{AP}^*) \text{N}^0 (\text{AP}^*) (\text{PP}^*) (\text{VP}^*) (\text{S}^*)$   
 PP → (DegP) P<sup>0</sup> (NP)

- (2) a. my dog  
 b. pictures of my dog  
 c. Sandy's pictures of Robin's dog  
 d. Sandy's stories about Robin's pictures of my dog  
 e. my stories about Robin's pictures of Sandy

- (3) NP: my, your, Sandy's, Robin's  
 N<sup>0</sup>: dog, Sandy, stories, pictures  
 P<sup>0</sup>: of, about

[§4.6.]

### Problems

1. Here is an example of an NP in Niuean.

- (1) Niuean  
 e tau manu kula fulufuluola e:  
 ABSC PL bird red beautiful that  
 'those beautiful red birds'  
 [Kahnemuyipour and Massam 2002]

The marker ABS<sub>C</sub> is “a portmanteau morpheme, which indicates the case of the [NP] as well as whether it is common or proper (where proper includes pronominal).”

Formulate a phrase structure rule or simple set of phrase structure rules that will account for the structure of the Niuene NP, using the rules for English as a guide.

[§4.3.]

2. The simple description of the English verbal sequence assumes that a modal is always tensed. We have argued that there are present and past forms for *will* and *can*, which can be seen when they are put into reported speech in the past, e.g.

- (1) a. Susan said “I will leave.”  
b. Susan said she would leave.

There does not appear to be a past tense form for the English modal *must*; in order to express the past of *must* the periphrastic form *had to* is required.

- (2) a. Susan said “I  $\left\{ \begin{matrix} \text{must} \\ \text{have to} \end{matrix} \right\}$  leave.”  
b. Susan said she  $\left\{ \begin{matrix} *\text{musted} \\ \text{had to} \end{matrix} \right\}$  leave.

What is the best way to express this fact in formal terms in the grammar of English? (Hint: What must happen when the modal *must* appears in AUX with PAST Tense? Where is this stated in the grammar?)

[§4.5.]

3. In section 4.5.4 we suggested that the structure of a sentence like (1) is (2).

- (1) My poodle is *furry*.  
(2) [s NP [aux is] [AP *furry*]]

Such a structure lacks a VP constituent. Revise the rules in (77) to accommodate this possibility, as well as cases in which the complement of *be* is NP or PP.

[§4.5.]

4. The following are passages from Shakespeare’s *Henry VIII*. There are four passages in boldface that in some way differ in grammatical form from Modern English, identified as (a)–(d). Describe each difference in grammatical terms, that is, in terms of what the relevant elements are, where

they appear, what their syntactic properties are, and what rules of contemporary English do or do not apply to them. You will have to refer to the structure of the English verbal sequence developed in section 4.5. (Don’t get distracted by the apostrophes – they are spelling differences, not syntactic differences.)

[§4.3.]

- (1) a. *would all other women*  
    *Could speak this with as free a soul as I do!*  
b. *My lords, I care not*, so much I am happy  
...  
c. *But, I beseech you, what's become of Katharine,*  
    *The princess dowager? how goes her business?*  
d. *Thou hast the sweetest face I ever look'd on.*  
    *Sir, as I have a soul, she is an angel.*

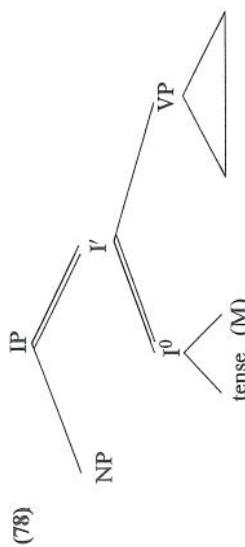
[§4.5.]

5. We noted in the text that the complementizer *that* is required when a sentential complement is in subject position or topicalized. State as simply as you can the conditions under which *that* can be omitted. In order to do this you will need to make up your own examples in which sentential complements appear in different positions in the sentence. We’ve given you a head start in (1) – the judgments are ours and yours might be different. (The notation “\*(*that*)” means that the sentence is not grammatical when it lacks the *that*.)

- (1) a. \*(*That*) the world is flat, I doubt.  
b. \*(*That*) the world is round bothers me.  
c. It bothers me (*that*) the world is round.  
d. It bothers me very much \*(*that*) the world is round.  
e. I proved (*that*) the world is round.  
f. I proved conclusively \*(*that*) the world is round.

[§4.7.1.]

6. Consider whether there is evidence for the internal structure of IP given in (78) (in particular I') in terms of movement, deletion, or pro-form replacement, using examples to test each possibility. Then, consider whether there is evidence for or against this structure using coordination tests.



[§4.7.1.]

### Research questions

1. State as simply as you can a generalization that accounts for the pattern seen in (1).

- (1) a. \*a [soaking wet from the bath] poodle  
 b. a [soaking wet] poodle  
 c. \*a poodle [soaking wet]  
 d. a poodle [soaking wet from the bath]

Can this generalization be formulated just in terms of phrase structure rules? Note also the grammaticality of the following examples. Do they simplify or complicate your account? Why?

