Chapter 10

The Passive Construction

10.1 Introduction

Perhaps the most extensively discussed syntactic phenomenon in the generative literature is the English passive construction. The active/passive alternation provided one of the most intuitive motivations for early transformational grammar, and it has played a role in the development of almost all subsequent theories of grammar.

In this chapter, we present an account of the English passive using the formal mechanisms we have developed in this text. Given the strongly lexical orientation of our theory, it should come as no surprise that we treat the active/passive relationship primarily as a relationship between two verb forms, and we use a lexical rule to capture the generality of that relationship.

We begin with some data, exemplifying the phenomenon in question. We then formulate our rule, and explain how it works. Finally, we turn to the question of the status of the forms of the verb *be* that characteristically occur in passive sentences.

10.2 Basic Data

Consider sets of sentences (and non-sentences) like the following:

(1) a. The dog bit the cat.

b. The cat was bitten (by the dog).

c. *The cat was bitten the mouse (by the dog).

(2) a. Pat handed Chris a note.

b. Chris was handed a note (by Pat).

c. *Chris was handed Sandy a note (by Pat).

(3) a. TV puts ideas in children's heads.

b. Ideas are put in children's heads (by TV).

c. *Ideas are put notions in children's heads (by TV).

The b-sentences in (1)-(3) are what are standardly called 'passive'; the a-sentences are referred to as their 'active' counterparts. There is clearly a close semantic relationship between such active and passive pairs. In particular, the semantic roles of the arguments are the same – e.g. in (1), the dog is the biter, and the cat is the one being bitten. To put it informally, in an active sentence and its passive counterpart, who does what to whom is the same. The crucial difference between active and passive sentences is that the subject of the passive corresponds to the object of the active. The participant denoted by the subject of the active, if expressed at all in the passive, is referred to by the object of the preposition *by*. Consequently, the verb in a passive sentence always has one fewer object (that is, NP complement) than the verb in its active counterpart. This is illustrated in the c-sentences of (1)-(3). It follows that sentences with intransitive verbs, like (4a) normally do not have passive counterparts, as in (4b).

(4) a. The patient died.

b. *The patient was died (by the doctor).

c. *The doctor died the patient.

Moreover, other than this one difference, active sentences and their corresponding passives have identical valence requirements. This is illustrated in (5), where the absence of an obligatory complement makes both the active and passive sentences ungrammatical.

(5) a. *Pat handed Chris.

b. *Chris was handed (by Pat).

c. *TV puts ideas.

d. *Ideas are put (by TV).

It would not be hard to formulate lexical entries for passive forms of verbs. In order to capture the generalizations stated informally above, however, we need to formulate a rule that can relate active and passive examples. As in the case of the rules discussed in Chapter 8, our passive rule is motivated by more than just parsimony. Faced with novel transitive verbs – either new coinages like *email* or rare words like *cark* – English speakers can (and often do) immediately use them correctly in passive sentences. Hence, a rule-governed treatment of the active/passive alternation will be psychologically more realistic than simply listing passive forms for all transitive verbs.

Intuitively, then, we want to formulate a rule that does the following:

- turns the first NP complement into the subject;
- optionally allows the subject to turn into the object of a PP headed by *by*;
- leaves the valence features otherwise unchanged;
- leaves the semantics unchanged; and
- makes the appropriate morphological change in the form of the verb.

This last item is one we have not mentioned to this point. A bit of reflection reveals that the morphology of the passive form of a verb (or 'passive participle', as they are commonly called) is always identical to that of the past participle; this comes out clearly from considering verbs with exceptional past participles, such as *do* (*done*), *sink* (*sunk*) and *cut* (*cut*). This generalization is easily captured in our framework simply by invoking the same morphological function, F_{PSP}, for both the past participle lexical rule and the passive lexical rule.

The following is a lexical rule that satisfies these desiderata:

(6) Passive Lexical Rule:

$$\left\langle \boxed{1}\,, \begin{bmatrix} \textit{tv-lxm} \\ \text{ARG-ST}\ \langle\ \text{NP}_i\ \rangle\ \oplus\ \boxed{2} \end{bmatrix} \right\rangle \Rightarrow \left\langle \text{F}_{PSP}(\boxed{1})\,, \begin{bmatrix} \textit{word} \\ \text{SYN} \quad \begin{bmatrix}\text{HEAD}\begin{bmatrix}\text{FORM pass}\end{bmatrix}\end{bmatrix} \\ \text{ARG-ST}\ \boxed{2}\ \oplus\ \left\langle \left(\text{PP}\begin{bmatrix}\text{FORM by} \\ \text{P-OBJ NP}_i\end{bmatrix}\right)\right\rangle \end{bmatrix} \right\rangle$$

There are several points of explanation that need to be made in connection with this formulation.

First, notice that most of the effects of the rule are in the ARG-ST. At a very coarse level of description, what it does is to rearrange the elements of the ARG-ST list. Because of the Argument Realization Principle (chapter 7), these rearrangements also affect the values for the VALENCE features. Specifically, (6) eliminates the first element of the input's ARG-ST list, moving up the other elements and optionally introducing a PP at the end of the new list. More precisely, the second element (corresponding to the direct object) of the input becomes the first element (corresponding to the subject) of the output; whatever follows the second element in the input, also moves up in the list. In addition, an optional 'PP[by]' is added to the end of the list. This notation is shorthand for a PP headed by the preposition *by*. We will return directly to the question of what this means formally, and will discuss closely related matters in the next chapter.

Second, recall that subscripts indicate values of the feature INDEX; so (6) says that the optional PP[by] in the rule output has a P-OBJ value that is coindexed with the subject of the lexical rule input. This means that whatever semantic role the verbal lexeme assigns to its subject will be assigned to the P-OBJ value of the PP[by] of the passive word, and hence to the prepositional object within the PP[by] (see below). Likewise, since the verbal lexeme's object – the first element in the list $\boxed{2}$ – is identified with the subject of the passive word, it follows that the index of the subject of the passive word has the same index as the verbal lexeme's direct object. Therefore, since the semantics remains unchanged by this lexical rule (in virtue of not being mentioned), the semantic role of the active object will be the same as that of the passive subject. The overall result of this rule, then, is to shift the role assignments from subject to PP[by] and from object to subject.

Third, the passive rule does not mention case at all. Verbal lexemes do not specify CASE values for any of their arguments (in English); hence, though the lexeme's object NP becomes its subject, there is no need to 'unassign' an accusative case specification. All non-subject arguments of verbs must be accusative, but the constraint that guarantees this (see Chapter 8, footnote 10) applies to (verbal) WORDS, not to lexemes.

Nor does the passive rule assign nominative case to the first argument of the rule output, as one might expect on the basis of examples like (7).

(7) a. He was arrested by the police.

b. *Him was arrested by the police.

The nominative case of the subject in examples like (7) is determined by the auxiliary verb *was*, whose SPR value will be unified with that of the passive VP, as discussed in the next section. There are in fact instances of passive verbs whose subjects are not nominative, as in (8).

(8) Him/His/*He being arrested by the police upset many people.

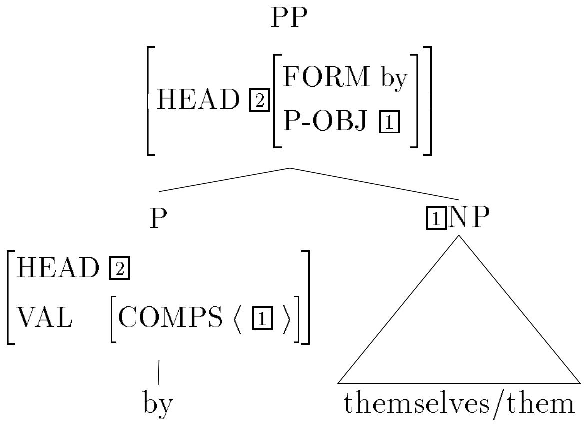
Our passive rule achieves the desired effect here by leaving the subject of the passive word unspecified for CASE. Hence, whatever case requirements are imposed by the particular grammatical context will determine the CASE value of a passive verb's subject.[1]

Fourth, the rule says that passive verbs are [FORM pass]. The justification for having a separate value 'pass' for the FORM of passive verbs has not yet been provided; this will be addressed in the next section.

Returning to the question of what 'PP[by]' in (5) stands for, we propose to use the feature FORM, which has previously been used only for distinguishing different verb forms, as a way to mark the choice of preposition in a PP. Since the set of prepositions in English is a relatively small, closed set, we could (in the limiting case) have a separate value of FORM for each preposition. This will allow us, for example, to state the fact that the verb *rely* requires a PP complement headed by either *on* or *upon*. The FORM value of the lexical preposition will be shared by the entire PP (since FORM is a HEAD feature and hence is governed by the Head Feature Principle), and therefore will allow for *by*-phrases of the sort sketched in (9):

[1] Verbal gerunds like *being* in (8), for example, might lexically specify the case of their subject (which is identified with the subject of the passive participle in (8)).

(9)



Crucially, we assume *by* is an argument-marking preposition that bears an NP category as its P-OBJ value. Thus whatever index is assigned by the passive participle to the P-OBJ value of its PP[by] complement will be identified with the index of the NP object within that PP, along with all the other information identified as $\boxed{1}$ in (9).

The effect of the Passive Lexical Rule, then, will be to map lexical entries like (10) into word entries like (11).

(10)
$$\left\langle \text{love}\ , \begin{bmatrix} \textit{tv-lxm} & \\ \text{SYN} & \begin{bmatrix} \text{HEAD } \textit{verb} & \\ \text{VAL} & \begin{bmatrix} \text{SPR} \ \langle\ [\ \ ]\ \rangle \end{bmatrix} \end{bmatrix} \\ \text{ARG-ST}\ \langle\ \text{NP}_i\ ,\ \text{NP}_j\ \rangle & \\ \text{SEM} & \begin{bmatrix} \text{INDEX s} & \\ \text{RESTR} & \left\langle \begin{bmatrix} \text{RELN} & \text{arrest} \\ \text{SIT} & \text{s} \\ \text{ARRESTOR} & \text{i} \\ \text{ARRESTED} & \text{j} \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix} \right\rangle$$

(11)
$$
\left\langle \text{loved}\ ,\ \begin{bmatrix}
\textit{word} & \\
\text{SYN} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{verb} \\ \text{FORM pass} \end{bmatrix} \\ \text{VAL} & \begin{bmatrix} \text{SPR} \ \langle\ [\ \ ]\ \rangle \end{bmatrix} \end{bmatrix} \\
\text{ARG-ST} & \left\langle \text{NP}_j\ ,\ \left(\begin{matrix} \text{PP[by]} \\ \begin{bmatrix} \text{P-FORM} & \text{NP}_i \end{bmatrix} \end{matrix} \right) \right\rangle \\
\text{SEM} & \begin{bmatrix} \text{INDEX} & \text{s} \\ \text{RESTR} & \left\langle \begin{bmatrix} \text{RELN} & \text{arrest} \\ \text{SIT} & \text{s} \\ \text{ARRESTOR} & \text{i} \\ \text{ARRESTED} & \text{j} \end{bmatrix} \right\rangle \end{bmatrix}
\end{bmatrix} \right\rangle
$$

Note that in both (10) and (11), the element on the SPR list is not identified with any member of the ARG-ST list. The identification of the subject with the first ARG-ST member will be enforced in lexical SDs by the ARP.

10.3 The Verb *Be* in Passive Sentences

What about the forms of *be* that immediately precede the passive participle in all our examples? The first thing to observe is that passive participles also occur in environments lacking any form of *be*. Some examples are given in (12).

(12) a. The cat got bitten (by the dog).

b. Liked by many people but respected by few, Jean will have to run an aggressive re-election campaign.

c. Anyone handed a note will be watched closely.

Hence, though some form of *be* is typical in passive sentences, it would have been a mistake to try to build it into the rule introducing the passive form of verbs. Rather, we need to provide an analysis of the relevant lexical entry for *be* that links its occurrence to the presence of a passive participle.[2]

The most obvious thing we need to say about the passive *be* is that it takes a VP[FORM pass] argument – that is, its ARG-ST list contains a VP[FORM pass]. There are a couple of points worth noting here. First, this is the first time we have considered VP arguments/complements in detail, though our head-complement rule permits them. We will see many more soon. Second, since FORM is a HEAD feature, a verb's FORM value will show up on its mother VP node. This allows us to say that this *be* must have a passive argument.

[2]We'll come back to the issue of whether we can analyze other uses of *be* in terms of this same lexical entry.

The trickiest and most important aspect of our analysis of *be* in passives is how we deal with the subject (i.e. with the value of SPR). In a sentence like (1b), the agreement indicates that *the cat* should be treated as the subject (that is, the SPR) of *was*; note the unacceptability of **The cat were bitten.* But in our discussion of passive participles in the previous section, *the cat* was treated as the subject of *bitten.* This was necessary for semantic reasons (i.e. to ensure that the cat functions semantically as the thing bitten, rather than as the biter), and to capture the correspondence between the valence values of the active and passive forms. It seems we need to treat *the cat* as the subject of BOTH *was* and *bitten.* The facts about the case marking on the subjects of passive verbs, illustrated in (7)-(8), point to the same conclusion: The finite forms of *be* (e.g. *was*) are the only forms that allow a nominative case subject, a fact that instantiates the more general fact that all finite verb forms take nominative case subjects.

In order to accomplish this, we use the familiar device of tagging, specifying that the subject of the passive *be* is identical to the subject of its VP complement. Using this notation, we can now formulate the lexical entry for passive *be* as follows:

(13)
$$\left\langle \text{be}\ , \begin{bmatrix} \textit{be-lxm} & \\ \text{ARG-ST} & \left\langle \boxed{1}\ , \begin{bmatrix} \text{SYN} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{verb} \\ \text{FORM pass} \end{bmatrix} \\ \text{VAL} & \begin{bmatrix} \text{SPR} \langle \boxed{1} \rangle \end{bmatrix} \end{bmatrix} \\ \text{SEM} & \begin{bmatrix} \text{INDEX } \boxed{3} \end{bmatrix} \end{bmatrix} \right\rangle \\ \text{SEM} & \begin{bmatrix} \text{INDEX } \boxed{3} \\ \text{RESTR } \langle\ \rangle \end{bmatrix} \end{bmatrix} \right\rangle$$

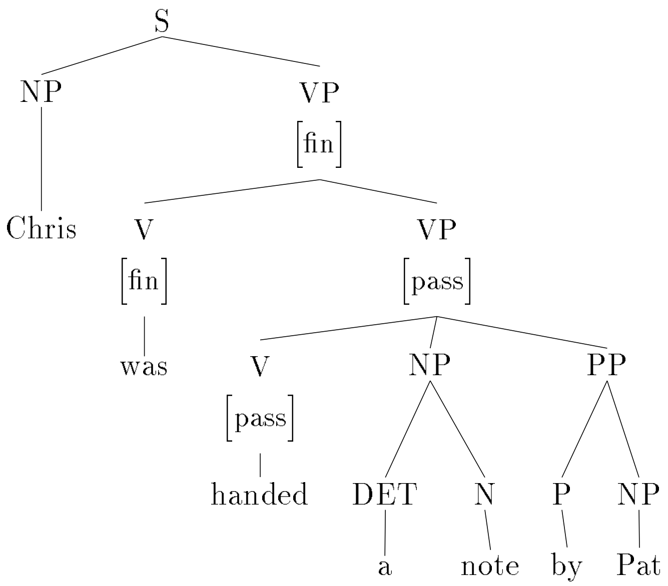
What this entry says is that *be* belongs to a new type *be-lxm* (a subtype of *verb-lxm* whose properties will not concern us yet) and takes a VP argument headed by a passive participle. In addition, the subject of the sentence serves as subject for both this form of *be* and for its passive argument. And because *be* adds nothing to the meaning except the information that the complement's INDEX value is the same as that of *be* (which ensures that that index is also the INDEX value of the VP *be* projects), (13) also guarantees that the semantics of the verb phrase headed by *be* is identical to the semantics of *be*'s VP complement.

We will see in the next two chapters that the idea of having a verb and its argument share a subject is extremely useful in describing a number of phenomena. In chapter 13, we will see in addition how lexical types can be used to simplify lexical entries such as these.

10.4 An Example

We conclude this chapter with a detailed analysis of example (2b). The phrasal SD we need to license is the following:

(14)



And the entry for *was* is:

(15)

$$\left\langle \text{was}\ , \begin{bmatrix} \textit{word} & \\ \text{SYN} & \begin{bmatrix}\text{HEAD} & [\text{FORM fin}] \\ \text{VAL} & [\text{SPR} \langle\, [\ ]\, \rangle]\end{bmatrix} \\ \text{ARG-ST} & \left\langle \boxed{1}[\text{AGR } \textit{3sing}], \begin{bmatrix} \text{SYN} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix}\textit{verb}\\ \text{FORM pass}\end{bmatrix} \\ \text{VAL} & [\text{SPR}\ \langle \boxed{1} \rangle]\end{bmatrix} \\ \text{SEM} & [\text{INDEX } \boxed{3}]\end{bmatrix}\right\rangle \\ \text{SEM} & \begin{bmatrix}\text{INDEX } \boxed{3} \\ \text{RESTR } \langle\ \rangle\end{bmatrix}\end{bmatrix}\right\rangle$$

This is the same as (13), except that it is finite (i.e. [FORM fin]) and requires a third person, singular subject. Note that the subject is identical to the complement's subject (as was the case in (13)) and that the verb's SPR value is still underspecified. However, the lexical entry in (15) gives rise to the lexical SD shown in (16), where the SPR and and ARG-ST lists share a member and the VP[pass] is included in the COMPS specification, both courtesy of the ARP.

(16)

$$
\left[\begin{array}{ll}
\multicolumn{2}{l}{\textit{word}} \\
\text{SYN} & \left[\begin{array}{ll}
\text{HEAD} & \left[\text{FORM fin}\right] \\
\text{VAL} & \left[\begin{array}{ll}
\text{SPR} & \langle \boxed{1} \rangle \\
\text{COMPS} & \langle \boxed{2} \rangle
\end{array}\right]
\end{array}\right] \\
\text{ARG-ST} & \left\langle \boxed{1}\left[\text{AGR } \textit{3sing}\right], \boxed{2}\left[\begin{array}{ll}
\text{SYN} & \left[\begin{array}{ll}
\text{HEAD} & \left[\begin{array}{l}
\textit{verb} \\
\text{FORM pass}
\end{array}\right] \\
\text{VAL} & \left[\text{SPR } \langle \boxed{1} \rangle\right]
\end{array}\right] \\
\text{SEM} & \left[\text{INDEX } \boxed{3}\right]
\end{array}\right] \right\rangle \\
\text{SEM} & \left[\begin{array}{ll}
\text{INDEX} & \boxed{3} \\
\text{RESTR} & \langle \quad \rangle
\end{array}\right]
\end{array}\right]
$$

$$
\text{was}
$$

So now let us consider the SD of the VP[pass], whose head is the passive participle *handed*. The basic lexical entry for *hand* is something like the following:

(17)

$$
\left\langle \text{hand}, \left[\begin{array}{ll}
\multicolumn{2}{l}{\textit{dtv-lxm}} \\
\text{SYN} & \left[\begin{array}{ll}
\text{HEAD} & \textit{verb} \\
\text{VAL} & \left[\text{SPR } \langle [\ ] \rangle\right]
\end{array}\right] \\
\text{ARG-ST} & \langle \boxed{1}\text{NP}_i, \boxed{2}\text{NP}_j, \boxed{3}\text{NP}_k \rangle \\
\text{SEM} & \left[\begin{array}{ll}
\text{INDEX} & \text{s} \\
\text{RESTR} & \left\langle \left[\begin{array}{ll}
\text{RELN} & \text{hand} \\
\text{SIT} & \text{s} \\
\text{HANDER} & \text{i} \\
\text{RECIPIENT} & \text{j} \\
\text{HANDED} & \text{k}
\end{array}\right] \right\rangle
\end{array}\right]
\end{array}\right] \right\rangle
$$

This lexeme undergoes the passive lexical rule, yielding the following lexical entry:

(18)

$$\left\langle \text{handed}\ ,\ \begin{bmatrix} \textit{word} & \\ \text{SYN} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{verb} \\ \text{FORM pass} \end{bmatrix} \\ \text{VAL} & \begin{bmatrix} \text{SPR} \ \langle\ [\ ]\ \rangle \end{bmatrix} \end{bmatrix} \\ \text{ARG-ST} & \left\langle \text{NP}_j\ ,\ \text{NP}_k\ \left(\ ,\ \text{PP} \begin{bmatrix} \text{FORM by} \\ \text{P-OBJ NP}_i \end{bmatrix} \right) \right\rangle \\ \text{SEM} & \begin{bmatrix} \text{INDEX} & \text{s} \\ \text{RESTR} & \left\langle \begin{bmatrix} \text{RELN} & \text{hand} \\ \text{SIT} & \text{s} \\ \text{HANDER} & \text{i} \\ \text{RECIPIENT} & \text{j} \\ \text{HANDED} & \text{k} \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix} \right\rangle$$

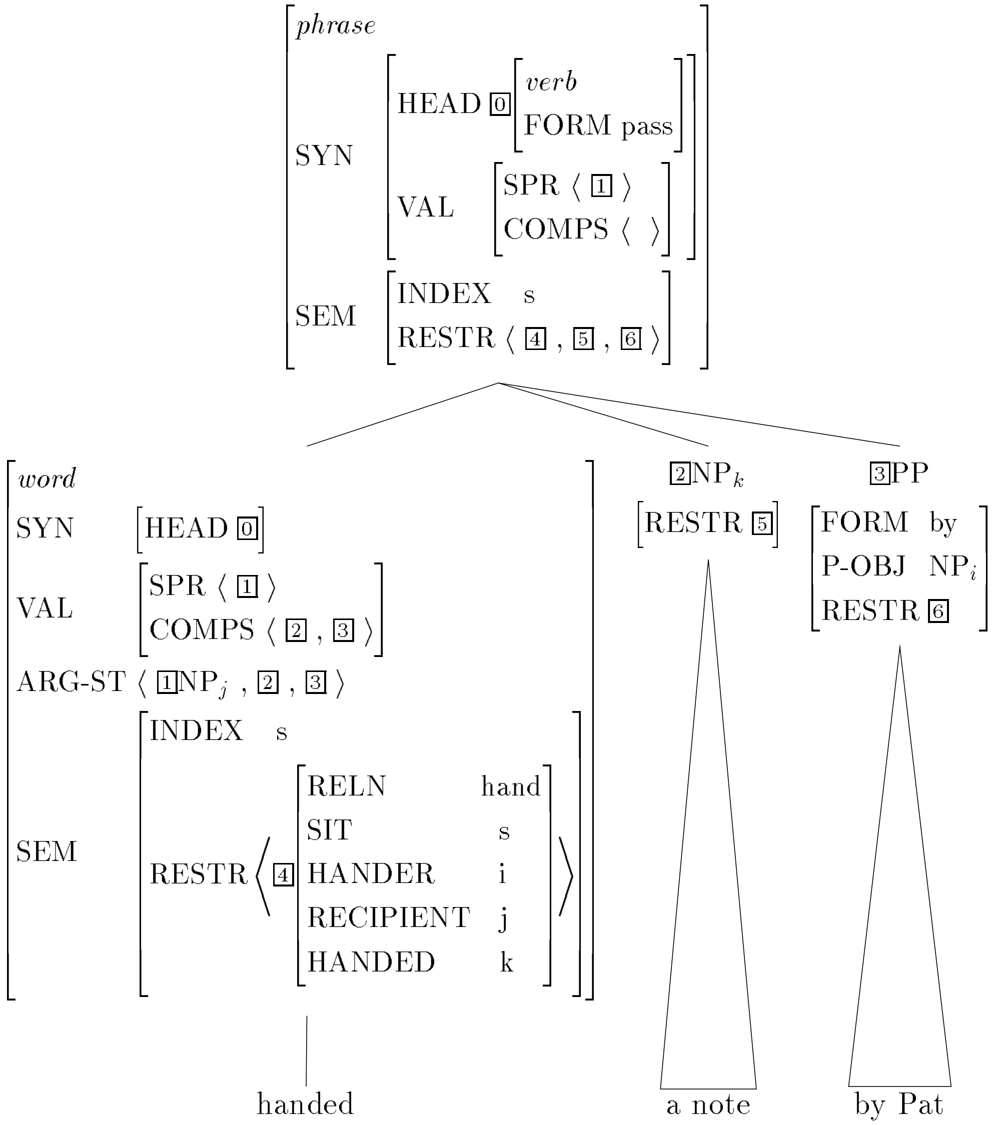
And this forms the basis for lexical SDs like (19):

(19)

$$\begin{array}{c} \begin{bmatrix} \textit{word} & \\ \text{SYN} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{verb} \\ \text{FORM pass} \end{bmatrix} \\ \text{VAL} & \begin{bmatrix} \text{SPR} \ \langle\ \boxed{1}\ \rangle \\ \text{COMPS} \ \langle\ \boxed{2}\ ,\ \boxed{3}\ \rangle \end{bmatrix} \end{bmatrix} \\ \text{ARG-ST} & \left\langle \boxed{1}\text{NP}_j\ ,\ \boxed{2}\text{NP}_k\ ,\ \boxed{3}\text{PP} \begin{bmatrix} \text{FORM by} \\ \text{P-OBJ NP}_i \end{bmatrix} \right\rangle \\ \text{SEM} & \begin{bmatrix} \text{INDEX} & \text{s} \\ \text{RESTR} & \left\langle \begin{bmatrix} \text{RELN} & \text{hand} \\ \text{SIT} & \text{s} \\ \text{HANDER} & \text{i} \\ \text{RECIPIENT} & \text{j} \\ \text{HANDED} & \text{k} \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix} \\ | \\ \text{handed} \end{array}$$

This is consistent with the use of *handed* in (14). (19) fits into the larger SD corresponding to the VP[pass] shown in (20).

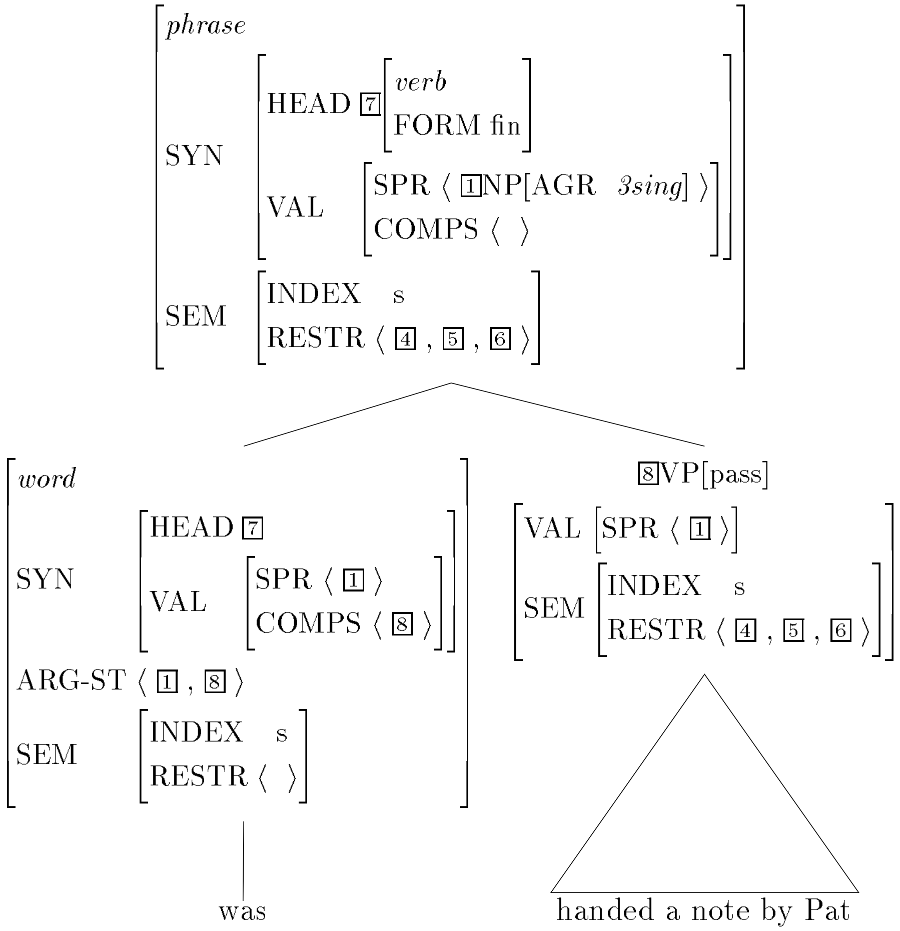
(20)



Note the effect here of the HFP, the Valence Principle (for the SPR value of the head daughter and mother) and the Semantics Principle.

This VP[pass] fits together with the lexical SD in (16) to form the SD for the VP[fin] in (14), which is shown in more detail in (21).

(21)



Again note the effect of the HFP, the Valence Principle, and the Semantics Principle.

And, finally, this VP combines with the subject NP in (14). Since the NP dominating *Chris* is singular, it is consistent with the SPR specification in (21). Hence *Chris* (more precisely the synsem-struc of the mother of the SD dominating *Chris*) is the subject of both *was* and *handed*. This assigns the correct semantic interpretation to the sentence: *Chris* plays the recipient role of the handing relation. The other two roles are straightforwardly determined by the indexing shown in (20).

◇**Problem 1: Passive and Binding Theory** The analysis of passive just sketched makes some predictions about the binding possibilities in passive sentences. Consider the following data:[3]

(i) She_i was introduced to herself_i (by the doctor).
(ii) *She_i was introduced to her_i (by the doctor).
(iii) The barber_i was shaved (only) by himself_i.
(iv) *The barber_i was shaved by him_i.
(v) The students_i were introduced to each other (by Leslie).
(vi) *The students_i were introduced to them_i (by Leslie).
(vii) Unforunately, he_i was introduced to the crowd by himself_i.
(viii) *Unforunately, he_i was introduced to the crowd by him_i.

Assuming that *to* and *by* in these examples are uniformly treated as argument-marking prepositions, are the judgements in (i) – (viii) correctly predicted by the treatment of passive sketched in the text? If so, explain why; if not, discuss the inadequacy of the analysis in precise terms. Be sure to provide detailed justification for your answer.

Problem 2: Pseudopassives Consider the following passive sentences:

(i) Dominique was laughed at by the younger kids.
(ii) This bed was slept in by the ambassador to Dalmatia.
(iii) This problem is talked about in every home.

A Explain why our current passive rule does not allow sentences like (i) – (iii) to be generated.

B Propose an additional lexical rule that will produce appropriate lexical entries for the passive participles in these sentences. [Hints: This is difficult, but feasible if you make a few assumptions. First, don't try to generate the passive lexical entries for (i)-(iii) directly with one rule. Instead, formulate a rule whose outputs will then undergo the Passive Lexical Rule to provide the lexical entries you will need to account for these examples. Second, since the outputs of your lexical rule will always have to undergo the Passive Lexical Rule, you will want to specify this

[3]It may require a little imagination to construct contexts where such examples have a plausible meaning, e.g. a doctor dealing with an amnesia victim. Being able to construct such contexts is an essential part of being able to understand what conclusions to draw from the fact that some sentence you are interested in doesn't sound completely acceptable.

We know of cases where grammatical deviance has not been separated with sufficient care from semantic implausibility. For example, sentences like ?*I smell funny to myself* have on occasion been cited as ungrammatical. However, a bit of reflection will reveal, we think, that what is strange about such examples is the message they convey, not their grammar. If one wanted to convey that one's own olfactory self-impression was strange (in whatever strange context such a need might arise), then *I smell funny to myself* is probably the most straightforward way the grammar of English allows such a meaning to be expressed.

fact on the output of your rule (using the FORM feature). Third, assume that the prepositions involved in examples of this sort are all marking prepositions – that is, they have P-OBJ values. Your rule will need to use these P-OBJ values (and the FORM values of the prepositions) in producing the entries that then get passivized, to license examples like (i)-(iii).]

C Illustrate the functioning of your rule by sketching the input and appropriate output for one of the passive participles in (i) – (iii).

D Assuming the lexical entry in (iv), does the rule you formulated in Task B predict that both (iii) and (v) are grammatical?

(iv)
$$\left\langle \text{talk}\ ,\ \begin{bmatrix} \textit{verb-lxm} & \\ \text{SYN} & \begin{bmatrix}\text{HEAD } \textit{verb}\end{bmatrix} \\ \text{ARG-ST} & \langle \text{ NP (, PP[to]) (, PP[about]) } \rangle \end{bmatrix} \right\rangle$$

(v) This person was talked to by every teacher.

Explain your answer.

10.5 Further Reading

The English passive has been analyzed and reanalyzed throughout the history of generative grammar. Among the most influential works on the subject are: Chomsky (1957), Chomsky (1965), Chomsky (1970), Perlmutter and Postal (1977), Wasow (1977), Bresnan (1982b), Burzio (1986) and Postal (1986).

Chapter 11

Nominal Types: Dummies and Idioms

11.1 Introduction

In the last chapter, we presented a lexical entry for the verb *be* that occurs in passive sentences. We begin this chapter with a consideration of how to generalize the formulation of this lexical entry to cover other uses of *be* as well. This will lead us into the use of forms of *be* in combination with the subject *there* as a way of presenting an entity or asserting its existence, as in (1).

(1) a. There are storm clouds gathering.

b. There is a monster in Loch Ness.

This, in turn, will take us into an examination of other NPs that seem to have very restricted distributions, and whose semantic contributions cannot readily be isolated from the meanings of the larger constructions in which they occur. Examples are the use of *it* in sentences like (2a) and *advantage* in (2b).

(2) a. It is obvious that Pat is lying.

b. Pat took advantage of the opportunity.

11.2 *Be* Revisited

The lexical entry for *be* presented in the last chapter demanded a VP[FORM pass] complement, but forms of *be* also occur with a variety of other types of complements:

(3) a. Pat is on the roof.

b. Pat is the captain of the team.

c. Pat is fond of Chris.

d. Pat is singing the blues.

Such examples show that the possible complements of *be* include, besides VP[FORM pass], at least PP, NP, AP, and VP[FORM prp]. At first glance, one might think that this could be handled simply by removing the FORM feature (and hence, implicitly, the part of speech information) from the second element of the ARG-ST list in the lexical entry for passive *be* – that is, allowing any type of phrase (of the appropriate valence) as a complement. However, the distribution of *be* is not quite this free.

(4) a. *Pat is likes Chris.

b. *Pat is hate Chris.

c. *Pat is mere.

These examples show that only SOME verb forms may head a VP complement of *be* and that not all adjectives may head AP complements of *be*. The traditional name for the kind of phrase that can appear after *be* is 'predicative', so we will introduce a binary feature PRED to encode this distinction. So *fond* is [PRED +], while *mere* is [PRED –], though both have HEAD values of type *adjective*. Likewise, passive and present participles are [PRED +] and all other verb forms are [PRED –]. The type *verb-lxm* can thus be associated with the constraint: [PRED –].

◊**Problem 1: Predicative Verb Forms** How could our grammar be modified to accommodate (in as general a way as possible) the fact that passive and present participles are [PRED +] but all other verbs are [PRED –]? Be as precise as you can. (Hint: Lexical rules preserve all information that isn't explicitly contradicted.)

Using the feature PRED, we can reformulate the lexical entry for *be* to handle not only passive VP complements, but also complements like those in (3). The new version of the entry for *be*[1] is the following:[2]

[1] We will incorporate this entry (in slightly revised form) into our lexical type hierarchy in chapter 13, sec. 2.1.

[2] The formulation in (5) requires that predicative nominals (that is, NP[PRED +]) have a nonempty SPR – more specifically, that they are [SPR ⟨ NP ⟩] to handle examples like (i).

(i) Pat is a scholar.

Since NPs normally have empty SPR values, our account is incomplete. We will not attempt to provide a solution to this problem here. Notice, however, that this syntactic distinction between predicative and nonpredicative NPs reflects a semantic difference between two uses of certain NPs: one involving properties; the other individuals. Thus, the NP *a scholar* in (i) is used to predicate a property of Pat (scholarliness) and hence its semantic mode is actually prop, whereas the same string of words in (ii) is used simply to make reference to an individual, i.e. its semantic mode is ref.

(ii) A scholar arrived.

(5)
$$\left\langle \text{be}\ , \begin{bmatrix} \textit{be-lxm} \\ \text{ARG-ST} \left\langle \boxed{1}\ , \begin{bmatrix} \text{SYN} \begin{bmatrix} \text{HEAD} \ [\text{PRED} \ +] \\ \text{VAL} \ \begin{bmatrix}\text{SPR} \ \langle \boxed{1} \rangle\end{bmatrix} \end{bmatrix} \\ \text{SEM} \begin{bmatrix}\text{INDEX} \ \boxed{2}\end{bmatrix} \end{bmatrix} \right\rangle \\ \text{SEM} \ \begin{bmatrix} \text{INDEX} \ \boxed{2} \\ \text{RESTR} \ \langle\ \rangle \end{bmatrix} \end{bmatrix} \right\rangle$$

As before, the semantic index of the verb *be* ($\boxed{2}$) is just the index of its predicative complement – the verb contributes nothing to the semantics of the sentences; it is just a syntactic placeholder. Indeed, in many languages (including some dialects of English) the meanings like those expressed by the sentences in (3) would normally be expressed without any verb at all, as in the following examples:

(6) a. Ona xorošij vrač
she good doctor
'She is a good doctor.'
(Russian)

b. A magyar zászló piros-fehér-zőld.
the Hungarian flag red-white-green
'The Hungarian flag is red, white, and green.'
(Hungarian)

11.3 The Existential *There*

Now consider another sort of sentence that involves *be*:

(7) a. There is a unicorn in the garden.

b. There were many people fond of Pat.

c. There are people looking through the window.

d. There was a felon elected to the city council.

These involve a non-referential subject, *there* (often called the 'dummy' *there*), an NP following *be* and a [PRED +] phrase following that. We can see that there are in fact two complements and not just one complex one (that is, an NP with some kind of modifying phrase attached to it) on the basis of sentences like (8).

(8) a. There is a seat available.

b. *A seat available was in the last row.

c. *Pat took a seat available.

d. *I looked for a seat available.

If *a seat available* in (8a) were a single NP, we would expect it to be able to appear in other typical NP positions, such as those in (8b-d). We conclude that *a seat* and *available* are two separate arguments of *be*. But if this use of *be* takes a subject and two more arguments, then we can conclude that it cannot be subsumed under (5), whose ARG-ST list contains only two elements. Hence, we will need a separate lexical entry for this lexeme, which we will call the 'existential *be*'.

Stating the restrictions on the existential *be*'s complements is not difficult.[3] But restricting the subject to the word *there* is not entirely trivial. This is the first case we have seen in which a verb requires that a particular word be its subject. We have, however, previously encountered an instance in which a verb specified that a specific word head one of its complements. This was in the passive construction: passive forms of verbs can always take an optional PP headed by *by* to express the argument of the passive that corresponds semantically to the subject of the active. Similar selections are involved with other verb-preposition pairs, such as *rely* and *on*. Indeed, the argument-marking prepositions discussed in chapter 7 are often selected by verbs, sometimes quite idiosyncratically.

To deal with the argument-marking prepositions, we extended the feature FORM (previously used only for distinguishing verbal inflections) to prepositions, and introduced new FORM values like 'by', 'to', etc. This same device can now be used with nouns and noun phrases. We can put the feature specification [FORM there] in the lexical entry for the existential *there*, and stipulate that the subject of the existential *be* must be [FORM there].[4]

[3]This is an oversimplification (as is almost any claim that some aspect of grammar is easy). Examples like (i) and (ii) are markedly worse than sentences like (7):

(i) ?*There is each unicorn in the garden.

(ii) ?There was the felon elected to the city council.

It is often claimed that the postverbal NP in existential sentences must be indefinite, but this is too strong: examples like (ii) are acceptable if interpreted as part of a listing of exemplars of something, and sentences like *There is the cutest puppy outside* are commonplace (in certain styles, at least). We will not pursue the problem of characterizing the so-called 'definiteness restriction' on the NPs in existential sentences, on the assumption that the restriction is actually a semantic one.

[4]By extending FORM to nouns in this way, we are allowing a potentially unlimited number of possible values for this feature. In actual practice, we believe that the number of words entering into such morphologically-sensitive cooccurrence relations in any language is quite manageable.

(9)

$$\left\langle \text{be}\ , \begin{bmatrix} \textit{be-lxm} & \\ \text{ARG-ST} & \left\langle \text{NP}\begin{bmatrix}\text{FORM there}\end{bmatrix},\ \boxed{2}\text{NP}\ ,\ \begin{bmatrix} \text{PRED} & + \\ \text{SPR} & \langle \boxed{2} \rangle \\ \text{COMPS} & \langle\ \rangle \\ \text{SEM} & \begin{bmatrix}\text{INDEX}\ \boxed{4}\end{bmatrix} \end{bmatrix} \right\rangle \\ \text{SEM} & \begin{bmatrix} \text{INDEX} & \boxed{4} \\ \text{RESTR} & \langle\ \rangle \end{bmatrix} \end{bmatrix} \right\rangle$$

Notice that existential *be* contributes nothing to the meaning of the sentence, except the identification of its index with that of its predicative complement. This is the index that will be inherited by phrases projected from (words formed from) existential *be*. Moreover, since the NP argument is identified with the SPR of the predicative argument, the semantics of these two will be combined within the VP in the same way as they would be in a simple subject-predicate sentence, i.e. by merging the RESTR lists of the daughters. Thus, the sentences in (7) are analyzed as paraphrases of those in (10).

(10) a. A unicorn is in the garden.

b. Many people were fond of Pat.

c. People are looking through the window.

d. A felon was elected to the city council.

We turn now to the lexical entry for the existential *there*. Its key feature is that it is the only word that is [FORM there]. Hence, the SPR value of (9) uniquely picks out this word as the subject. Non-dummy NPs (proper nouns, pronouns and phrases headed by common nouns alike) will now be specified as [FORM none], presumably in virtue of a default constraint associated with the type *noun-lxm*. The existential *there* is also exceptional in that, although it is a pronoun, it has no referential function, and under our analysis, as noted in the preceding paragraph, it does not contribute to the meaning of the sentences in which it occurs.

The lexical entry for existential *there*, then, is the following:

(11)

$$\left\langle \text{there}\ , \begin{bmatrix} \textit{pron-lxm} & \\ \text{SYN} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \text{AGR} & \begin{bmatrix}\text{PER 3rd}\end{bmatrix} \\ \text{FORM} & \text{there} \end{bmatrix} \end{bmatrix} \\ \text{SEM} & \begin{bmatrix} \text{MODE} & \text{none} \\ \text{INDEX} & \text{none} \\ \text{RESTR} & \langle\ \rangle \end{bmatrix} \end{bmatrix} \right\rangle$$

The requirement that the HEAD value in (11) be of the type *noun* is inherited from the type *noun-lxm* (a supertype of *pron-lxm*); and the requirement that the argument structure be empty is inherited (by default) from this type as well. Note that the AGR specification in (11) is underspecified for number; this is because *there* can be plural, as in (7b,c). Note also that the empty list specification for the feature RESTR guarantees that *there* will not contribute to the RESTR list of phrases that contain it. And finally, the 'none' specifications that we have introduced for the features MODE and INDEX reflect the fact that *there* has no referential potential and no referential index.