- (2) a. I met { someone } nice yesterday.  
 b. Do you have { anything } cheaper?  
 c. I want to go { somewhere } warm.

[§4.4.]

2. The rules that we have stated for the English verbal sequence do not account for sentences such as the following.

- (1) a. I can't believe you did that.  
 b. You shouldn't have said anything.  
 c. Won't you please sit down.  
 d. Don't they know that it's raining.

The phenomenon illustrated here is called **negative contraction**.

Work out a modification of the rules to account for such sentences. Most importantly, you must specify where the contracted form of negation

appears in the structure, and provide motivation for locating it in this position.

[§4.5.]

3. It is traditional in generative grammar to view *not* in English as being responsible for *do* support because it intervenes between I<sup>0</sup> and the verb. Consider the following data, which complicates the issue.

- (1) a. Sandy { will } not call.

b. Sandy { will } { certainly } call.

c. Sandy { certainly } called.

A. Explain why this data is problematic for the view that anything that intervenes between Tense and V automatically triggers *do* support.

B. What adjustments would you have to make in the analysis proposed in the text in order to accommodate these facts?

[§4.5.]

4. Given the analysis of the English verbal sequence discussed in the text, what is the status of the infinitive? Here are some relevant examples.

- (1) a. to leave  
 b. to have left  
 c. to be leaving  
 d. to have been leaving  
 e. \*to { can } leave  
 f. I expect Sandy { not to leave }.

A. Suppose that *to* is a non-finite variant of AUX. Assuming this, how should we change the rule that specifies the content of AUX?

B. What has to be said about the distribution of *not* in order to account for example (1f)? Compare the distribution of *not* in this case with its distribution in finite sentences. Is there a natural way to capture the difference that goes beyond simply stating the facts? (Hint: You may have to develop a very different analysis of the structure of the verbal sequence in order to account for the behavior of *not*, and this account may have interesting consequences.)

[§4.5.]

5. The *do* support analysis given in the text is a version of the classical analysis of Chomsky 1957. A number of alternatives have been explored in the literature over the years, with the goal of eliminating Affix hopping and accounting for the appearance of *do* on the basis of general principles rather than a specific rule.

Assume for this problem that *do* is a modal. Formulate the simplest set of rules that will account for the distribution of *do*. Make sure that when *do* is present it is marked for TENSE. You will have to specify the conditions under which *do* is deleted, since it does not appear before auxiliary *have* and *be*.

[§4.5.]

6. An appealing alternative to the *do* support analysis in the text is one that eliminates Affix hopping and assumes that all verbs (auxiliaries and main verbs) are introduced into the structure already marked for TENSE. One instantiation of such an analysis assumes the following.

(1)  $S \rightarrow NP\ VP[TENSE]$

Here, [TENSE] is a feature of VP, and therefore V will have the feature [TENSE].

Such an analysis turns out to be difficult to work out in detail, because of the fact that a tensed auxiliary verb has a different distribution from a tensed main verb. VP may be headed by a main verb or by a VAUX. In the latter case, V may precede *not*, and may precede the subject NP in cases of inversion.

Work out a set of rules and conditions to govern the distribution of TENSE and *do* without assuming Affix hopping. How does your analysis compare to the *do* support analysis that assumes Affix hopping? (This is a particularly challenging problem.)

[§4.5.]

7. A view that is commonly encountered in mainstream syntactic theory is that a single phrase structure for each phrasal category is basic to all languages. For example, it has been proposed that the DP has the following basic structure.

(1)  $[D^0 [Quan^0 [Adj^0 [N^0]]]]$

where all branching is binary and to the right. On this view, other possible orders must be derived from this basic structure by movement of constituents to the left. By assumption, heads can only attach to heads. For

example, the order  $D^0$ – $Quan$ – $N$ – $Adj$  would be derived by adjoining the N to the left of  $Adj$ .

i. Given the assumption of fixed initial structure and order, how would you derive

(2)  $N^0 D^0 Quan^0 Adj^0$

ii. Does the assumed structure and leftward movement derivation explain why it is that the following are **not** possible orders? Explain.

- (3)
  - \* $N^0 Quan^0 D^0 Adj^0$
  - \* $N^0 Adj^0 D^0 Quan^0$
  - \* $Adj^0 N^0 D^0 Quan^0$
  - \* $Quan^0 N^0 D^0 Adj^0$
  - \* $Quan^0 D^0 N^0 Adj^0$

[§4.7.2.]

Section	Exercise	Problems	Research questions
4.1.			
4.2.	1, 2		
4.3.	3	1	
4.4.			1
4.5.	4, 5	2, 3, 4	2, 3, 4, 5, 6
4.6.	6, 7		
4.7.	5, 6	7	