This last fact is particularly significant, as it allows us to explain the restricted distribution of existential *there*. All of the verbs we have considered thus far (except for *be*) have lexical entries where it is stated that the indices of the NP (if there are any) are assigned semantic roles (e.g. LOVER, GIVEN). But because existential *there* has no index, it follows that any attempt to combine *there* with a role assigning verb will produce a conflicting SD. Thus from the semantic vacuity of existential *there*, it follows immediately that examples like the following are all ungrammatical:

(12) a. *There loved Sandy.

b. *Merle gave there a book.

c. *We talked to them about there.

Problem 2: *There* and Agreement The analysis of existential *there* sentences presented so far says nothing about verb agreement.

A. Consult your intuitions (and/or those of your friends, if you wish) to determine what the facts are regarding number agreement on the verb in *there* sentences. Give an informal statement of a generalization covering these facts, and illustrate it with both grammatical and ungrammatical examples. [Note: Variation exists with regard to this question, both among individual judgements and across dialects. Hence, there can be more than one right answer to this question.]

B. How would you elaborate or modify our analysis of the *there* construction so as to capture the generalization you have discovered? Be as precise as you can.

11.4 Extraposition

Consider pairs of sentences like the following:

(13) a. That Cleveland lost the series sucks.

b. It sucks that Cleveland lost the series.

(14) a. That dogs bark annoys people.

b. It annoys people that dogs bark.

(15) a. That Chris knew the answer (never) occurred to Pat.

b. It (never) occurred to Pat that Chris knew the answer.

(16) a. That the Cardinal won the game gave Sandy a thrill.

b. It gave Sandy a thrill that the Cardinal won the game.

This seems to be a rather systematic alternation that we would like to account for. Moreover, it is productive: an English speaker unfamiliar with the verb *cark* who heard (17a) would know that (17b) is also well-formed.

(17) a. That many languages are dying out carks linguists.

b. It carks linguists that many languages are dying out.

Thus the alternation illustrated in (13)–(16) has some claim to psychological reality.

The b-sentences in (13)–(17) all have a non-referential pronoun *it* as their subject and a *that*-clause at the end. In our treatment of another 'dummy' (i.e. non-referential) NP earlier in the chapter, we gave it an empty RESTR list, and the value 'none' for INDEX. It seems natural to do the same with this use of *it*. As was the case with existential *there*, the dummy *it* is very restricted in its distribution. In examples like (18)–(19), which do not fit the pattern of (13)–(17), the uses of *it* are referential.

(18) a. *That Pat is innocent proves.

b. It proves that Pat is innocent.

(19) a. *That Sandy had lied suggested.

b. It suggested that Sandy had lied.

Following the treatment of existential *there*, then, we are led to posit lexical entries for the verbs in the b-sentences of (13)–(17) which specify that their subjects must be the non-referential *it*. We can do this as we did with *there* by positing a FORM value 'it', which uniquely identifies the dummy *it*.

Thus, the lexical entry for the dummy *it* is the following:

(20)
$$\left\langle \text{it}, \begin{bmatrix} \textit{pron-lxm} & \\ \text{SYN} & \begin{bmatrix}\text{HEAD} & \begin{bmatrix}\text{FORM} & \text{it}\\ \text{AGR} & \textit{3sing}\end{bmatrix}\end{bmatrix} \\ \text{SEM} & \begin{bmatrix}\text{MODE} & \text{none}\\ \text{INDEX} & \text{none}\\ \text{RESTR} & \langle\ \rangle\end{bmatrix}\end{bmatrix}\right\rangle$$

Note that dummy *it*, unlike *there*, inherits from the type *pn-lxm* the constraint that its AGR value is *3sing*.

Like the dummy existential *there*, and for exactly the same reasons, dummy *it* can never appear in a role-assigned position:

(21) a. *It loved Sandy.

b. *I gave it to Pat.

Such examples are fully grammatical, of course, if we interpret *it* as the personal pronoun *it* (i.e. as a pronoun referring to something in the context), rather than as the dummy *it*.

In order to capture the regularity of the alternation illustrated in (14)–(18), we will want to posit a lexical rule, whose output is the version of the verbs taking the dummy subject *it*. But before we can do this, we need to consider how to analyze the *that*-clauses that occur in the examples in question.

The part after *that* is just a finite S (i.e. a phrase headed by a finite verb, with all its COMPS and its SPR filled – we'll call such a phrase 'saturated'). It is less obvious how to deal with *that*, which might be thought of as simply 'marking' the sentence that follows it. We propose to treat *that* as a head, taking a finite S as its only argument (note that in this resepct, *that* is similar to the argument-marking prepositions (e.g. *to*, *of*) first discussed in chapter 7. In order to handle words like *that*, however, we will have to introduce a new part of speech type: *comp* (for 'complementizer'). *That*-clauses, then, are complementizer phrases (CP, for short).

Notice that some verbs (largely verbs of thinking or communicating, such as *guess, know, promise, remember, say,* and *think*) may take *that*-clauses as complements. Most of these also can take clausal complements without *that*. A clever way of handling this is to say that *that* is [FORM fin], just like finite verbs. Now the lexical entries for verbs like *guess*, etc. can have an ARG-ST specification like the following:

(22)
$$\left[\text{ARG-ST}\left\langle \text{NP}\ ,\begin{bmatrix}\text{FORM} & \text{fin}\\ \text{SPR} & \langle\ \rangle\\ \text{COMPS} & \langle\ \rangle\end{bmatrix}\right\rangle\right]$$

This specification then allows the second argument to be either a *that*-clauses or a finite clause without *that*. Our feature system thus attributes a common property to this class of categories, predicting that they are a 'natural class'.

Returning to examples with *that*-clause subjects, notice that the complementizer is obligatory:

(23) *Dogs bark annoys people.

This can be handled by saying that verbs like *annoy* take finite complementizer phrases as subjects – that is, (24) is the ARG-ST specification found in their lexical entries:

(24) $\left[\text{ARG-ST}\left\langle\begin{bmatrix}\text{HEAD} & \textit{comp}\\ \text{FORM} & \text{fin}\\ \text{SPR} & \langle\ \rangle\\ \text{COMPS} & \langle\ \rangle\end{bmatrix}, \ldots\right\rangle\right]$

We can now turn to the problem of formulating our lexical rule, which we will call 'extraposition'.[5] Given our analysis of *that*-clauses, the only tricky thing about formulating the rule is making certain that the *that*-clause plays the same semantic role in both sentences.

So far, our SEM values have been specifications (in referential or propositional mode) where the RESTR list has contained simple predications, i.e. predications where the semantic role features (LOVER, INSTANCE, etc.) take indices as their argument. These indices in general correspond to individuals that are referred to by NPs within the sentence. One important exception to this had to do with modification. In chapter 6, we allowed situational indices to be the value of the feature ARG(UMENT) that appeared in certain predications introduced by adverbial modifiers, e.g. as in (25).

(25) $\begin{bmatrix}\text{MODE} & \text{prop}\\ \text{INDEX} & s_1\\ \text{RESTR} & \left\langle\begin{bmatrix}\text{RELN} & \text{today}\\ \text{SIT} & s_1\\ \text{ARG} & s_2\end{bmatrix}\right\rangle\end{bmatrix}$

This in fact is the general technique we will use for propositional embedding – for making one proposition the argument of another. That is, we will never embed one feature structure within another inside the value of SEM, as in (26):

(26) $\begin{bmatrix}\text{MODE} & \text{prop}\\ \text{INDEX} & s_1\\ \text{RESTR} & \left\langle\begin{bmatrix}\text{RELN} & \text{today}\\ \text{SIT} & s_1\\ \text{ARG} & \begin{bmatrix}\text{RELN} & \ldots\\ \text{SIT} & s_2\\ \ldots & \end{bmatrix}\end{bmatrix}\right\rangle\end{bmatrix}$

Instead, we will use identity of situational indices to get the same semantic effect. We will use various (hopefully intuitive) feature names to designate the roles whose value is an 'embedded' proposition. In this way, we can express meanings that involve arbitrarily deep semantic embeddings, but we can keep the RESTR lists inside our semantic structures 'flat'.

On this view of things, we will be able to deal with the semantics of subordinate clauses in terms of index identity, using the kind of semantic analysis we have already developed.

[5]In this we follow terminology introduced by the great Danish grammarian Otto Jespersen (1860–1943).

For example, we can make the reasonable assumption that the semantics of *Fido barks* in *That Fido barks annoys me* is the same as that of the stand-alone sentence *Fido barks*, i.e. (27).

(27)
$$\begin{bmatrix} \text{MODE} & \text{prop} \\ \text{INDEX} & s_1 \\ \text{RESTR} & \left\langle \begin{bmatrix} \text{RELN} & \text{bark} \\ \text{SIT} & s_1 \\ \text{BARKER} & i \end{bmatrix}, \begin{bmatrix} \text{RELN} & \text{name} \\ \text{SIT} & s_2 \\ \text{NAME} & \text{Fido} \\ \text{NAMED} & i \end{bmatrix} \right\rangle \end{bmatrix}$$

How do we construct such a semantics?

The complementizer *that* belongs to a new type of lexeme that we may associate with the constraints in (28):[6]

(28)
$$\textit{comp-lxm}: \begin{bmatrix} \text{SYN} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{comp} \\ \text{FORM } \boxed{2} \end{bmatrix} \end{bmatrix} \\ \text{ARG-ST} & \left\langle \ldots, \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{verb} \\ \text{FORM } \boxed{2} \end{bmatrix} \\ \text{SEM} & \begin{bmatrix} \text{INDEX } \boxed{1} \end{bmatrix} \end{bmatrix} \right\rangle \\ \text{SEM} & \begin{bmatrix} \text{INDEX } \boxed{1} \\ \text{RESTR } \langle\ \rangle \end{bmatrix} \end{bmatrix}$$

(28) says that all instances of this type of lexeme share the semantic index of their last argument.[7] In addition, it is required that the complementizer and its last argument share values for the feature FORM.

With these type constraints in place, the lexical entry for *that* need say nothing more than what is shown in (29).

(29)
$$\left\langle \text{that}, \begin{bmatrix} \textit{comp-lxm} & \\ \text{SYN} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \text{FORM fin} \end{bmatrix} \\ \text{VAL} & \begin{bmatrix} \text{SPR } \langle\ \rangle \end{bmatrix} \end{bmatrix} \\ \text{ARG-ST} & \langle\, [\text{SPR } \langle\ \rangle]\, \rangle \end{bmatrix} \right\rangle$$

[6] The type *comp-lxm* is a subtype of *const-lxm* (though complementizers in some varieties of certain Germanic languages show what appear to be inflected forms of complementizers!).

[7] Other complementizers, e.g. the complementizer *to* discussed in the next chapter, allow more than one argument.

The constraints inherited through type inheritance thus interact with those that are lexically specified to ensure that the complementizer *that* has the INDEX and FORM value of its only argument, which in turn must be a saturated finite clause. Type inheritance thus gives us the fully specified lexical entry in (30):

(30)

$$\left\langle \text{that}\ , \begin{bmatrix} \textit{comp-lxm} & \\ \text{SYN} & \begin{bmatrix}\text{HEAD} & \begin{bmatrix}\textit{comp}\\ \text{FORM } \boxed{2}\end{bmatrix} \\ \text{VAL} & \begin{bmatrix}\text{SPR } \langle\ \rangle\end{bmatrix}\end{bmatrix} \\ \text{ARG-ST} & \left\langle \ldots, \begin{bmatrix} \text{HEAD} & \begin{bmatrix}\textit{verb}\\ \text{FORM } \boxed{2}\text{fin}\end{bmatrix}\\ \text{SPR} & \langle\ \rangle \\ \text{SEM} & \begin{bmatrix}\text{INDEX } \boxed{1}\end{bmatrix}\end{bmatrix}\right\rangle \\ \text{SEM} & \begin{bmatrix}\text{MODE} & \text{prop}\\ \text{INDEX} & \boxed{1} \\ \text{RESTR} & \langle\ \rangle\end{bmatrix}\end{bmatrix}\right\rangle$$

As a result of this lexical entry and its interaction with the Semantics Principle (chapter 6), it follows that the semantics of *that*-clauses is identical to the semantics of the clause that *that* takes as its complement. And the meaning of a clause like *That Fido barks annoys me* will then be represented as follows (where the index *j* will be further constrained to refer to the speaker):

(31)
$$\begin{bmatrix}\text{MODE} & \text{prop}\\ \text{INDEX} & s_0 \\ \text{RESTR} & \left\langle \begin{bmatrix}\text{RELN} & \text{bark}\\ \text{SIT} & s_1 \\ \text{BARKER} & i\end{bmatrix}, \begin{bmatrix}\text{RELN} & \text{name}\\ \text{SIT} & s_2\\ \text{NAME} & \text{Fido}\\ \text{NAMED} & i\end{bmatrix}, \begin{bmatrix}\text{RELN} & \text{annoy}\\ \text{SIT} & s_0\\ \text{ANNOYED} & j\\ \text{ANNOYANCE} & s_1\end{bmatrix}\right\rangle\end{bmatrix}$$

This will result from combining the CP subject *that Fido barks* with the VP *annoys me.* As before, we are simply following the Semantics Principle. Hence, we identify the INDEX of the S with that of its VP head, and we form the S's RESTR list by concatenating the RESTR lists of the subject and the VP.

Now we are in a position to state our Extraposition rule, which is a key ingredient of our analysis of sentences like *It annoys me that Fido barks:*

(32) Extraposition Lexical Rule:

$$\left\langle \boxed{1}\ , \begin{bmatrix} \textit{lxm} \\ \text{ARG-ST}\ \boxed{2}\left\langle \begin{bmatrix}\text{HEAD}\ \textit{comp}\end{bmatrix} \right\rangle \oplus \boxed{3} \end{bmatrix} \right\rangle \Rightarrow \left\langle \boxed{1}\ , \begin{bmatrix} \text{ARG-ST}\ \langle\ \text{NP}\begin{bmatrix}\text{FORM it}\end{bmatrix} \rangle \oplus \boxed{3} \oplus \boxed{2} \end{bmatrix} \right\rangle$$

This rule creates new lexemes from any lexeme (not just *verb-lxm*s, as we will see) whose first argument is a CP. The output lexeme always takes a dummy *it* as its subject and takes as a final argument whatever kind of CP was specified as the input's first argument. Notice that on this analysis we do not need any new phrase structure rules to handle extraposition. Words formed from the lexeme outputs of this rule all fit the general patterns already provided by our existing grammar rules. All we have needed to handle this new phenomenon was a new value for the feature FORM. It was then quite straightforward to formulate a lexical rule that could capture the regularity illustrated by the sentence pairs at the beginning of this section.

◊**Problem 3: An Annoying Problem** Assume that the lexical entry for the verb *annoy* is the following: (Note that the first argument of this lexeme overrides the default condition (associated with the type *verb-lxm*) requiring the first argument to be an NP.)

(i)

$$\left\langle \text{annoy}\ ,\ \left[\begin{array}{ll} \multicolumn{2}{l}{\textit{stv-lxm}} \\ \text{ARG-ST} & \left\langle \begin{bmatrix} \text{HEAD} & \textit{comp} \\ \text{SEM} & \begin{bmatrix}\text{INDEX } \boxed{1}\end{bmatrix} \end{bmatrix}, [\ ]_i \right\rangle \\ \text{SEM} & \left[\begin{array}{ll} \text{INDEX} & \text{s} \\ \text{RESTR} & \left\langle \begin{bmatrix} \text{RELN} & \text{annoy} \\ \text{SIT} & \text{s} \\ \text{ANNOYED} & \text{i} \\ \text{ANNOYANCE} & \boxed{1} \end{bmatrix} \right\rangle \end{array}\right] \end{array}\right] \right\rangle$$

A. Show the lexical entry that results from applying the Extraposition Lexical Rule to (i).

B. Using the lexical entry given in the text for the complementizer *that*, describe the analysis of the clause *that Fido barks*. Make sure you explain exactly how this clause is assigned the semantics shown in (29).

C. Using the lexical entry you gave in Part A and the analysis of *that Fido barks* you came up with in Part B, sketch the analysis of *That Fido barks annoys Lee*. Be sure that the semantics that results from your analysis is like (31), except for the difference between *me* and *Lee*.

D. How would you modify the lexical entry in (i) so that it would also allow sentence like *Sandy annoys me*. Discuss any interactions between that modification and the theory of extraposition you sketched in Parts A–C.

11.5 Idioms

We have now encountered two non-referential NPs with highly restricted distributions, namely the dummies *there* and *it*. Other NPs that share the properties of non-referentiality and restricted distribution can be found in idioms – that is, in fixed (or partially fixed) combinations of words that are used to express meanings that aren't determined in the usual way from those words. For example:

(33) a. Carrie kicked the bucket last night. ('Carrie died last night')

b. The FBI kept (close) tabs on Sandy. ('The FBI (carefully) observed Sandy')

c. The candidates take (unfair) advantage of the voters. ('The candidates exploit the voters (unfairly)')

The idioms *kick the bucket*, *keep tabs on*, and *take advantage* have idiosyncratic meanings, which require that all of the parts cooccur. That is, the words in these idioms take on their idiomatic meanings only when they appear together with the other parts of the idioms. For example, the following sentences do not have interpretations related to those in (33) (If they are acceptable at all):

(34) a. Chris dreads the bucket.

b. The police put tabs on undocumented workers.

c. The candidates bring advantage to the voters.

Since the lexical entries for verbs contain information about the arguments they cooccur with (but not vice versa), one way to capture the idiosyncratic properties of idioms is to encode them in the entries of the verbs. That is, we can treat idiomatic nouns, such as *tabs* and *advantage* by:

- giving them their own FORM values;
- marking them as [MODE none] and [INDEX none]; and
- specifying that they are [RESTR ⟨ ⟩]

This amounts to treating idiom parts (or 'idiom chunks', as they are often called) almost exactly like the dummies just considered.

We can now have entries for *keep* and *take* specifying that their objects must be [FORM tabs] and [FORM advantage], respectively. These verbal entries will contain all of the idioms' semantic information.[8] The detailed entries for idiomatic nouns *tabs* and *advantage* and the verbs that go with them are given in (35) and (36).[9]

(35) a.

$$\left\langle \text{tabs}\ , \begin{bmatrix} \textit{cn-lxm} & \\ \text{SYN} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \text{FORM tabs} & \\ \text{AGR} & \begin{bmatrix} \text{PER} & \text{3rd} \\ \text{NUM} & \text{pl} \end{bmatrix} \end{bmatrix} \\ \text{VAL} & \begin{bmatrix} \text{SPR} \ \langle\ \rangle \end{bmatrix} \end{bmatrix} \\ \text{ARG-ST} \ \langle\ \rangle & \\ \text{SEM} & \begin{bmatrix} \text{MODE} & \text{none} \\ \text{INDEX} & \text{none} \\ \text{RESTR} & \langle\ \rangle \end{bmatrix} \end{bmatrix} \right\rangle$$

[8]This treatment (like a number of others in this book) is a simplification. For a more thorough discussion of the authors' views on the semantics of idioms, see Nunberg, Sag, and Wasow (1994).

[9]Note that the entries for *tabs* and *advantage* override default specifications for both ARG-ST and SPR.

b.
$$\left\langle \text{advantage}\ ,\ \begin{bmatrix} \textit{cn-lxm} & \\ \text{SYN} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \text{FORM} & \text{advantage} \\ \text{AGR} & \textit{3sing} \end{bmatrix} \\ \text{VAL} & \begin{bmatrix} \text{SPR}\ \langle\ \rangle \end{bmatrix} \end{bmatrix} \\ \text{ARG-ST}\ \langle\ \rangle & \\ \text{SEM} & \begin{bmatrix} \text{MODE} & \text{none} \\ \text{INDEX} & \text{none} \\ \text{RESTR} & \langle\ \rangle \end{bmatrix} \end{bmatrix} \right\rangle$$

(36) a.
$$\left\langle \text{keep}\ ,\ \begin{bmatrix} \text{ARG-ST} & \left\langle \text{NP}_i\ ,\ \begin{array}{c}\text{NP}\\ \begin{bmatrix}\text{FORM tabs}\end{bmatrix}\end{array},\ \begin{array}{c}\text{PP}\\ \begin{bmatrix}\text{FORM} & \text{on} \\ \text{P-OBJ} & \text{NP}_j\end{bmatrix}\end{array} \right\rangle \\ \text{SEM} & \begin{bmatrix} \text{INDEX} & \text{s} \\ \text{RESTR} & \left\langle \begin{bmatrix} \text{RELN} & \text{observe} \\ \text{SIT} & \text{s} \\ \text{OBSERVER} & \text{i} \\ \text{OBSERVED} & \text{j} \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix} \right\rangle$$

b.
$$\left\langle \text{take}\ ,\ \begin{bmatrix} \text{ARG-ST} & \left\langle \text{NP}_i\ ,\ \begin{array}{c}\text{NP}\\ \begin{bmatrix}\text{FORM advantage}\end{bmatrix}\end{array},\ \begin{array}{c}\text{PP}\\ \begin{bmatrix}\text{FORM} & \text{of} \\ \text{P-OBJ} & \text{NP}_j\end{bmatrix}\end{array} \right\rangle \\ \text{SEM} & \begin{bmatrix} \text{INDEX} & \text{s} \\ \text{RESTR} & \left\langle \begin{bmatrix} \text{RELN} & \text{exploit} \\ \text{SIT} & \text{s} \\ \text{EXPLOITER} & \text{i} \\ \text{EXPLOITED} & \text{j} \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix} \right\rangle$$

The careful reader may have noticed that we have exemplified our analysis with only two of the three sample idioms we began with. We have had very little to say about the analysis of *kick the bucket.* There is a reason for this: different idioms exhibit different syntactic behavior, so not all idioms should be analyzed in the same fashion. In particular, observe that *kick the bucket* differs from *keep tabs on* and *take advantage* in its lack of a passive form. That is, while (37a,b) allow idiomatic interpretations, (37c) can only convey the literal meaning, which entails that Pat's foot made contact with an actual bucket.

(37) a. Tabs are kept on suspected drug dealers by the FBI.

b. Advantage is taken of every opportunity for improvement.

c. The bucket was kicked by Pat.

The analysis of *keep tabs on* and *take advantage* presented above correctly allows them to have passive forms. The idiomatic verb entries meet the input conditions on the Passive lexical rule, allowing the generation of passive forms of the idiomatic verbs. The FORM restrictions on the NP complements of the active idiomatic verbs are restrictions on the subjects (that is, SPRs) of their passive versions. Hence, idiomatic *taken* (as a passive) requires that its subject be *advantage*.

Problem 4: Idiomatic *kept*

A Give the lexical entry for the passive of the idiomatic *kept* – that is, the result of applying the passive lexical rule to (35).

B Explain precisely how the contrast between (i) and (ii) is explained on our analysis:

(i) Tabs were kept on Chris by the FBI.

(ii) *Advantage was kept on Chris by the FBI.

Be sure to discuss the role of the verb *be*.

If *kick the bucket* were to be analyzed in a parallel fashion, we would incorrectly predict that (37c) had an idiomatic interpretation (that is, 'Pat died'). To avoid this, we need a different analysis of this idiom. The most straightforward treatment is simply to say that the whole string *kick the bucket* is the verb.[10]. Thus, there is a single lexical entry for the entire idiom *kick the bucket*; it is given in (38).

(38)

$$\left\langle \langle \text{kick, the, bucket} \rangle , \begin{bmatrix} \textit{iv-lxm} & \\ \text{ARG-ST} & \langle \text{NP}_i \rangle \\ \text{SEM} & \begin{bmatrix} \text{INDEX} & \text{s} \\ \text{RESTR} & \left\langle \begin{bmatrix} \text{RELN} & \text{die} \\ \text{CORPSE} & \text{i} \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix} \right\rangle$$

This entry is an intransitive (multi-word) verb root, so it doesn't have a passive form. Or, to put it more formally, entry (38) does not satisfy the conditions necessary to serve as input to the Passive lexical rule, since it is not a *tv-lxm*. Hence, it does not passivize.

[10]In order to insure that the verbal morphology appears on the first word in this multi-word lexical entry, we adopt the general convention that morphological functions apply only to the first word of such entries. This also covers a number of other cases, such as the locations of the plural *-s* in *runs batted in* and the comparative suffix *-er* in *harder of hearing.*

11.6 Conclusion

In this chapter, we have extended the use of the FORM feature to NPs and made use of it in the analysis of existential sentences containing the dummy *there*, the extraposition construction, and idioms. These three constructions share the property that they involve nonreferential NPs. The distribution of such NPs is more than an idle curiosity, however. In more complex sentences it plays a crucial role in motivating the analysis of infinitival and other kinds of complements, which is precisely what next chapter concerns.

11.7 Further Reading

Influential early discussions of the existential *there* and extraposition include Rosenbaum (1967), Milsark (1977), and Emonds (1975). See also Chomsky (1981) and Postal and Pullum (1988). Of the many generative discussions of idioms, see especially Fraser (1970), Chomsky (1980), Ruwet (1991), and Nunberg et al. (1994).

Chapter 12

Infinitival Complements

12.1 Introduction

In the discussion of Extraposition in the last chapter, we had our first encounter with sentences expressing complex meanings – those usually described in terms of one proposition being embedded within another. As we noted, the semantic analysis we have given for a sentence like *That dogs bark annoys people* (or its extraposed counterpart) involves not embedding of one feature structure within another, but rather unification of the SIT value of one predication with the ARG value of another.

In this chapter, we will investigate additional constructions involving this sort of semantic embedding. In particular, we will focus on infinitival complements in sentences such as (1).

(1) a. Pat continues to avoid conflict.

b. Pat tries to avoid conflict.

We will see that, despite their superficial parallelism, examples (1a) and (1b) are quite different in their semantics and in certain associated syntactic properties. These two examples are representative of two basic ways in which propositions can be combined into complex meanings.

12.2 The Infinitival *To*

Before we get into the distinction illustrated in (1), however, we need to provide an analysis for the word *to* that appears in both sentences. Like the lexeme *that* discussed in the previous chapter, the infinitival *to* is a complementizer, and hence belongs to the type *comp-lxm*. An important difference between the two complementizers, however, is that while *that* introduces a subordinate clause, *to* introduces a subordinate VP. Like any complementizer, *to* does not contribute to the semantics in any substantive way, as is particularly evident in those rare cases where it is optional: there is no apparent difference in meaning between (2a) and (2b).

(2) a. Pat helped Chris to solve the problem.

b. Pat helped Chris solve the problem.

We can capture both the similarities and the differences between *that* and *to* with the following lexical entry.

(3)
$$\left\langle \text{to}\ ,\ \begin{bmatrix} \textit{comp-lxm} & \\ \text{SYN} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \text{FORM inf} \end{bmatrix} \\ \text{VAL} & \begin{bmatrix} \text{SPR} \langle\ [\ ]\ \rangle \end{bmatrix} \end{bmatrix} \\ \text{ARG-ST} & \left\langle \boxed{1}\ ,\ \begin{bmatrix} \text{SPR} \ \langle \boxed{1} \rangle \end{bmatrix} \right\rangle \end{bmatrix} \right\rangle$$

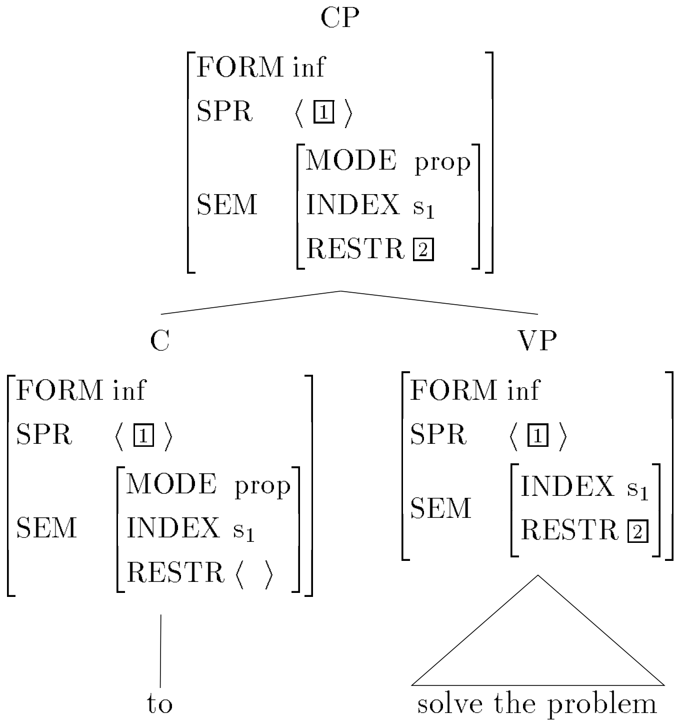
This interacts with the constraints on the type *comp-lxm* to give us, via type inheritance, the following fully specified entry for the complementizer *to*.

(4)
$$\left\langle \text{to}\ ,\ \begin{bmatrix} \textit{comp-lxm} & \\ \text{SYN} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{comp} \\ \text{FORM}\ \boxed{3} \end{bmatrix} \\ \text{VAL} & \begin{bmatrix} \text{SPR} \langle\ [\ ]\ \rangle \end{bmatrix} \end{bmatrix} \\ \text{ARG-ST} & \left\langle \boxed{1}\ ,\ \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{verb} \\ \text{FORM}\ \boxed{3}\text{inf} \end{bmatrix} \\ \text{SPR} & \langle \boxed{1} \rangle \\ \text{SEM} & \begin{bmatrix} \text{MODE} & \text{prop} \\ \text{INDEX} & \boxed{2} \end{bmatrix} \end{bmatrix} \right\rangle \\ \text{SEM} & \begin{bmatrix} \text{MODE} & \text{prop} \\ \text{INDEX} & \boxed{2} \\ \text{RESTR} & \langle\ \ \rangle \end{bmatrix} \end{bmatrix} \right\rangle$$

Note that although *to* inherits the constraint that its FORM value is unified with that of its last argument, the complementizer *to* (unlike *that*) and its complement are both [FORM inf]. Hence *to* is a complementizer that selects as its second argument an infinitival VP with an element on its SPR list that is identified with the first argument of *to*. (*To* is like *be* in this respect.) *To* differs from *that* in requiring an element on its SPR list. But since *to* is like *that* in bearing the semantic specification [RESTR ⟨ ⟩], it follows that when *to* combines with its VP complement, only the latter has a contribution to make to the semantic restriction of the resulting CP. Moreover the VP's index is the same as *to*'s index and hence becomes the index of the CP *to* projects.

With this complementizer added to our lexicon, we can use our old grammar rules and principles to account for structures like the following:

(5)



12.3 The Verb *Continue*

Recall that the dummies *it* and *there*, as well as idiom chunks like *(close) tabs* or *(unfair) advantage*, have a very restricted distribution – they occur only as subjects or objects of verbs that select them in those positions. What these NPs all have in common is that they are nonreferential – that is, take 'none' as their value for MODE and INDEX. They are therefore inherently unsuited to play a role in any predication. Consequently, on semantic grounds, we have already explained the ungrammaticality of (6) and the fact that *it* must be referential in (7).

(6) a. *I hate advantage/tabs/there.

b. *Advantage/tabs/there really affected us.

(7) a. I hate it.

b. It really affected us.

It might seem surprising, then, that there are some other verbs that allow subject NPs that lack referential indices. *Continue* is one such example:

(8) a. Sandy continues to eat oysters.

b. There continued to be riots in Croatia.

c. It continues to bother me that Chris dates Lee.

d. (Close) tabs continue to be kept on Bo by the FBI.

e. (Unfair) advantage continues to be taken of the refugees.

A nonreferential subject can occur with *continue* only if the verb down inside the infinitival CP is one that selects it.[1]

(9) a. *There continues to [eat oysters]/[bother me that Chris dates Lee]/[be kept on Bo by the FBI]/[be taken of the refugees].

b. *It continues to [eat oysters]/[be riots in Croatia]/[be kept on Bo by the FBI]/[be taken of the refugees].

c. *(Close) tabs continue to [eat oysters]/[be riots in Croatia]/[bother me that Chris dates Lee]/[be taken of the refugees].

d. *(Unfair) advantage continues to [eat oysters]/[be riots in Croatia]/[bother me that Chris dates Lee]/[be kept on Bo by the FBI].

The contrast between (8) and (9) suggests that the verb *continue* is in an intuitive sense transparent to the cooccurrence restrictions between the subject and the verb in its complement.

We can capture this intuition by specifying that *continue* and its complement must have the same subject. We do this in the same way as we did it earlier for the passive *be* and for the infinitival *to* above: the first element in *continue*'s ARG-ST list (the subject) will be identical to the SPR value of the second element in the ARG-ST list (the complement). Since the complement is a CP headed by *to*, the SPR value of the CP will be identical to the SPR value of the embedded VP. Hence, the cooccurrence restrictions involving the nonreferential NPs will be transmitted from the verbs heading the infinitival VPs through *to* up to the subject of the verb *continue*.

Notice also that passivizing the complement's verb does not change the meaning. That is, examples (10a) and (10b) are essentially paraphrases[2].

(10) a. The FBI continues to visit Lee.

b. Lee continues to be visited by the FBI.

This observation suggests that, semantically, *continue* takes only one argument – the situation of its CP complement – and predicates of it simply that it continues to be the case. Thus, both sentences in (10) mean that it continues to be the case that the FBI visits Lee. Crucially, the subject of *continue* is not assigned a role in the predication whose RELN is 'continue' (otherwise the nonreferential NPs we looked at above should be impossible as subjects of *continue*, since they have no index that can be assigned a role). All of this can be formalized by assigning the sentences in (10) a semantics like the following:

[1] The versions with *it* are, of course, acceptable on the irrelevant reading where *it* is referential.

[2] We say 'essentially' because there are subtle differences in emphasis between the two sentences. The crucial test, for our purposes, is that there are no conceivable conditions under which one of the sentences would be true and the other would be false. This is the operational test we will use throughout for saying sentences do or do not mean the same thing.

(11)
$$\begin{bmatrix} \text{MODE} & \text{prop} \\ \text{INDEX} & s_1 \\ \text{RESTR} & \left\langle \begin{bmatrix} \text{RELN} & \text{continue} \\ \text{SIT} & s_1 \\ \text{ARG} & s_2 \end{bmatrix}, \begin{bmatrix} \text{RELN} & \text{visit} \\ \text{SIT} & s_2 \\ \text{VISITOR} & i \\ \text{VISITED} & j \end{bmatrix}, \begin{bmatrix} \text{RELN} & \text{name} \\ \text{SIT} & s_3 \\ \text{NAME} & \text{The FBI} \\ \text{NAMED} & i \end{bmatrix}, \begin{bmatrix} \text{RELN} & \text{name} \\ \text{SIT} & s_4 \\ \text{NAME} & \text{Lee} \\ \text{NAMED} & j \end{bmatrix} \right\rangle \end{bmatrix}$$

Putting this together with our observation about the subject-sharing between *continue* and its complement, we may postulate the following lexical type, which is a kind of (i.e. an immediate suptype of) *verb-lxm*:

(12) *subject-raising-verb-lxm* (*srv-lxm*):

$$\begin{bmatrix} \text{ARG-ST} \left\langle \boxed{1}, \overset{\text{XP}}{\begin{bmatrix} \text{SPR} \langle \boxed{1} \rangle \end{bmatrix}} \right\rangle \end{bmatrix}$$

And in terms of this type, we can formulate the lexical entry for *continue*:

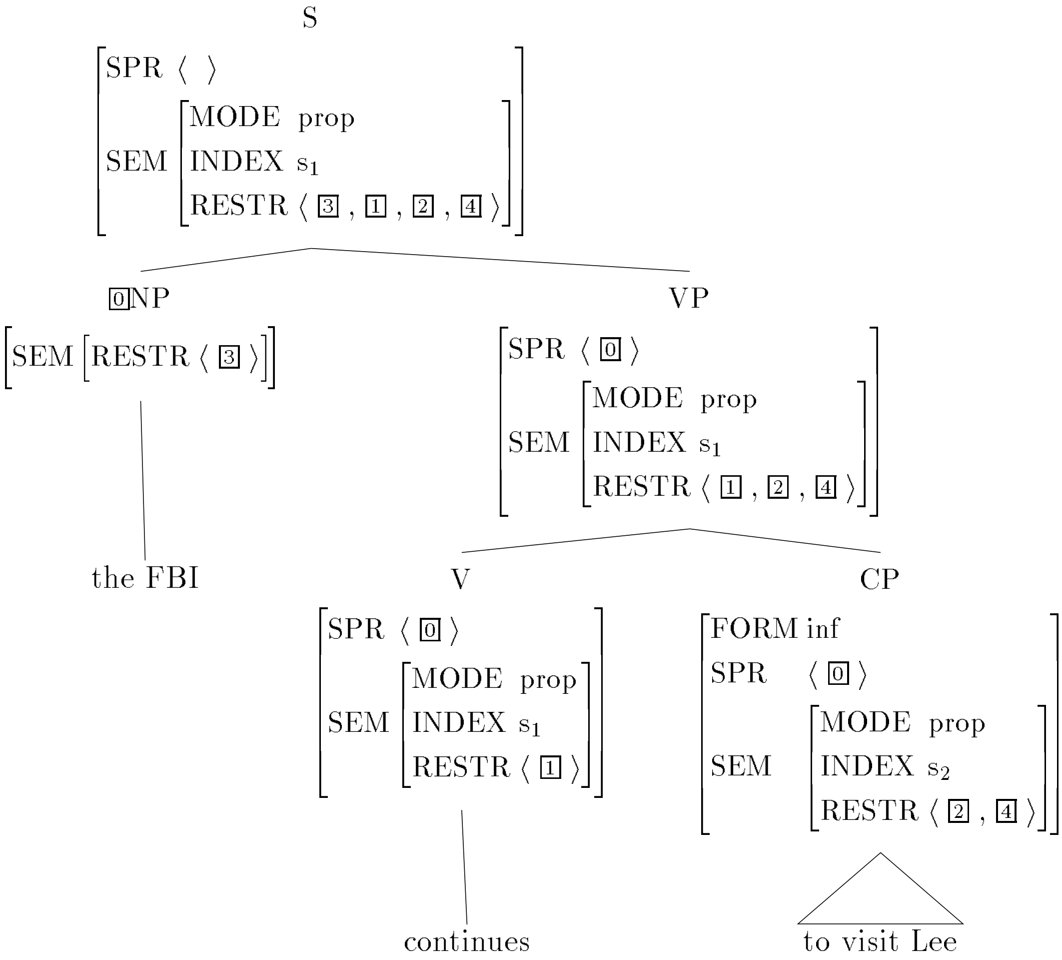
(13)
$$\left\langle \text{continue}, \begin{bmatrix} \textit{srv-lxm} & \\ \text{ARG-ST} & \left\langle [\ ], \overset{\text{CP}}{\begin{bmatrix} \text{FORM} & \text{inf} \\ \text{SEM} & \begin{bmatrix} \text{INDEX} & \boxed{2} \end{bmatrix} \end{bmatrix}} \right\rangle \\ \text{SEM} & \begin{bmatrix} \text{INDEX} & s \\ \text{RESTR} & \left\langle \begin{bmatrix} \text{RELN} & \text{continue} \\ \text{SIT} & s \\ \text{ARG} & \boxed{2} \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix} \right\rangle$$

This analysis, where the lexeme *continue* inherits information not only from the type *srv-lxm*, but also from the relevant supertypes *verb-lxm* and *lexeme*, achieves all the desired effects:

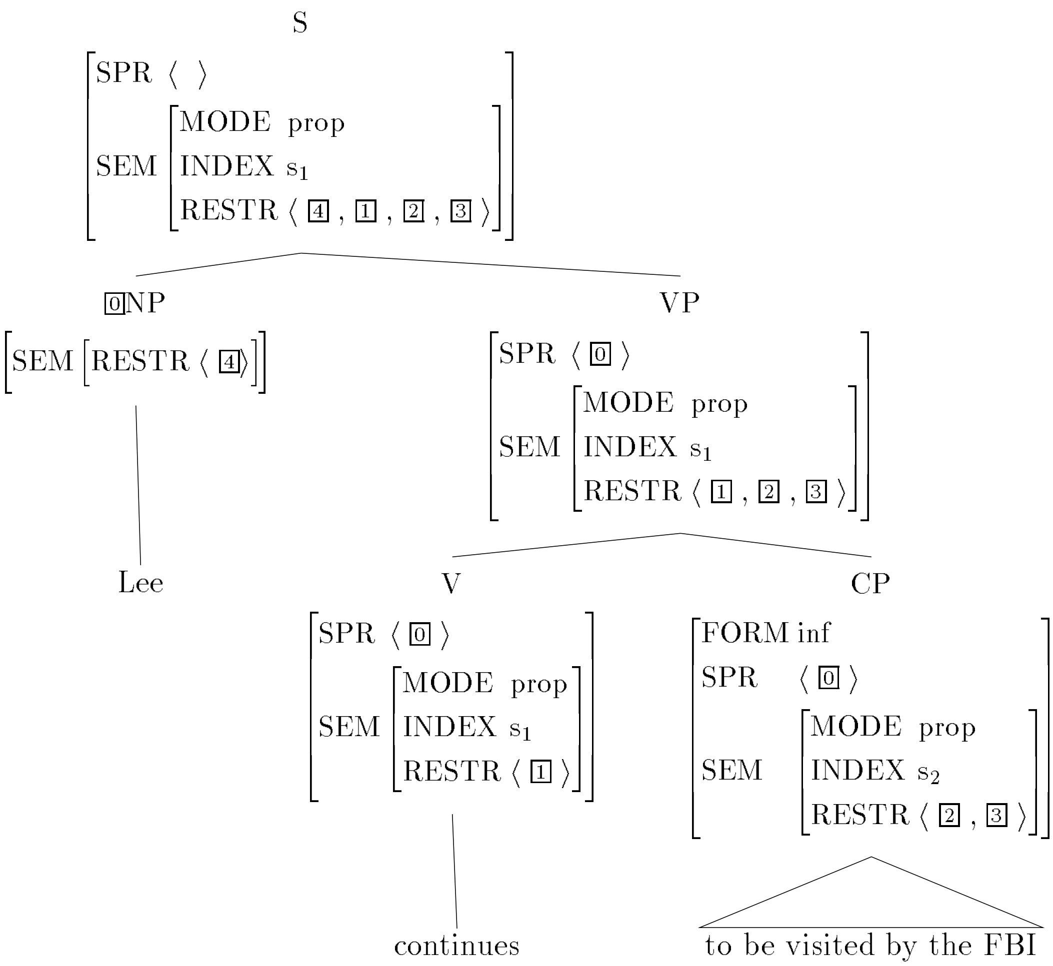
- the CP is the semantic argument of *continue*,
- the subject of *continue* and that of the CP complement are unified,
- the subject of *continue* plays no role in the continue relation, and
- as a result, the sentence in (10) both receive a semantic analysis equivalent to the one sketched in (12).

These properties are illustrated in (14) and (15); note that the tags $\boxed{1}$–$\boxed{4}$ refer to the same feature structure descriptions in (14)–(16):

(14)


S
SPR ⟨ ⟩
SEM MODE prop
INDEX s_1
RESTR ⟨ 3 , 1 , 2 , 4 ⟩
0NP
SEM RESTR ⟨ 3 ⟩
the FBI
VP
SPR ⟨ 0 ⟩
SEM MODE prop
INDEX s_1
RESTR ⟨ 1 , 2 , 4 ⟩
V
SPR ⟨ 0 ⟩
SEM MODE prop
INDEX s_1
RESTR ⟨ 1 ⟩
continues
CP
FORM inf
SPR ⟨ 0 ⟩
SEM MODE prop
INDEX s_2
RESTR ⟨ 2 , 4 ⟩
to visit Lee

(15)



Here the relevant predications are those given earlier and tagged appropriately in (16).

(16)
$$\begin{bmatrix} \text{MODE} & \text{prop} \\ \text{INDEX} & s_1 \\ \text{RESTR} & \left\langle \boxed{1}\begin{bmatrix} \text{RELN} & \text{continue} \\ \text{SIT} & s_1 \\ \text{ARG} & s_2 \end{bmatrix}, \boxed{2}\begin{bmatrix} \text{RELN} & \text{visit} \\ \text{SIT} & s_2 \\ \text{VISITOR} & i \\ \text{VISITED} & j \end{bmatrix}, \boxed{3}\begin{bmatrix} \text{RELN} & \text{name} \\ \text{SIT} & s_3 \\ \text{NAME} & \text{The FBI} \\ \text{NAMED} & i \end{bmatrix}, \boxed{4}\begin{bmatrix} \text{RELN} & \text{name} \\ \text{SIT} & s_4 \\ \text{NAME} & \text{Lee} \\ \text{NAMED} & j \end{bmatrix} \right\rangle \end{bmatrix}$$

The two semantic values are thus equivalent, modulo the order of elements on the RESTR list, a matter of no semantic consequence.

12.4 The Verb *Try*

The analysis of the verb *continue* we just developed was motivated by two observations: (i) that *continue* is transparent to cooccurrence restrictions between its subject and its complement's verb; and (ii) that passivizing its complement (making the complement's subject be the subject of *continue*) did not have any essential semantic effect.

Turning to the superficially similar verb *try*, we see that it differs from *continue* with respect to both (i) and (ii). Thus the analogues to (8b-e), with nonreferential subjects, are systematically ill-formed:

(17) a. Sandy tried to eat oysters.

b. *There tried to be riots in Croatia.

c. *It tried to bother me that Chris dates Lee.

d. *(Close) tabs try to be kept on Bo by the FBI.

e. *(Unfair) advantage tries to be taken of the refugees.

Likewise, the following two sentences are not synonymous:

(18) a. The FBI tried to find Lee

b. Lee tried to be found by the FBI.

(18a) could be true under circumstances where (18b) would be false; indeed, it is quite likely that most people the FBI are trying to find are not trying to be found by them or by anybody else. Since the analysis of *continue* was designed to account for points (i) and (ii) above, it is clear that we need to analyze *try* quite differently.

Let us begin with the semantics of *try*. Unlike the continue relation, which takes only one semantic role (ARG, whose value is a situation), situations of trying involve two things: an individual (the entity that is trying) and some event or state of affairs that the trier is trying to bring about. This is why the examples in (18) differ in meaning: the two triers (and what they are trying to bring about) are not the same. Notice also what the trier is trying to bring about always involves the trier. That is, it is not possible to express a meaning in which, say, what Kim is trying is for Sandy to visit Bo.[3] These remarks are synthesized in the following semantic structure for *Sandy tries to visit Bo*:

(19)
$$\begin{bmatrix} \text{MODE} & \text{prop} \\ \text{INDEX} & s_1 \\ \text{RESTR} & \left\langle \begin{bmatrix} \text{RELN} & \text{try} \\ \text{SIT} & s_1 \\ \text{TRIER} & i \\ \text{ARG} & s_2 \end{bmatrix}, \begin{bmatrix} \text{RELN} & \text{visit} \\ \text{SIT} & s_2 \\ \text{VISITOR} & i \\ \text{VISITED} & j \end{bmatrix}, \begin{bmatrix} \text{RELN} & \text{name} \\ \text{SIT} & s_3 \\ \text{NAME} & \text{Kim} \\ \text{NAMED} & i \end{bmatrix}, \begin{bmatrix} \text{RELN} & \text{name} \\ \text{SIT} & s_4 \\ \text{NAME} & \text{Bo} \\ \text{NAMED} & j \end{bmatrix} \right\rangle \end{bmatrix}$$

Semantic structures like this immediately rule out the use of non-referential subjects (i.e. dummies and idiom chunks) with *try*. This is because the subject position of *try* always corresponds to a semantic argument slot, namely, TRIER. Since non-referential NPs have

[3]Maybe you could force an interpretation on this, something like 'Kim tried to bring it about that Sandy visit Bo, but notice that in so doing you are coercing the interpretation of the complement to a meaning that DOES contain the trier. We will ignore such COERCIONs here.

no INDEX feature, it follows that there can be no semantics for examples like (17) – the index of the TRIER cannot be unified with the subject NP's index.

Again, we will want to use lexical types to express constraints general to this class of verbs. So we will want to introduce another suptype of *verb-lxm* like the one shown in (20):

(20) *subject-control-verb-lxm* (*scv-lxm*):

$$\left[\text{ARG-ST}\left\langle \text{NP}_i\ ,\ \overset{\text{XP}}{\begin{bmatrix}\text{FORM} & \text{inf}\\ \text{SPR} & \langle\ \text{NP}_i\ \rangle\end{bmatrix}}\right\rangle\right]$$

And the following lexical entry for *try*, taken together with the constraints it inherits from its various types, accounts for the facts we have been considering:

(21)

$$\left\langle \text{try}\ ,\ \begin{bmatrix} \textit{scv-lxm} & \\ \text{ARG-ST} & \left\langle [\ ]_i\ ,\ \overset{\text{CP}}{\begin{bmatrix}\text{SEM}\ \begin{bmatrix}\text{INDEX}\ \boxed{2}\end{bmatrix}\end{bmatrix}}\right\rangle \\ \text{SEM} & \begin{bmatrix}\text{INDEX} & \text{s}\\ \text{RESTR} & \left\langle\begin{bmatrix}\text{RELN} & \text{try}\\ \text{SIT} & \text{s}\\ \text{TRIER} & \text{i}\\ \text{ARG} & \boxed{2}\end{bmatrix}\right\rangle\end{bmatrix}\end{bmatrix}\right\rangle$$

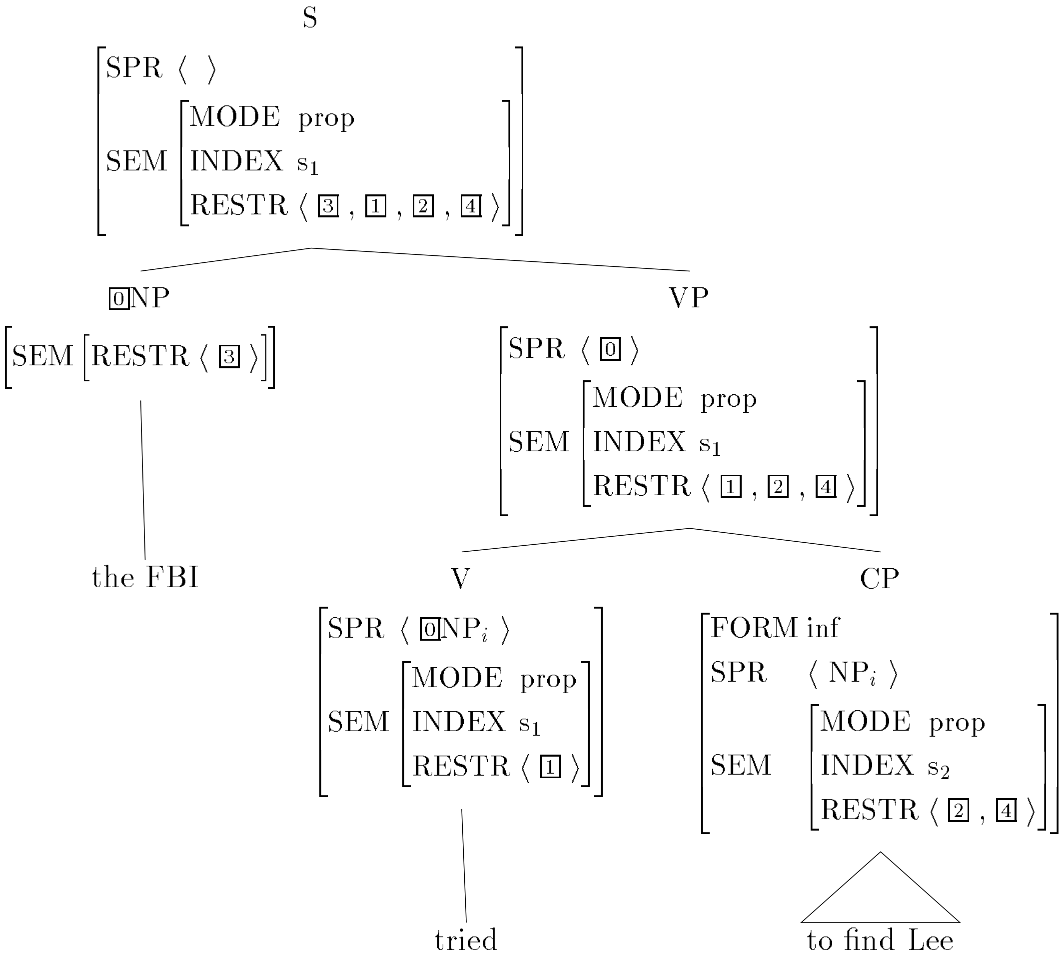
Note that the first argument of *try* and the subject of the CP are not unified. Rather, only their indices are unified. This is the critical difference between raising verbs and control verbs.

Our analysis thus ensures:

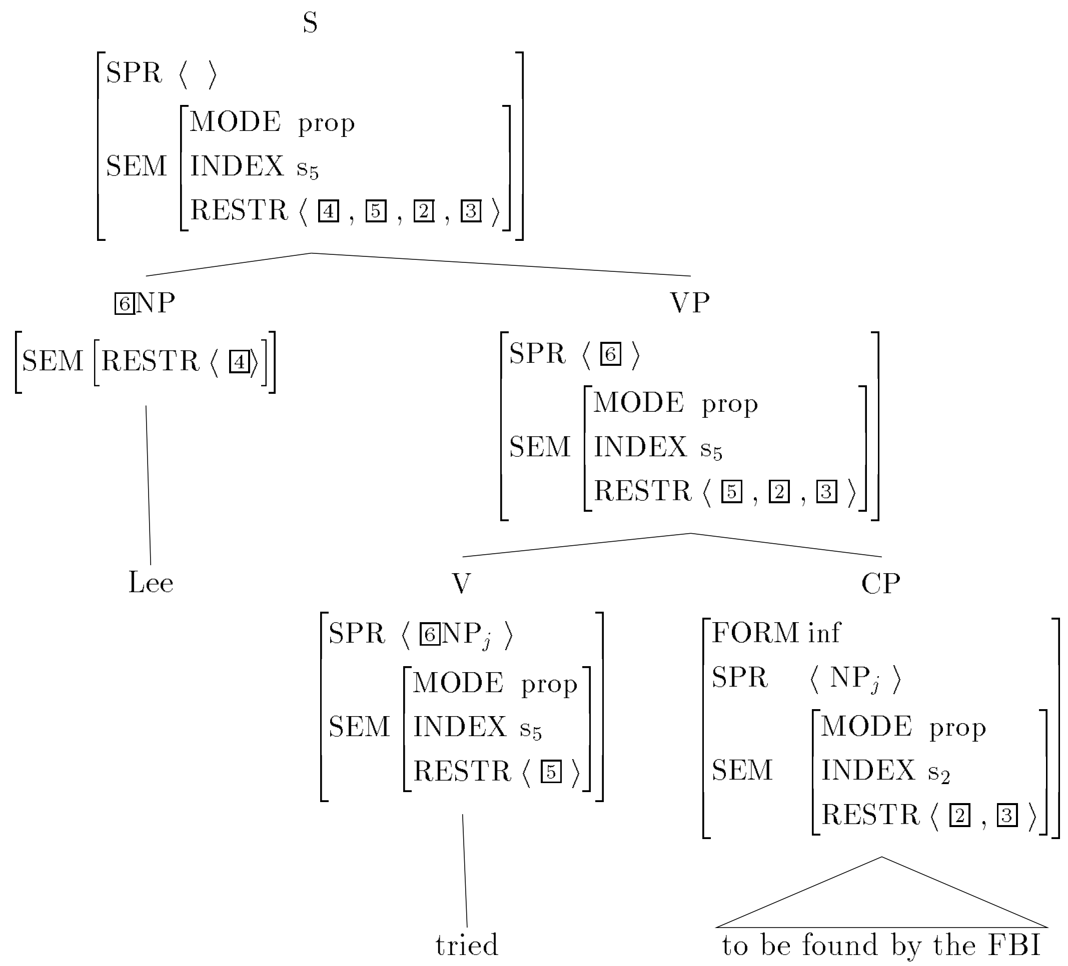
- that the subject of *try* is assigned to the TRIER role, and hence
- that nonreferential NPs can never be the subject of *try*,
- that the infinitival complements can never select for a nonreferential subject (because they must have an index identified with the trier), and
- that (18a) and (18b) have different meanings (because in the one case the FBI is the trier and in the other case, Lee is).

These observations are illustrated in the following pair of SDs.

(22)


S
SPR ⟨ ⟩
SEM
MODE prop
INDEX s_1
RESTR ⟨ 3 , 1 , 2 , 4 ⟩
0 NP
SEM RESTR ⟨ 3 ⟩
the FBI
VP
SPR ⟨ 0 ⟩
SEM
MODE prop
INDEX s_1
RESTR ⟨ 1 , 2 , 4 ⟩
V
SPR ⟨ 0 NP_i ⟩
SEM
MODE prop
INDEX s_1
RESTR ⟨ 1 ⟩
tried
CP
FORM inf
SPR ⟨ NP_i ⟩
SEM
MODE prop
INDEX s_2
RESTR ⟨ 2 , 4 ⟩
to find Lee

(23)



The first of these has the semantics shown in (24)

(24)
$$\begin{bmatrix} \text{MODE} & \text{prop} \\ \text{INDEX} & s_1 \\ \text{RESTR} & \left\langle \boxed{3}\begin{bmatrix}\text{RELN} & \text{name}\\ \text{SIT} & s_3 \\ \text{NAME} & \text{The FBI}\\ \text{NAMED} & \text{i}\end{bmatrix}, \boxed{1}\begin{bmatrix}\text{RELN} & \text{try}\\ \text{SIT} & s_1 \\ \text{TRIER} & \text{i}\\ \text{ARG} & s_2\end{bmatrix}, \boxed{2}\begin{bmatrix}\text{RELN} & \text{visit}\\ \text{SIT} & s_2 \\ \text{VISITOR} & \text{i}\\ \text{VISITED} & \text{j}\end{bmatrix}, \boxed{4}\begin{bmatrix}\text{RELN} & \text{name}\\ \text{SIT} & s_4 \\ \text{NAME} & \text{Lee}\\ \text{NAMED} & \text{j}\end{bmatrix} \right\rangle \end{bmatrix}$$

While the sentence with the passive complement in (23) has the semantics in (25), where the trier is j, the index of Lee, not the FBI.

(25)
$$\begin{bmatrix} \text{MODE} & \text{prop} \\ \text{INDEX} & s_5 \\ \text{RESTR} & \left\langle \boxed{4}\begin{bmatrix}\text{RELN} & \text{name}\\ \text{SIT} & s_4 \\ \text{NAME} & \text{Lee}\\ \text{NAMED} & \text{j}\end{bmatrix}, \boxed{5}\begin{bmatrix}\text{RELN} & \text{try}\\ \text{SIT} & s_5 \\ \text{TRIER} & \text{j}\\ \text{ARG} & s_2\end{bmatrix}, \boxed{2}\begin{bmatrix}\text{RELN} & \text{visit}\\ \text{SIT} & s_2 \\ \text{VISITOR} & \text{i}\\ \text{VISITED} & \text{j}\end{bmatrix}, \boxed{3}\begin{bmatrix}\text{RELN} & \text{name}\\ \text{SIT} & s_3 \\ \text{NAME} & \text{The FBI}\\ \text{NAMED} & \text{i}\end{bmatrix} \right\rangle \end{bmatrix}$$

By positing a lexical distinction between raising and control verbs in the hierarchy of lexemes, we thus correctly account for their differing syntactic and semantic properties without adjusting our grammar rules or any other aspect of our theory.

12.5 Subject Raising and Subject Control

The verbs *continue* and *try* are not arbitrarily chosen examples: each one is representative of a class of verbs that share the properties we have been discussing. The names we have introduced for the types we have assigned these verbs to reflect commonly used terminology in the field.[4] 'Subject raising' verb (or sometimes just 'raising' verb) is used for verbs like *continue*, which express properties (relations of one argument) of propositions, allow non-referential subjects (so long as their complements are compatible with them), and don't change meaning when their complements are passivized. The term '(subject-)control' verb (or 'equi' verb) is used for verbs like *try*, which express relations between individuals and embedded propositions (or their situational indices), never take non-referential subjects, and can induce a change of meaning when their complement is passivized.

In fact, it is not just verbs that can be divided into these two classes; there are also raising adjectives and control adjectives. They are exemplified in (26), with the diagnostic properties illustrated in (27)-(28).

(26) a. Pat is likely to scream.

b. Pat is eager to scream.

(27) a. There is likely to be a letter in the mailbox.

b. It is likely to upset Pat that Chris left.

c. Tabs are likely to be kept on participants.

d. Advantage is likely to be taken of unwary customers.

(28) a. The doctor is likely to examine Pat. $\approx$ Pat is likely to be examined by the doctor.

b. The doctor is eager to examine Pat. $\neq$ Pat is eager to be examined by the doctor.

(29) a. *There is eager to be a letter in the mailbox.

b. *It is eager to upset Pat that Chris left.

c. *Tabs are eager to be kept on participants.

d. *Advantage is eager to be taken of unwary customers.

[4] These perhaps non-mnemonic terms derive from the analysis of this distinction that was developed in standard theory transformational grammar.

Thus our system of lexical types will ultimately have to become slightly more abstract (perhaps introducing types like *subject-raising-lxm* as supertypes of *srv-lxm* and a similar type of adjectival lexeme), in order to accommodate generalizations that cut across the various part of speech distinctions like verb vs. adjective. Even the lexical entry for the infinitival complementizer *to*, given at the beginning of this chapter, could be simplified if *to* were classified in terms of a cross-categorial type such as *subject-raising-lxm*.

Problem 1: Lexical Entries

> Provide lexical entries for the raising and control adjectives *likely* and *eager*. Be as detailed as you need to be to represent the differences that account for the differences in their behavior discussed above. This will include discussing the role of *be* in constraining the 'flow' of information in your trees. Do not assume the existence of a *subject-raising-lxm* type, unless you are prepared to give a precise characterization of that type.

◊Problem 2: Classifying Predicates

(A) Classify the following verbs as raising or control and justify your classifications, constructing relevant examples:

- tend
- condescend
- manage
- fail
- happen

Make sure you restrict your attention to cases of the form: NP V *to* VP. That is, make sure you ignore cases like *Kim manages a store*, *Carrie failed physics*, and any other possible valence that doesn't resemble the *continue* vs. *try* pattern.

(B) Classify the following adjectives as raising or control and justify your classifications, constructing relevant examples.:

- anxious
- apt
- certain
- lucky

Make sure you restrict your attention to cases of the form: NP *be* Adj *to* VP. That is, make sure you ignore cases like *Kim is anxious about the exam*, *Carrie is certain of the answer*, and any other possible valence that doesn't resemble the *likely* vs. *eager* pattern.

12.6 Object Raising and Object Control

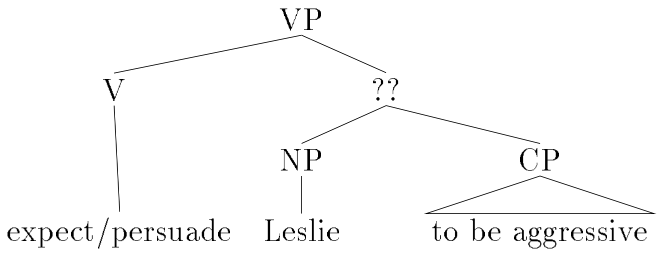
Consider now two new verbs: *expect* and *persuade*. These two verbs are similar in that they both occur in examples like the following.

(30) a. I expected Leslie to be aggressive.

b. I persuaded Leslie to be aggressive.

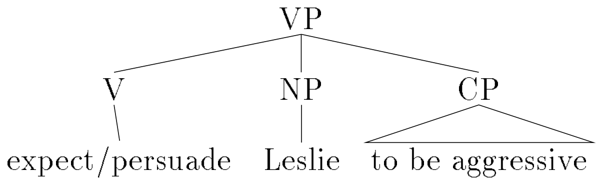
There are two possible analyses one could imagine for these verbs: either there is some kind of phrase that includes both the NP and the infinitival CP *to be aggressive*, as in:

(31)



Or else the NP is the direct object of the verb and the infinitival CP is also a complement of the verb:

(32)



But in fact, only the latter structure is consistent with the analysis of other phenomena presented in earlier chapters.

♢Problem 3: Justifying the Structure.

Use passivization to justify the choice of the structure in (32) over the alternative in (31).[5]

The difference between *expect* and *persuade* in structures like (32) is analogous to the distinction we just drew between *continue* and *try*. *Expect* is an example of what is usually called an 'object raising' verb (or 'subject-object raising' verb) and *persuade* is an 'object control' (or 'object equi') verb. That is, we will want to introduce the two types in (33) with the indicated constraints and then provide lexical entries for *expect* and *persuade* like the ones shown in (34).

(33) a. *object-raising-verb-lxm* (*orv-lxm*):

$$\begin{bmatrix}\text{ARG-ST}\left\langle \text{NP}\ ,\ \boxed{1}\ ,\ \begin{matrix}\text{XP}\\ \begin{bmatrix}\text{SPR}\ \langle\boxed{1}\rangle\end{bmatrix}\end{matrix}\right\rangle\end{bmatrix}$$

b. *object-control-verb-lxm* (*ocv-lxm*):

$$\begin{bmatrix}\text{ARG-ST}\left\langle \text{NP}\ ,\ \text{NP}_i\ ,\ \begin{matrix}\text{XP}\\ \begin{bmatrix}\text{SPR}\ \langle\ \text{NP}_i\ \rangle\end{bmatrix}\end{matrix}\right\rangle\end{bmatrix}$$

(34) a.

$$\left\langle \text{expect}\ ,\ \begin{bmatrix} \textit{orv-lxm} & \\ \text{ARG-ST} & \left\langle [\ \ ]_j\ ,\ [\ \ ]\ ,\ \begin{matrix}\text{CP}\\ \begin{bmatrix}\text{FORM} & \text{inf}\\ \text{SEM} & \begin{bmatrix}\text{INDEX}\ \boxed{2}\end{bmatrix}\end{bmatrix}\end{matrix}\right\rangle \\ \text{SEM} & \begin{bmatrix}\text{INDEX} & \text{s}\\ \text{RESTR} & \left\langle\begin{bmatrix}\text{RELN} & \text{expect}\\ \text{SIT} & \text{s}\\ \text{EXPECTER} & \text{j}\\ \text{ARG} & \boxed{2}\end{bmatrix}\right\rangle\end{bmatrix}\end{bmatrix}\right\rangle$$

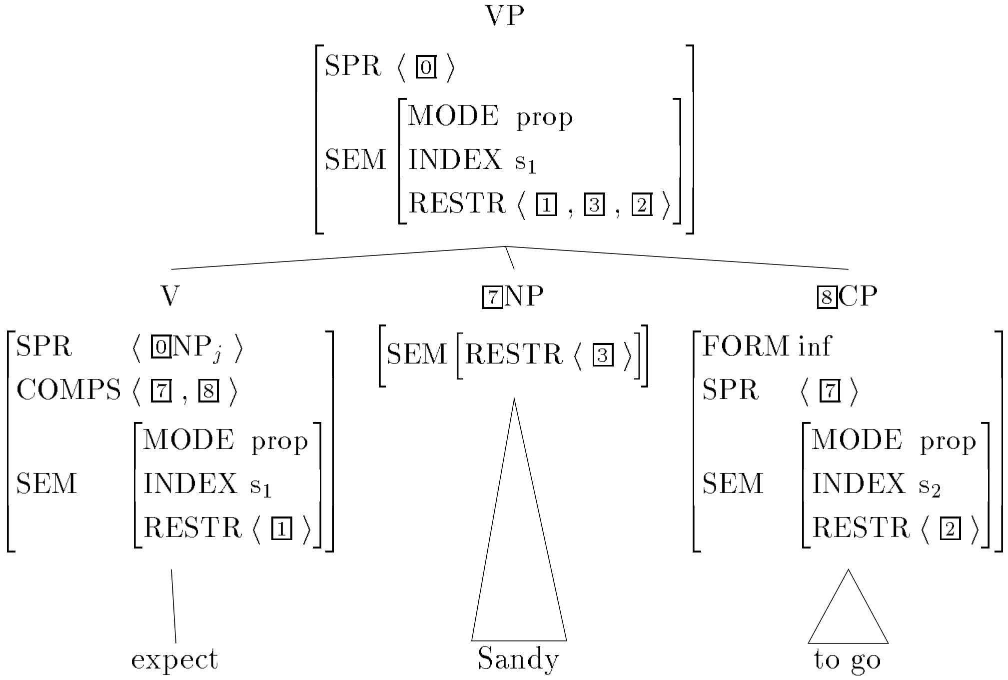
[5]Make sure you ignore all cases of finite CP complements, e.g. *persuade NP that ...* or *expect that ...* and anything else not directly relevant. So make sure you ignore sentences like *I expect to go*, *I am expecting Kim*, and *She is expecting*, too.

b.

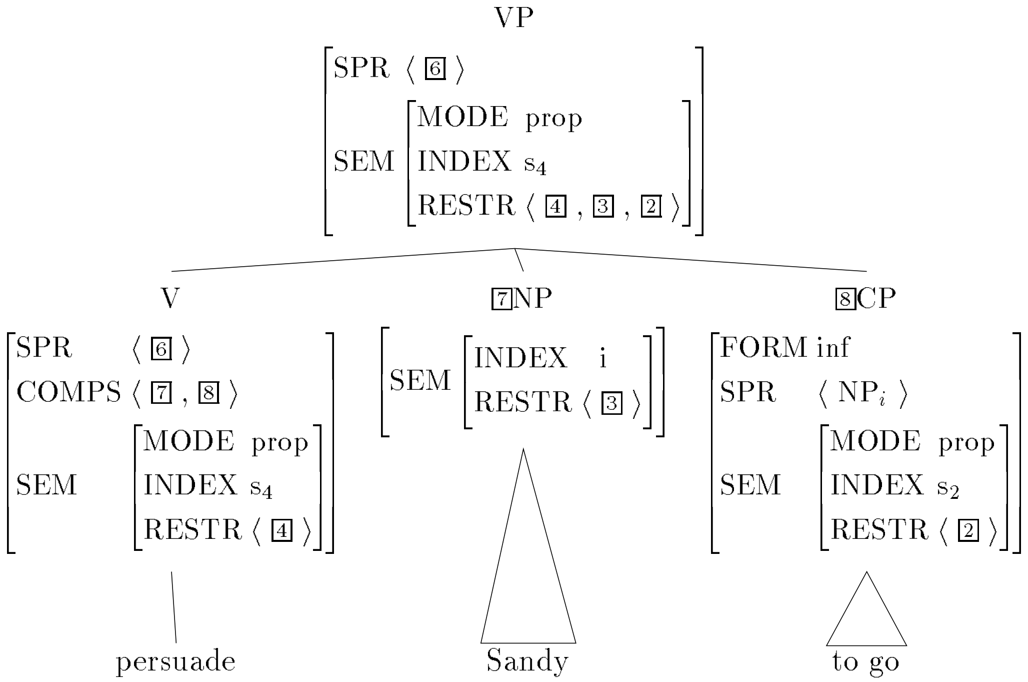
$$\left\langle \text{persuade}\ ,\ \begin{bmatrix} \textit{ocv-lxm} \\ \text{ARG-ST} \left\langle [\ \ ]_j\ ,\ [\ \ ]_i\ ,\ \overset{\text{CP}}{\begin{bmatrix} \text{FORM} & \text{inf} \\ \text{SEM} & \begin{bmatrix}\text{INDEX}\ \boxed{2}\end{bmatrix} \end{bmatrix}} \right\rangle \\ \text{SEM} \begin{bmatrix} \text{INDEX} & \text{s} \\ \text{RESTR} & \left\langle \begin{bmatrix} \text{RELN} & \text{persuade} \\ \text{SIT} & \text{s} \\ \text{PERSUADER} & \text{j} \\ \text{PERSUADEE} & \text{i} \\ \text{ARG} & \boxed{2} \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix} \right\rangle$$

The words derived from these lexemes will then project SDs like the following.

(35)



(36)



And the semantic analyses associated with these SDs are as shown in (37) and (38).

(37)
$$\begin{bmatrix} \text{MODE} & \text{prop} \\ \text{INDEX} & s_1 \\ \text{RESTR} & \left\langle \boxed{1}\begin{bmatrix} \text{RELN} & \text{expect} \\ \text{SIT} & s_1 \\ \text{EXPECTER} & \text{j} \\ \text{ARG} & s_2 \end{bmatrix}, \boxed{3}\begin{bmatrix} \text{RELN} & \text{name} \\ \text{SIT} & s_3 \\ \text{NAME} & \text{Sandy} \\ \text{NAMED} & \text{i} \end{bmatrix}, \boxed{2}\begin{bmatrix} \text{RELN} & \text{go} \\ \text{SIT} & s_2 \\ \text{GOER} & \text{i} \end{bmatrix} \right\rangle \end{bmatrix}$$

(38)
$$\begin{bmatrix} \text{MODE} & \text{prop} \\ \text{INDEX} & s_4 \\ \text{RESTR} & \left\langle \boxed{4}\begin{bmatrix} \text{RELN} & \text{persuade} \\ \text{SIT} & s_4 \\ \text{PERSUADER} & \text{j} \\ \text{PERSUADEE} & \text{i} \\ \text{ARG} & s_2 \end{bmatrix}, \boxed{3}\begin{bmatrix} \text{RELN} & \text{name} \\ \text{SIT} & s_3 \\ \text{NAME} & \text{Sandy} \\ \text{NAMED} & \text{i} \end{bmatrix}, \boxed{2}\begin{bmatrix} \text{RELN} & \text{go} \\ \text{SIT} & s_2 \\ \text{GOER} & \text{i} \end{bmatrix} \right\rangle \end{bmatrix}$$

◊**Problem 4:** ***Expect*** **vs.** ***Persuade***

We have just sketched an analysis of the verbs *expect* and *persuade* without providing justification for the fundamental distinction between the two types of lexeme we have posited. The purpose of this problem is to make you construct the arguments that underlie the proposed distinction between *orv-lxm* and *ocv-lxm*.[6]

A. Construct relevant examples with dummy *there* to support the proposed distinction.

B. Construct relevant examples with dummy *it* to support the proposed distinction.

C. Construct relevant examples to support the proposed distinction involving sentences containing parts of idioms.

D. Construct examples to support the proposed distinction involving paraphrase relations (or the lack thereof) between relevant pairs of sentences containing active and passive complements.

[6] Again, make sure you ignore all irrelevant uses of these verbs, including cases of finite CP complements, e.g. *persuade NP that ...* or *expect that ...* and anything else not directly relevant (*I expect to go*, *I am expecting Kim*, *She is expecting*, and so forth).

Problem 5: Icelandic Again

As noted in an earlier problem, Icelandic has verbs that assign idiosyncratic cases to their subjects. Thus, we get contrasts like the following:

(i) *Hun* er vinsael.
She-NOM is popular

(ii) *Hana* vantar peninga.
Her-ACC lacks money

(iii) *Henni* batana*d*i veikin.
Her-DAT recovered-from the-disease

In infinitival constructions, two patterns are observed:

(iv) *Eg* *vonast* til a*d* vanta ekki peninga
I-NOM hope for to lack not money

(v) *Eg* vonast til a*d batnad veikin*
I-NOM hope for to recover-from the-disease

(vi) *Hana* *virdist* vanta peninga.
Her-ACC seems to-lack money

(vii) *Henni* *virdist hafa batnad veikin.*
Her-DAT seems to-have recovered-from the-disease

Use these examples to argue for a distinction between control and raising verbs in Icelandic, and explain how our analysis of the distinction accounts for the two patterns.

♢Problem 6: There, There....

In an earlier problem, you were asked to develop an analysis of verb agreement in sentences with *there* as the subject. Simplifying somewhat, finite forms of the *be* that takes *there* as its subject agree in number with the NP following *be*. This could be formalized in either of two ways:

- the relevant lexical entries for *is*, *are*, *was*, and *were* could stipulate the value of the NUM feature of the second element of their ARG-ST list, or
- the entry for the lexeme *be* could say that the NUM value on *there* was the same as the NUM value on the second element of the ARG-ST list (and this basic entry would then undergo the normal inflectional lexical rules).

Both analyses cover the data in simple *there* sentences.

(A) Explain how each analysis covers the data in simple *there* sentencs.

(B) The two analyses make different predictions, however, with regard to the interaction of *there* with raising. Discuss the relevance of data like the following for choosing between the two competing analyses of *there*-sentences:

(i) There continues to be a bug in my program.
(ii) *There continue to be a bug in my program.

♢Problem 7: Reflexives in Infinitival Complements

In Problem 5 above, you justified our analysis of *expect* and *persuade*.

(A) Does that analysis, taken together with the analysis of reflexive and pronoun binding we developed in chapter 7, account for the following contrasts:

(i) We expect the doctor to examine us.
(ii) *We expect the doctor to examine ourselves.
(iii) We expect them to examine themselves.
(iv) *We expect them$_i$ to examine them$_i$.
(v) We persuaded the doctor to examine us.
(vi) *We persuaded the doctor to examine ourselves.
(vii) We persuaded them to examine themselves.
(viii) *We persuaded them$_i$ to examine them$_i$.

Explain clearly why or why not.

(B) Consider the following contrasts.

(i) They appeared to us to support themselves.
(ii) *They$_i$ appeared to us to support them$_i$.
(iii) *They appealed to us to support themselves.

(iv) They$_i$ appealed to us to support them$_i$.

Develop an analysis of *appear* and *appeal* (that fits in with our binding theory) that explains these contrasts. Do not worry too much about the details of the type hierarchy your analysis will require, i.e. it is sufficient to give the lexical entries needed for the lexemes *appeal* and *appear* and to explain how these interact with binding theory and other aspects of our grammar to explain the relevant data.

12.7 Further Reading

The raising/control distinction was first introduced into the generative literature (but with different terminology) by Chomsky (1965) and Rosenbaum (1967). Other discussions of these phenomena include Jackendoff (1972), Postal (1974), Bach (1979), Bresnan (1982c), and Sag and Pollard (1991).

Chapter 13

Auxiliary Verbs

sectionIntroduction

In this chapter, we investigate the English auxiliary verb system. This is one of the most extensively analyzed (and frequently reanalyzed) empirical domains in the literature on generative syntax. The transformational treatment of auxiliaries in Chomsky's *Syntactic Structures* was immensely influential; it galvanized the field in support of transformational grammar. In the intervening four decades, numerous alternative treatments have been put forward within a wide range of theoretical frameworks.

The auxiliary verb system is a particularly attractive domain for syntacticians because it involves a relatively small number of elements (basically, just a handful of verbs and the word *not*) which interact with each other in intricate and apparently complex ways. Moreover, though the English auxiliary system is quite language-specific (even closely related languages like Dutch and French have verbal systems that behave very differently), there are analogous elements in many other languages. Thus, this is a fertile domain for examining the interaction of universal grammatical principles with language-specific variation.

Cross-linguistically, the elements that get called 'auxiliaries' tend to share the following semantic and syntactic characteristics: (i) they express notions of time (past, present, future; continuation, completion), necessity, possibility, obligation, permission, negation, or questioning; and (ii) they occur in fixed positions in sentences, usually at or near the beginning or end. English auxiliaries are a special kind of verb, including what are called 'modals' (*can, could, may, might, must, shall, should, will, would*), and uses of *be, do,* and *have* as 'helping verbs'.

Our analysis treats auxiliaries as a special kind of subject raising verb, an idea originally proposed by J. R. Ross in the 1960s. We then go on to show how the special properties of auxiliaries with respect to such phenomena as negation and questioning can be handled in terms of syntactic features and how the relevant generalizations about them can be expressed in terms of lexical rules.

13.1 Basic Facts about Auxiliaries

Consider the following data:

(1) Pat tapdanced.

(2) a. Pat can tapdance.

b. *Pat can tapdanced/tapdancing.

c. Pat is tapdancing.

d. *Pat is tapdance/tapdanced.

e. Pat has tapdanced.

f. *Pat has tapdance/tapdancing.

(3) a. Pat could have tapdanced.

b. Pat could be tapdancing.

c. Pat has been tapdancing.

d. Pat could have been tapdancing.

e. *Pat has could tapdanced.

f. *Pat is having tapdanced.

g. *Pat could be having tapdanced.

(4) a. *Pat could will tapdance.

b. *Pat has had tapdanced.

c. *Pat is being tapdancing.

These examples illustrate the following generalizations about auxiliary verbs:[1]

(5) a. Auxiliaries are optional.

b. Auxiliaries determine the FORM of the following verb.

c. Auxiliaries can cooccur with each other, but only in a fixed order.

d. Auxiliaries (of any given type) cannot iterate.

---

[1]In some dialects of English, sequences of modals, as in *Pat might could tapdance* are possible, apparently violating (5c). Without careful study of these dialects, we cannot be certain how to analyze such examples. It could be that (5c) is actually false in them; alternatively, it is possible that some standard English modals have been reanalyzed into other types (e.g. adverbs) in these dialects.

In the literature, we find two basic approaches to the analysis of English auxiliaries. The first, going back to Chomsky's original treatment, involves introducing a new (phrasal) category called AUX which dominates all the auxliary verbs. AUX is expanded with a rule something like the following:[2]

(6) AUX $\rightarrow$ (M)(PERF)(PROG).

This approach has the attractive feature that it straightforwardly captures the optionality, the ordering, and the non-iterability among auxiliaries – that is, the properties listed in (5a, c, and d). On the other hand, it doesn't say anything about the FORM dependencies – that is, it doesn't rule out the starred alternatives in (2).

The other type of analysis treats auxiliaries as verbs taking VP complements. This has the immediate advantage that it provides the tools for restricting the FORM value of the head of the following VP. Its potential disadvantage is that it doesn't provide an obvious way of expressing the ordering and iteration constraints.

The second approach fits much better with the grammar we have been developing. This is because the AUX constituent doesn't seem to have a head, so it isn't clear how to fit it in with our phrase structure rules or with our way of handling cooccurence relations like the FORM dependencies between auxiliaries. In what follows, we will pursue the VP complement analysis of auxiliary verbs. In fact, as will become clear below, this treatment can be incorporated into our grammar without assuming any new grammar rules – all the essential information will be in the lexical entries for auxiliary verbs.

13.1.1 Lexical Entries for Auxiliary Verbs

We have already seen one auxiliary verb's entry, namely, the verb *be*. We will use it as a model for the others, and then return to the issues of ordering and iteration.

The entry for *be* that we used originally for the passive was generalized in chapter 11 to cover other uses of *be*, including the progressive. The entry we gave for *be* (which was intended to cover its cooccurrence with both passive and progressive VP complements) was the following:

(7)
$$\left\langle \text{be}\ , \begin{bmatrix} \textit{be-lxm} & \\ \text{ARG-ST} & \left\langle \boxed{1}\ , \begin{bmatrix} \text{SYN} & \begin{bmatrix} \text{HEAD} & [\text{PRED} +] \\ \text{VAL} & [\text{SPR} \langle \boxed{1} \rangle] \end{bmatrix} \\ \text{SEM} & [\text{INDEX}\ \boxed{2}] \end{bmatrix} \right\rangle \\ \text{SEM} & \begin{bmatrix} \text{INDEX}\ \boxed{2} \\ \text{RESTR} \langle\ \rangle \end{bmatrix} \end{bmatrix} \right\rangle$$

[2]'M' in (6) stands for 'modal', 'PERF' for 'perfective', and 'PROG' for 'progressive'. The latter two are fairly standard terms for the uses of *have* and *be* under discussion.

But (7) clearly bears a close resemblance to the type *srv-lxm* that we introduced in the last chapter. Thus instead of listing such shared properties in the lexical entries of *be* and the other auxiliary verbs, we posit a new subtype of *srv-lxm* that states the common properties of auxiliaries. This type, which we will call *auxv-lxm*, will have to allow complements other than [FORM inf] CPs (VPs or, in the case of copular *be*, any predicative complement), but the choice of complement can be stated within individual lexical entries and this will override the [ARG-ST ⟨ [ ] , CP ⟩] specification stated as a constraint on the type *srv-lxm*.

In the analyses of negation, inversion, contraction and ellipsis given below, we will make use of a HEAD feature AUX to distinguish auxiliary verbs from all others. The constraint needed for the type *auxv-lxm* is thus minimally the following.

(8) $$\textit{auxv-lxm}\text{:}\ \left[\text{SYN}\ \left[\text{HEAD}\ \left[\text{AUX}\ +\right]\right]\right]$$

Once the type *auxv-lxm* is part of the lexical type hierarchy, the type *be-lxm* can then be eliminated in favor of an analysis where *be* is simply assigned to the type *aux-lxm*.
This allows us to simplify the lexical entry of *be*, relying on inheritance to express further properties that *be* shares with other lexemes. Thus the lexical entry specified in (9) is enriched to (10) through inheritance.

(9) $$\left\langle \text{be}\ ,\ \begin{bmatrix} \textit{auxv-lxm} & \\ \text{ARG-ST} & \left\langle [\ \ ]\ ,\ \begin{bmatrix} \text{SYN} & \left[\text{HEAD}\ \left[\text{PRED}\ +\right]\right] \\ \text{SEM} & \left[\text{INDEX}\ \boxed{2}\right] \end{bmatrix} \right\rangle \\ \text{SEM} & \begin{bmatrix} \text{INDEX}\ \boxed{2} \\ \text{RESTR}\ \langle\ \rangle \end{bmatrix} \end{bmatrix} \right\rangle$$

(10) $$\left\langle \text{be}\ ,\ \begin{bmatrix} \textit{auxv-lxm} & \\ \text{SYN} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{verb} \\ \text{AUX}\ + \\ \text{ANA}\ - \end{bmatrix} \\ \text{VAL} & \left[\text{SPR}\ \langle\ [\ ]\ \rangle\right] \end{bmatrix} \\ \text{ARG-ST} & \left\langle \boxed{3}\ ,\ \begin{bmatrix} \text{SYN} & \begin{bmatrix} \text{HEAD} & \left[\text{PRED}\ +\right] \\ \text{SPR} & \langle\ \boxed{3}\ \rangle \end{bmatrix} \\ \text{SEM} & \left[\text{INDEX}\ \boxed{2}\right] \end{bmatrix} \right\rangle \\ \text{SEM} & \begin{bmatrix} \text{MODE}\ \ \text{prop} \\ \text{INDEX}\ \boxed{2} \\ \text{RESTR}\ \langle\ \rangle \end{bmatrix} \end{bmatrix} \right\rangle$$

And the entry for auxiliary *have* will look something like this:

(11)

$$\left\langle \text{have}\ , \begin{bmatrix} \textit{auxv-lxm} & \\ \text{ARG-ST} & \left\langle [\ \ ]\ , \begin{bmatrix} \text{SYN} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{verb} \\ \text{FORM psp} \end{bmatrix} \end{bmatrix} \\ \text{SEM} & \begin{bmatrix} \text{INDEX}\ \boxed{3} \end{bmatrix} \end{bmatrix} \right\rangle \\ \text{SEM} & \begin{bmatrix} \text{INDEX} & \text{s} \\ \text{RESTR} & \left\langle \begin{bmatrix} \text{RELN} & \text{have} \\ \text{SIT} & \text{s} \\ \text{ARG} & \boxed{3} \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix} \right\rangle$$

This entry differs from (9) in two essential ways: first, the complement (i.e. the second element of ARG-ST) must be a VP headed by a past participal (indicated with the specification [FORM psp]); second, the semantics of auxiliary *have*, unlike that of *be* is not vacuous. The form of the complement and the meaning are, in fact, what distinguishes *have* from other auxiliary verbs in English. Again, no constraint has to be stated in (11) to identify the first element of the ARG-ST list with the VP complement's SPR value, as this information is inherited from the supertype *srv-lxm*.

The modals have a peculiarity that we want to indicate in our lexical entry, which is illustrated by the following:

(12) a. *Pat hopes to can study syntax.

b. *Sandy has musted study syntax!

These examples show that modals don't have entries with [FORM inf] or [FORM psp]. In fact, the only contexts in which modals CAN occur are ones where we normally expect finite verbs. Notice, by the way, that this restriction appears not to be semantically based, since *be able to* (which is virtually synonymous with *can*) is fine in these contexts. So our entry for a modal could look like (13):

(13)
$$\left\langle \text{can}\ , \begin{bmatrix} \textit{auxv-lxm} & \\ \text{SYN} & \begin{bmatrix}\text{HEAD} \begin{bmatrix}\text{FORM fin}\end{bmatrix}\end{bmatrix} \\ \text{ARG-ST} & \left\langle [\ \ ]\ , \begin{bmatrix} \text{SYN} & \begin{bmatrix}\text{HEAD} & \begin{bmatrix}\textit{verb}\\ \text{FORM inf}\end{bmatrix}\end{bmatrix} \\ \text{SEM} & \begin{bmatrix}\text{INDEX } \boxed{2}\end{bmatrix}\end{bmatrix}\right\rangle \\ \text{SEM} & \begin{bmatrix}\text{INDEX} & \text{s} \\ \text{RESTR} & \left\langle \begin{bmatrix}\text{RELN} & \text{can}\\ \text{SIT} & \text{s} \\ \text{ARG} & \boxed{2}\end{bmatrix}\right\rangle\end{bmatrix}\end{bmatrix}\right\rangle$$

Notice that, unlike most lexemes of type *verb*, (13) specifies a FORM value. The FORM values that we use for verbs (e.g. fin, psp) are, in most cases, introduced into the entries by inflectional lexical rules like Past Tense Verb Lexical Rule or the Passive Lexical Rule. The stipulation that the lexeme *can* is [FORM fin] means that it cannot serve as the input to any lexical rules that introduce other FORM values, since the output FORM values would fail to unify.

Problem 1: Modals and Imperatives Explain in detail why modals are not possible in imperatives, as illustrated by the following:

(i) *Can solve all the problems! (cf. Be able to solve all the problems!)

Before we look at the ordering and iteration constraints, notice that our analysis entails that auxiliaries are treated semantically like raising verbs. That is, they assign no semantic role to their subjects; rather, the subject of an auxiliary verb gets its semantic role – and various syntactic properties – from the complement of the auxiliary. This makes predictions regarding the possibility of auxiliaries occurring in sentences with dummy subjects or idiom chunk subjects. Specifically, we correctly predict that sentences like the following will be grammatical:

(14) a. There might be a unicorn in the garden.

b. There has been a unicorn in the garden.

c. It will annoy people that dogs are barking.

d. It is annoying people that dogs are barking.

e. Tabs have been kept on Pat by the FBI.

f. Tabs are being kept on Pat by the FBI.

We also predict that there will be no difference in truth conditions between *A doctor must have been examining Pat* and *Pat must have been being examined by a doctor*. This also seems to be correct.

13.1.2 Cooccurrence Constraints Among Auxiliaries

Some of the facts we noticed earlier about ordering and iteration among auxiliaries fall out naturally from our lexical entries. Others require some work.

- The fact that modals must come first in any string of auxiliaries follows from the fact that they only have finite entries. Since the complements to auxiliary *have* and *be* must have some FORM specification other than finite (namely: psp, prp, or pass), modals can't head their complements.

- The fact that modals don't iterate also follows from their obligatory finiteness, since the head of the complement to a modal must be [FORM inf].

- The fact that perfective *have* can't follow progressive *be* can be seen as a manifestation of a wider generalization. There is a restriction on which verbs can appear in the progressive. Specifically, verbs whose semantics involves a state, rather than an action or an activity, generally sound bad in the progressive:

  (15) a. *Pat is owning a house.

  b. *Chris is knowing the answer.

  This is pretty clearly a semantic restriction: making something progressive turns an action or activity into a state, namely, the state of that action or activity being in progress; for stative verbs, it doesn't make sense to talk about a state being in progress. The perfective *have* also is used to denote states, namely, the state of completion for whatever its complement VP denotes. Since state-denoting verbs don't have progressives, the perfective *have* doesn't either. We will not attempt to formalize this restriction in our lexical entry, since it depends on dealing with aspects of semantics that go beyond the scope of this text.

- The same semantic restriction accounts for the failure of progressive *be* to iterate, since it, too, denotes a state, and hence can't be the complement to another occurrence of progressive *be*. Again, we'll leave the formalization of this to the semanticists.

- Finally, the failure of perfective *have* to iterate cannot be handled in just the same way as the last two restrictions, since state-denoting verbs (like *own* and *know*) CAN occur in the perfective. We could stipulate that perfective *have* is an exception to the past-participle lexical rule. This would entail that it doesn't have a past participle entry, so it couldn't appear as the head of the VP complement to another occurrence of perfective *have*. Alternatively, we could try to find a semantic explanation, e.g. that iterating perfective *have* would be redundant. For now, we will not choose between these analyses.

13.2 The NICE Properties

English auxiliary verbs differ from other verbs in (at least) four ways:

(16) a. NEGATION: They can be immediately followed by *not* as a way of negating the sentence.

b. INVERSION: They can precede the subject in questions.

c. CONTRACTION: They have contracted forms created with the suffix *n't*.

d. ELLIPSIS: Their complements can be omitted when the meaning of the missing complement can be reconstructed from the surrounding linguistic context.

These are sometimes called the 'NICE' properties of auxiliaries. They are illustrated in the following examples.

(17) a. Pat should not leave.

b. *Pat raked not leaves.

(18) a. Has Pat left town?

b. *Left Pat town?

(19) a. They haven't cut the price.

b. *They cutn't the price.

c. *They halven't the price.

(20) a. If anybody is spoiling the children, Pat is.

b. *If anybody keeps spoiling the children, Pat keeps.

Our analysis of these differences will be purely lexical in nature. It will make use of a handful of features (including AUX) and and a small set of lexical rules.

13.3 Auxiliary *do*

Notice that the negative, interrogative, or elliptical counterparts to sentences with no auxiliary verb are usually expressed with the verb *do*:

(21) a. Pat raked leaves.

b. Pat did not rake leaves.

(22) a. Pat left town.

b. Did Pat leave town?

(23) a. They halved the price.

b. They didn't halve the price.

(24) If anybody keeps spoiling the children, Pat does.

So let's add *do* to our list of auxiliary verbs. In order to do so, we need to examine what its properties are. For example, what is the FORM of the head of its complement? Are there any other restrictions on the kind of complements it can take? Does it have any restrictions on the FORMS it can have?

The following examples illustrate properties of *do* that will have to be incorporated into the analysis.

(25) a. Pat does not eat garlic.

b. *Pat does not eats/eating/eaten garlic.

c. Pat tried to take logic.

d. *Pat tried to don't take logic.

e. *Pat has done not take logic.

f. *Pat is doing not take logic.

g. Does Pat like watching television?

h. *Does Pat be watching television?

i. *Does Pat have watched television?

These examples show:

- The head of the complement of *do* must be [FORM inf].
- Auxiliary *do* itself only occurs in finite forms.
- The head of the complement of *do* cannot be an auxiliary verb.

That is, *do* is just like modals, but with the added restrictions that (i) its complement cannot be headed by an auxiliary verb and (ii) it makes no contribution to the meaning, except to bear the tense information that corresponds to its finite morphology. This can be straightforwardly encoded into the lexical entry for the lexeme for auxiliary *do*:

(26)
$$\left\langle \text{do}\ , \begin{bmatrix} \textit{auxv-lxm} & \\ \text{SYN} & \begin{bmatrix}\text{HEAD} \begin{bmatrix}\text{FORM fin}\end{bmatrix}\end{bmatrix} \\ \text{ARG-ST} & \left\langle [\;\;]\ , \begin{bmatrix} \text{SYN} & \begin{bmatrix}\text{HEAD} & \begin{bmatrix} \textit{verb} & \\ \text{FORM} & \text{inf} \\ \text{AUX} & - \end{bmatrix}\end{bmatrix} \\ \text{SEM} & \begin{bmatrix}\text{INDEX } \boxed{2}\end{bmatrix}\end{bmatrix}\right\rangle \\ \text{SEM} & \begin{bmatrix}\text{INDEX} & \boxed{2} \\ \text{RESTR} & \langle\;\;\rangle\end{bmatrix}\end{bmatrix}\right\rangle$$

The semantics specified in (26) correctly guarantees the lack of semantic contribution made by *do*; and the [FORM fin] specification ensures that the only words derived from this root are finite forms. The analysis of *do* (as an *auxv-lxm*, and hence) as a *srv-lxm* also predicts that it will allow dummies and idiom chunks as subjects, given the right complements. It is actually quite tricky to construct such sentences, since the verbs that license dummies or idiom chunk subjects are generally forms of *be*, and hence [AUX +]. Since *do* doesn't allow [AUX +] complements, this requires an extra step in the construction of the relevant examples. The trick is to put a nonauxiliary raising verb in between. That is, we get sentences like (27).

(27) a. There did not continue to be riots in the park.

b. Does it continue to annoy people that dogs bark?

c. Tabs don't continue to be kept on Abbie.

13.4 Analyzing the NICE Properties

Let us work out analyses of each of the NICE Properties within our theory. This will involve one lexical rule per property, plus the addition of a few new features.

13.4.1 Negation

The word *not* can appear in a wide variety of contexts, but in this discussion, we want to restrict attention to sentence negation – that is, to cases in which it is the whole clause that is interpreted as being negated. Hence, we will not be dealing with non-sentence negation, that is, with uses of *not* like those in (28).[3]

(28) a. Not many arrows hit the target.

[3] In a nutshell, our analysis of these is to treat *not* as a modifier that attaches to the left of phrases (other than finite verb phrases). Working this analysis out in detail would require some additional machinery that would take us too far afield, so we will not pursue it here.

b. I try not to make trouble.

c. Pat must have not been listening.

We also exclude from our analysis the second occurrence of *not* in examples like (29), since this is negating only the VP, not the whole sentence.

(29) Kleptomaniacs can not NOT steal.

If both occurrences of *not* in (29) were sentence negation, they would cancel each other out, and it would mean 'kleptomaniacs can steal.' While (29) clearly has this as an entailment, it actually asserts something stronger, namely that kleptomaniacs MUST steal. This is the interpretation we get if we assume that the first *not* negates the whole sentence, but the second one negates only *steal*.

(29) shows that there can be only one sentential *not* per clause. To insure this, we introduce a feature NEG. The negation rule will specify that its input must be [NEG –], and the output is [NEG +]. This will prevent it from applying to its own output, thereby preventing any clause from having multiple sentential negations.[4]

The sort of data we DO want to account for includes the following:

(30) a. Pat will not leave.

b. *Pat not will leave.

c. Pat has not left.

d. *Pat not left.

e. Pat would not have left.

f. *Pat not has left.

g. Pat must not have been leaving.

The generalization about where sentential *not* can appear is that it must follow a finite auxiliary verb. We can formalize this by having a derivational (lexeme-to-lexeme) rule that inserts *not* as a second argument of an auxiliary and requires the output to be [NEG +] and [FORM fin]. More precisely, the rule looks like this:

(31) Negation Lexical Rule:

[4]NEG is declared as appropriate only for the part of speech *verb*. And by adding the constraint [NEG / –] to the type *verb-lxm*, we can express the constraint on auxiliary verbs in a maximally general way.

$$
\left\langle \boxed{3}\,, \begin{bmatrix} \textit{verb-lxm} & \\ \text{SYN} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \text{NEG} & - \\ \text{AUX} & + \end{bmatrix} \end{bmatrix} \\ \text{ARG-ST} & \langle\, \boxed{1} \,\rangle \oplus \boxed{2} \\ \text{SEM} & \begin{bmatrix} \text{INDEX} & \boxed{5} \end{bmatrix} \end{bmatrix} \right\rangle \Rightarrow
$$

$$
\left\langle \boxed{3}\,, \begin{bmatrix} \text{SYN} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \text{FORM} & \text{fin} \\ \text{NEG} & + \end{bmatrix} \end{bmatrix} \\ \text{ARG-ST} & \langle\, \boxed{1} \,\rangle \oplus \left\langle \begin{bmatrix} \text{HEAD} & \textit{adv} \\ \text{SEM} & \begin{bmatrix} \text{INDEX} & \boxed{4} \\ \text{RESTR} & \left\langle \begin{bmatrix} \text{RELN} & \text{not} \\ \text{ARG} & \boxed{5} \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix} \right\rangle \oplus \boxed{2} \\ \text{SEM} & \begin{bmatrix} \text{INDEX} & \boxed{4} \end{bmatrix} \end{bmatrix} \right\rangle
$$

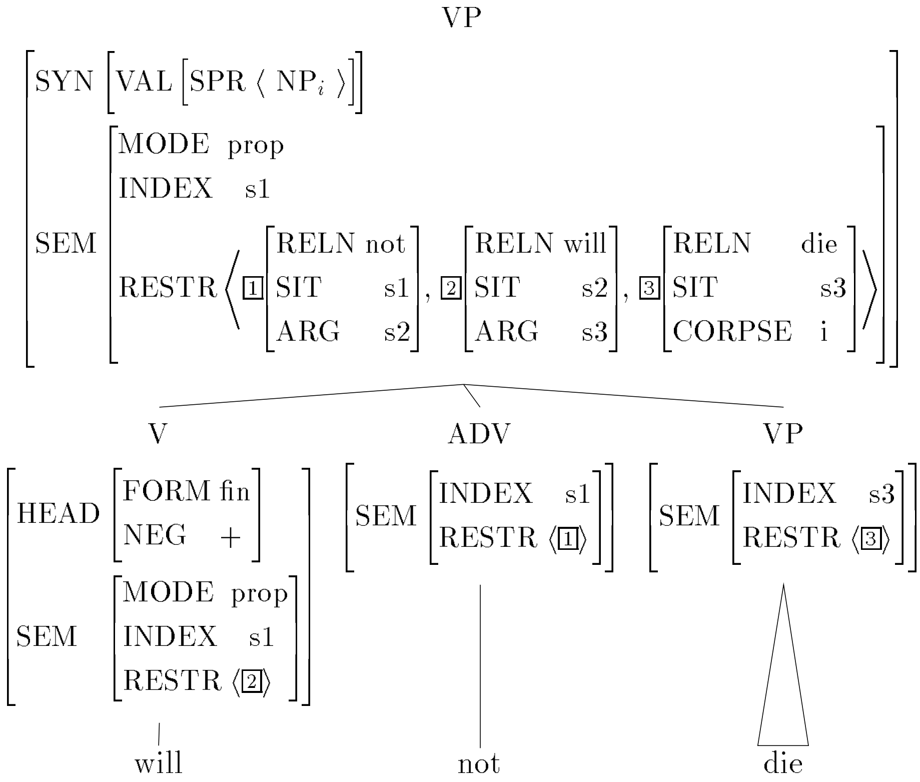
The word *not* is treated as an adverb, and it alone is lexically specified as having 'not' as the value of RELN on its RESTRICTION list, as sketched in (32).

(32)

$$
\left\langle \text{not}\,, \begin{bmatrix} \text{SYN} & \begin{bmatrix} \text{HEAD} & \textit{adv} \end{bmatrix} \\ \text{ARG-ST} & \langle\ \rangle \\ \text{SEM} & \begin{bmatrix} \text{INDEX} & \boxed{8} \\ \text{RESTR} & \left\langle \begin{bmatrix} \text{RELN} & \text{not} \\ \text{SIT} & \boxed{8} \\ \text{ARG} & \text{s} \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix} \right\rangle
$$

The effect of the rule in (31) then is to permit *not* (and only *not*) to appear as an optional second argument of an auxiliary. And when this happens, the index of *not* ($\boxed{4}$ in (31)) is the INDEX of the auxiliary and the semantic index of the rule input ($\boxed{5}$ in (31)) is the argument of the 'not' relation. This produces a negated semantics for a VP (and hence for a sentence), as shown in (33).

(33)



Problem 2: Negation and *do* How do our rules and lexical entries so far account for the following contrast?

(i) *Pat put not the ice cream in the freezer.

(ii) Pat did not put the ice cream in the freezer.

Be precise.

13.4.2 Inversion

In questions, a finite auxiliary verb precedes the subject. All the same restrictions that apply to auxiliaries in declaratives apply when they occur in this inverted order. Thus, we have:

(34) a. Can Pat tapdance?

b. *Can Pat tapdanced/tapdancing?

c. Is Pat tapdancing?

d. *Is Pat tapdance/tapdanced?

e. Has Pat tapdanced?

f. *Has Pat tapdance/tapdancing?

g. Could Pat be tapdancing?

h. *Is Pat coulding tapdance?

i. Could Pat have tapdanced?

j. *Has Pat could tapdance?

k. Has Pat been tapdancing?

l. *Is Pat having tapdanced?

m. Could Pat have been tapdancing?

n. *Could Pat be having tapdanced?

o. *Could Pat will tapdance?

p. *Has Pat had tapdanced?

q. *Is Pat being tapdancing?

This suggests that we want to maintain the relationship between the auxiliary verb and its complement even when the auxiliary precedes the subject. The immediate problem then is how to get the subject to appear on the right of the (finite) auxiliary instead of on the left. A simple approach to this is to treat the post-auxiliary NP not as a specifier, but rather as its first complement. Recall that the Head-Complement grammar rule generates complements in the same order in which they are listed in the head's COMPS list.[5] Hence, making the subject NP into the first complement of the lexical entry for the inverted auxiliary puts it just where we want it.

This effect can be easily achieved by a lexical rule. Since the inverted verb in yes-no questions is the first element in the sentence, the Inversion Lexical Rule must be formulated so that the SPR list of the output is empty and the output's semantic mode is 'ques(tion)', rather than 'prop'.[6]

(35) Inversion Lexical Rule:

$$\left\langle \boxed{4}, \begin{bmatrix} \textit{verb-lxm} & \\ \text{SYN} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix}\text{AUX } +\end{bmatrix} \\ \text{VAL} & \begin{bmatrix}\text{SPR } \langle \text{ NP } \rangle\end{bmatrix} \end{bmatrix} \\ \text{SEM} & \begin{bmatrix}\text{MODE prop}\end{bmatrix} \end{bmatrix} \right\rangle \Rightarrow \left\langle \boxed{4}, \begin{bmatrix} \text{SYN} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix}\text{FORM fin}\end{bmatrix} \\ \text{VAL} & \begin{bmatrix}\text{SPR } \langle\ \rangle\end{bmatrix} \end{bmatrix} \\ \text{SEM} & \begin{bmatrix}\text{MODE ques}\end{bmatrix} \end{bmatrix} \right\rangle$$

[5] A less stipulative approach to constituent ordering would be desirable, especially for languages with much freer word order than English. There are a number of interesting proposals in the literature, but they go beyond the scope of this text.

[6] Here we make the simplifying assumption that inverted sentences are always associated with interrogative semantics. In fact, inverted clauses appear in other kinds of constructions, e.g. the following:

(i) Never have I heard such a beautiful rendition!

(ii) Had we known that beforehand, we would never have participated.

The outputs of this rule are auxiliary verb lexemes that can only give rise to finite forms. In addition, the outputs are specified as [SPR ⟨ ⟩]. This specification is crucial for our analysis. Recall that the lexical rules for finite forms presented in chapter 8 have the effect of specifying constraints (about case and agreement features) on the first member of the ARG-ST list. But these rules said nothing about the SPR value. Thus, because all outputs of the rule in (35) are specified as [SPR ⟨ ⟩], there is a crucial interaction with the Argument Realization Principle. That is, the only way that a lexical SD based on an output of this rule can obey the ARP is if all the arguments, including the nominative first argument, appear on the COMPS list, as shown in (36).

(36)
$$\begin{bmatrix} \textit{word} & \\ \text{SYN} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix}\text{FORM} & \text{fin}\\ \text{AUX} & +\end{bmatrix} \\ \text{VAL} & \begin{bmatrix}\text{SPR} & \langle\ \rangle \\ \text{COMPS} & \langle \boxed{1}, \boxed{2} \rangle\end{bmatrix}\end{bmatrix} \\ \text{ARG-ST} & \left\langle \boxed{1}\text{NP[nom]}\ , \boxed{2}\begin{bmatrix}\text{HEAD} & \begin{bmatrix}\textit{verb}\\ \text{FORM inf}\end{bmatrix} \\ \text{SPR} & \langle \boxed{1} \rangle\end{bmatrix}\right\rangle \end{bmatrix}$$

will

Because the first element of the ARG-ST list is the first complement, all words formed from the outputs of this LR will specify the appropriate CASE and AGR constraints not on the SPR value, but rather on the first COMPS member. The LRs for finite verbal forms interact with the Inversion LR in (36) to predict contrasts like the following:

(37) a. Can she tapdance?

b. *Can her tapdance?

c. Are we winning?

d. *Are us winning?

Similarly, for those auxiliaries that exhibit agreement with their subjects (namely, finite forms of *be*, *have*, and *do*), the agreement in the inverted entries (i.e. the outputs) will be with the first complement. This correctly predicts facts like the following:

(38) a. Is the dog barking?

b. *Am/Are the dog barking?

c. Have you finished the assignment?

d. *Has you finished the assignment?

Moreover, since auxiliaries, as we have seen, are raising verbs, their first argument is identical to the element on the SPR list of their VP argument. Hence, in the output (inverted) auxiliary's entry, the first complement will also function as the second complement's subject. We therefore predict data like the following:

(39) a. Will there be children in the audience?

b. *Will there win the game?

c. Has it annoyed people that dogs bark?

d. Are tabs kept on all linguists by the FBI?

e. *Are tabs taken on all linguists by the FBI?

f. Was advantage taken of the opportunity by students?

g. *Was advantage kept of the opportunity by students?

h. Did it continue to annoy people that nobody listened?

i. *Did it try to annoy people that nobody listened?

In short, this rule creates lexical entries whose first complement has all the properties of a subject, except that it comes after the verb.

◊**Problem 3: Inverted SDs** Draw SDs for the following sentences. (You need not include all features on the nodes. Concentrate on getting the tree geometry right, using standard abbreviations for node labels.)

(i) Did Pat put the ice cream in the freezer?
(ii) Is there a monster in Loch Ness?

Problem 4: Inversion and *Do* How does our analysis rule out the following sentence:

*Put Pat the ice cream in the freezer?

Be precise.

Problem 5: Negation and Inversion Our Negation and Inversion lexical rules can interact to allow us to generate negative questions. Which of the following sentences will be licensed by our rules so far?

(i) Has Pat not been sleeping?
(ii) Has not Pat been sleeping?

Explain your answer. Do the predictions of the grammar with respect to such sentences accord with your intuitions of well-formedness? If not, how could the grammar be changed to account for your judgements?

13.4.3 Contraction

The contraction of *not* to *n't* involves a number of lexical idiosyncracies. For example, we get *won't*, not **willn't*. Others are *don't, mustn't*, and for people who have it at all, *shan't*. (Don't be fooled by spelling: *don't* and *mustn't* are exceptional because of their pronunciation, which is not what would result from simply appending the sound 'nt' to *do* and *must*). There are also exceptions to the rule: **amn't* and, for many speakers, **mayn't*.

We will treat contraction like the inflectional lexical rules we saw earlier, which also allowed for idiosyncratic morphological exceptions; that is, we will posit a morphological function, F_{NEG}, that relates inflected forms of auxiliaries to their negative contracted forms. The rule is then fairly straightforward: it applies to finite forms of auxiliaries, changing the morphology and the semantics. The only other modification needed is to add the feature [NEG –] to the input and [NEG +] to the output.[7] Thus, this is the rule:

(40) Contraction Lexical Rule:

$$\left\langle \boxed{2}\,, \begin{bmatrix} \textit{word} & \\ \text{SYN} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{verb} & \\ \text{FORM} & \text{fin} \\ \text{AUX} & + \\ \text{NEG} & - \end{bmatrix} \end{bmatrix} \\ \text{SEM} & \begin{bmatrix} \text{INDEX} & \boxed{1} \\ \text{RESTR} & \boxed{3} \end{bmatrix} \end{bmatrix} \right\rangle \Rightarrow$$

$$\left\langle \mathrm{F}_{NEG}(\boxed{2})\,, \begin{bmatrix} \textit{word} & \\ \text{SYN} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \text{NEG} & + \end{bmatrix} \end{bmatrix} \\ \text{SEM} & \begin{bmatrix} \text{INDEX} & \text{s} \\ \text{RESTR} & \left\langle \begin{bmatrix} \text{RELN} & \text{not} \\ \text{SIT} & \text{s} \\ \text{ARG} & \boxed{1} \end{bmatrix} \right\rangle \oplus \boxed{3} \end{bmatrix} \end{bmatrix} \right\rangle$$

Note that this is the first lexical rule we have seen that creates new inflected words from inflected words already formed via application of lexical rules to verbal roots. On this analysis then, contracted forms in English involve a kind of 'extended' verbal inflection.

Problem 6: Contraction and Double Negation As formulated, neither the Negation LR nor the Contraction LR can apply to the other one's output.

A Explain why not.

[7]Note that this keeps the rule from applying to its own output, and hence automatically blocks forms like **can'tn't*.

B Does the mutual exclusivity of these two lexical rules make the right empirical predictions? Provide data and an explanation to support your answer.

Problem 7: First Person *Aren't* In colloquial usage, examples like (i)-(iii) are common, although their uninverted counterparts, (iv)-(vi) are ungrammatical.

(i) Aren't I lucky?
(ii) Aren't I doing a good job?
(iii) Aren't I chosen?
(iv) *I aren't lucky.
(v) *I aren't doing a good job.
(vi) *I aren't chosen.

How could we account for this in our theory? [Hint: Assume that this *aren't* is a separate lexical entry from the one in examples like *You aren't doing a good job.* Then provide an explicit lexical entry for the *aren't* in (i)-(iii) and explain why it behaves as it does.]

13.4.4 Ellipsis

Ellipsis is a discourse phenomenon, in the sense that the interpretation of the missing constituent may depend on something said in an earlier sentence – possibly even by another speaker, as in the following dialogue:[8]

(41) Speaker A: I haven't been reading the newspapers.
Speaker B: Well, I have.

Consequently, we will not try to provide an analysis of the semantic relation between an elliptical sentence and its antecedent. Instead, we will concentrate on the syntactic constraints on ellipsis.

We saw earlier that ellipsis could not immediately follow non-auxiliary verbs. The following example shows that the auxiliary verb right before an ellipsis site does not have to be finite.

(42) I haven't been following the debate on taxes, but I should have.

[8]By the way, this example also illustrates an argument for the phrase structure we assign to auxiliary constructions (with nested VPs), rather than the alternative with a node AUX containing all auxiliary verbs. Under our analysis, what is missing from speaker B's utterance (namely, *been reading the newspapers*) forms a constituent (a VP). But under the AUX alternative, what is missing is part of the AUX, plus the following VP. In examples like (i), we see that all three of the possible ellipses correspond to a constituent in our analysis, but only one of them would be a constituent in the AUX analysis.

(i) Pat couldn't have been doing the reading, but Chris could (have (been))

In this respect, ellipsis differs from the previous three NICE properties we looked at, in which the auxiliary is always finite. Hence, the lexical rule we formulate for ellipsis will not have to stipulate [FORM fin], though it will still require [AUX +].

There is actually one word that can immediately precede an ellipsis site that we are not analyzing as a verb at all, namely the *to* that is used to introduce infinitives.

(43) a. We asked them to open the window, and they tried to.

b. We hoped that the wine would improve with age, but it didn't seem to.

We can handle this if we leave open the part of speech of the input of the Ellipsis lexical rule, and say that infinitival *to* is [AUX +]. Then the only [AUX +] elements in the lexicon are auxiliary verbs and the complementizer *to*, so it is just these elements that may precede an elliptical VP.

The following formulation of the rule captures our syntactic observations:

(44) **Ellipsis Lexical Rule:**

$$\left\langle \boxed{3}\,, \begin{bmatrix} \textit{lexeme} \\ \text{SYN} \quad \begin{bmatrix} \text{HEAD} \begin{bmatrix} \text{AUX} + \\ \text{NEG} - \end{bmatrix} \end{bmatrix} \\ \text{ARG-ST} \ \langle \boxed{1} \rangle \oplus \boxed{2} \end{bmatrix} \right\rangle \Rightarrow \left\langle \boxed{3}\,, \begin{bmatrix} \text{ARG-ST} \ \langle \ \boxed{1} \ \rangle \end{bmatrix} \right\rangle$$

The outputs of this rule are entries whose ARG-ST no longer contains any of its arguments except the first one. Note that the semantics of such outputs are incomplete, and must be supplemented by appropriate material from the surrounding linguistic context. This analysis permits us to account for ways in which elliptical sentences behave as if they contained a constituent that is not in fact present. For example, non-referential subjects are possible in elliptical sentences, so long as the missing complements are understood properly:

(45) a. We hoped it would be obvious that we were unhappy, and it was.

b. The students thought there would be a trick question on the exam, and there was.

The rule as formulated in (45) says nothing about the discourse properties of ellipsis. In particular, it does not specify that ellipsis is only possible in contexts where there is an antecedent phrase to provide the interpretation of the missing complement. It simply specifies that the lexicon will include lexical entries that can give rise to lexical SDs like the following:

(46)

$$\left[\begin{array}{ll} \textit{word} & \\ \text{SYN} & \left[\begin{array}{ll} \text{HEAD} & \left[\begin{array}{ll}\text{FORM} & \text{fin}\\ \text{AUX} & +\end{array}\right] \\ \text{VAL} & \left[\begin{array}{ll}\text{SPR} & \langle \boxed{1} \rangle \\ \text{COMPS} & \langle\ \rangle\end{array}\right]\end{array}\right] \\ \text{ARG-ST} & \langle \boxed{1}\text{NP[nom]} \rangle \\ \text{SEM} & \left[\begin{array}{ll} \text{MODE} & \text{prop}\\ \text{INDEX} & s_1 \\ \text{RESTR} & \left\langle \left[\begin{array}{ll}\text{RELN} & \text{will}\\ \text{SIT} & s_1 \\ \text{ARG} & s_2\end{array}\right]\right\rangle \end{array}\right]\end{array}\right]$$

will

In SDs like these, s_2 – the argument of the 'will' relation – is not associated with any predication. Hence the meaning of any clause built from (46) is inherently incomplete.[9]

Problem 8: The Interaction of Ellipsis with Negation and Inversion A final observation, independent of these last concerns, is that ellipsis is possible after *not*:

(i) We wanted to taste the salad, but we could not.

(ii) They were asked to help the cook, but they did not.

(iii) You thought you were clearing the table, but you were not.

(iv) We thought that they had arrived, but they had not.

In addition, ellipsis is possible in inverted clauses, as in the following sentences:

(v) [They will become famous.] Will they?

(vi) You thought you were helping them out, but were you?

A. Does our grammar correctly predict that examples like (i) – (iv) are well-formed? Explain clearly why or why not.

B. Does our grammar correctly predict that examples like (v) – (vi) are well-formed? Explain clearly why or why not.

[9] Presenting a fully worked out treatment of VP ellipsis is beyond the scope of this text. There is a rich literature on the subject that we cannot survey here.

13.5 Conclusion

English auxiliaries comprise a richly structured system, with numerous idiosyncratic properties. Our theory handles the complexities of the system straightforwardly. Auxiliary verbs are raising verbs that impose special conditions on their second argument. Auxiliary verbs exhibit some exceptional behaviors, such as the restriction of modals to [FORM fin]. And there are several lexical rules that are restricted to auxiliaries, which create specialized versions of the auxiliary verbs to account for the NICE properties.

In the next chapter, we examine some of the dialect variation in the behavior of English auxiliaries and discuss how our analysis would have to be modified to handle it.

13.6 Further Reading

As noted above, Chomsky (1957) was the seminal work on the English auxiliary system. Among the most influential subsequent work is Ross (1969), McCawley (1971), Akmajian et al. (1979), Steele (1981), Gazdar et al. (1982), and Pollock (1989). The standard reference on negative contraction is Zwicky and Pullum (1983). The analysis presented here is based in part on that of Kim (1995) and Kim and Sag (1995).

Chapter 14

Dialect Variation in the Auxiliary System

14.1 Introduction

English auxiliaries constitute a particularly interesting syntactic system, involving a small set of lexical items exhibiting many intricate interactions and some fascinating idiosyncracies. This system is peculiar to English, though many other languages have elements with intriguingly parallel properties doing some of the same work.

English auxiliaries have changed considerably over the last 1000 years or so, and the changes have been well documented, making them a natural domain for studying syntactic change, a topic that goes beyond the scope of this text. Change starts with variation, and the auxiliary system is also the locus of some fascinating differences among varieties of English. Studying variation is interesting in its own right, but it also helps in trying to ascertain what properties of our grammar we should try to deduce from general principles (or even build into our formalism) and which ones we should treat as essentially accidental.

In this chapter, we provide some examples of variation in the English auxiliary. The first example concerns variable behavior of one word, *have*, whose syntactic behavior makes it look like an auxiliary verb in some instances and not in others. The second example deals with a set of phenomena in a dialect of English different from the one assumed in the rest of this book. In both cases, we will explore how the variation might be handled within our theory. Our examples and discussion are intended only as samples of how variation might be brought into work on syntactic theory. Syntactic variation is a topic worthy of a textbook in its own right, and we make no pretense of doing it justice here.

14.2 Auxiliary Behavior in Main Verb *have*

Our first example of variation in the English auxiliary system is one that is found in a number of varieties of English, and may even be variable for individual speakers, depending on the formality of the context.

In some circumstances, certain uses of *have* as a main verb exhibit some auxiliary-like behaviors. For example, we have all heard usages like (1).

(1) a. Have you any idea of the time?

b. I haven't a clue.

c. They said we had a problem, and we have.

This is not the first time we have seen a verb that is not a 'helping verb' – that is, one that is the sole verb in its clause – exhibiting some of the NICE properties. According to our analyses, the lexeme *be* (from which all forms of the verb are derived) must belong to the type *auxv-lxm*, all finite forms of *be* undergo the Negation, Inversion, and Contraction Lexical Rules, and all forms of *be* undergo the Ellipsis Lexical Rule.[1]

In our grammar, the feature [AUX +] (associated with all instances of the type *auxv-lxm* and with certain other elements, e.g. the complementizer *to*) is associated with a certain range of properties, notably (i) the NICE properties, and (ii) not being a possible complement to the auxiliary *do*. In the dialects that allow main verb *have* to exhibit NICE properties, we can posit a lexical entry for *have* that takes an NP complement (rather than the VP complement of the auxiliary *have*), but is still [AUX +]. That is, we posit an entry along the following lines:

(2)
$$\left\langle \text{have}\ , \begin{bmatrix} \textit{stv-lxm} & \\ \text{SYN} & \begin{bmatrix}\text{HEAD} \begin{bmatrix}\text{AUX} +\end{bmatrix}\end{bmatrix} \\ \text{ARG-ST} & \langle\ \text{NP}_i\ ,\ \text{NP}_j\ \rangle \\ \text{SEM} & \begin{bmatrix} \text{INDEX} & \text{s} \\ \text{RESTR} & \left\langle \begin{bmatrix} \text{RELN} & \text{possess} \\ \text{SIT} & \text{s} \\ \text{POSSESSOR} & \text{i} \\ \text{POSSESSED} & \text{j} \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix} \right\rangle$$

To the best of our knowledge, all dialects that allow examples like (1) also permit their counterparts in (3).

(3) a. Do you have any idea of the time?

b. I don't have a clue.

[1]There are a few exceptions, which we will not attempt to deal with here. When *be* is used to denote activities over which the subject has clear voluntary control (meaning something close to 'act'), it can cooccur with auxiliary *do*, as in Bob Dole's statement to supporters during the 1996 presidential campaign:

(i) You're not gonna get that tax break if you don't be quiet.

In addition, as first noted by Akmajian and Wasow (1974), *being* appears to be an exception to the Ellipsis Lexical Rule (for reasons that remain obscure):

(ii) They said we were being followed by a blue car, and we were (*being).

c. They said we had a problem, and we do.

This suggests that the entry in (2) is not quite right. Instead of stipulating [AUX +], it should just be underspecified for the feature AUX. This will permit it to occur where [AUX +] is required (i.e. in the lexical rules involved in the NICE phenomena) as well as where [AUX –] is required (in the complement of auxiliary *do*). Thus, the dialect allowing main verb *have* to behave like an auxiliary differs from the standard dialect only in terms of this one feature specification.

The situation is actually a bit more complex than this. Not all uses of *have* exhibit the NICE properties, even in the dialects that accept (1). Some examples are given in (4)-(6)

(4) a. They had a fit.

b. *They had not a fit.

c. *Had they a fit?

d. *They hadn't a fit.

e. *I said they would have a fit, and they had.

(5) a. You have cancer.

b. *You have not cancer.

c. ?*Have you cancer?

d. *You haven't cancer.

e. ?*They said you had cancer, and you have.

(6) a. Every day at lunch, Lou had a martini.

b. *Every day at lunch, Lou had not a martini.

c. *Every day at lunch, had Lou a martini?

d. *Every day at lunch, if Fran had a martini, Lou had, too.

There seems to be a semantic difference between those uses of *have* that exhibit NICE properties in the dialect in question and those that do not. Roughly, *have* means 'possess' in the NICE uses, but it assumes more specialized meanings in (4)–(6). In order to capture the correlation of the different syntactic behaviors with different semantics, we need to postulate multiple lexical entries for *have*. In particular, the entry in (2) specifies that the semantic relation is possession. Other main verb entries for *have* have other relations, and they all are [AUX –].

While the postulation of multiple entries for *have* may seem a priori undesirable, the fact that it has so many meanings would require this, even if the meanings were not correlated with syntactic differences.

14.3 African American Vernacular English

The next case of variation we will examine concerns a dialect we will refer to as African American Vernacular English, or AAVE (which is also known as Black English or African American English). We will pretend that AAVE is a homogeneous dialect, just as we have been pretending that there is a homogeneous standard American English. There is, in fact, considerable variation within AAVE, but there are also many properties that are quite general to AAVE and make it legitimate to talk of it as one dialect.[2]

Before delving into the data, we need to digress briefly, in order to clear up some common misconceptions about AAVE. In the autumn of 1996, as we were in the process of drafting the present chapter, the school board in Oakland, California passed a resolution calling for the use of 'Ebonics' (another name for AAVE, favored particularly by afrocentric activists who wish to deny that AAVE is a variety of English) as a tool in the teaching of standard English to African American children. This event unleashed a storm of public outrage across the country. Much of the criticism was directed at the unfortunate wording of the Oakland resolution, and some concerned specific classroom practices; neither of these is relevant to the present text. A great deal of the outcry, however, concerned the linguistic status of AAVE, revealing widespread misunderstanding about the nature of language and grammar, even among many highly educated and sophisticated commentators.

Eldridge Cleaver, the former Black Panther leader, wrote in the *Los Angeles Times*, "When I was growing up, what is now euphemistically being called Ebonics was accurately called bad English." This statement – like numerous similar ones that appeared in the press – reveals the powerful influence of prescriptivism. It presupposes that some varieties of English are correct, while others are incorrect. But what is the basis for attributions of correctness or 'badness' to a language variety – or for that matter to a particular utterance? In this text, we have appealed to native speaker intuitions of well-formedness to determine what is grammatical and what is not. This is clearly not the standard of correctness prescriptivists employ. Rather, prescriptivism singles out one linguistic variety as the standard, and labels deviations from that standard as incorrect. The choice of the standard is determined by a variety of historical, social, and political factors, and it may be quite different from the language people actually use on a day-to-day basis. There is no linguistic basis for elevating

[2] No two humans speak exactly the same way, or share exactly the same intuitions about every sentence. Indeed, individual speakers change the way they speak over time and under different circumstances. Hence, the concepts of 'languages' and 'dialects' are idealizations, based on undefined notions of similarity. They are nevertheless indispensible starting points for linguistic analysis. Moreover, providing precise characterizations of similarities and differences across different varieties of speech may provide a scientific foundation for some of the intuitions underlying the way people individuate languages.

Linguists place little stock in the language/dialect distinction. One might attempt to characterize two varieties of speech as dialects of the same language if they are mutually intelligible, but even this intuitive characterization is problematic. Thus varieties that we have other reasons to think of as distinct languages (e.g. Swedish and Danish) are to a very large extent mutually intelligible. Moreover the relation of mutual intelligibility is not transitive: given three varieties A, B, and C, mutually intelligibility between A and B and between B and C does not guarantee that A and C are mutually intelligible. Thus one can talk at best about 'complexes' of language varieties (Hockett 1958) among which certain patterns of mutual intelligibility exist. Fortunately, these terminological issues do not need to be resolved in order for linguistic analysis to proceed.

one language variety in this way.

No language or dialect is inherently 'good' or 'bad'. They can only be evaluated with respect to some objective. As linguists, we are interested in languages as natural phenomena. To say that one language is 'better' than another per se makes no more sense to us than saying one atomic particle is better than another.[3] For our purposes, AAVE is just as legitimate an object of study as any other language variety.

A more serious, but widespread, misconception is exemplified in a column by Brent Staples in the *New York Times*, who described AAVE as "broken English". Similarly, in a column by *The Washington Post*'s William Raspberry, AAVE is described as "a language that has....no discernable rules." Raspberry's piece recounts a fictional conversation with a taxicab driver, who says, "you can say pretty much what you please [in Ebonics], as long as you're careful to throw in a lot of 'bes' and leave off final consonants." If such claims were true, it would make linguistic investigation of AAVE trivial and pointless. But they are in fact patently false. Careful investigation of AAVE by linguists over the past three decades has shown that it has as much structure and system to it as any language. The differences between it and other varieties of English are quite systematic. A few of those differences will be discussed briefly in this chapter, but see Rickford and Green (in press) for a much more detailed survey.[4]

14.3.1 Invariant *be*

One of the most striking features of AAVE is the one Raspberry ridicules in the quote above: the use of *be* in contexts where standard American English (SAE, from now on) would not permit it. This is exemplified in (7)[5].

(7) a. He be tired.

b. The students be in the hall when the bell ring.

These examples do not mean the same thing as the corresponding SAE sentences with finite forms in place of *be*. Rather, they are interpreted as denoting repeated or habitual situations: he is constantly tired, and the students are usually in the hall when the bell rings.

This 'invariant *be*', as it is sometimes called, is one of several words AAVE has that can be used to express particular temporal relations. In addition to the habitual *be*, AAVE uses *done* to express completion of an event, *been* with heavy stress (often written '*BIN*') to express remote past, *finna* to express future, and possibly others. Examples (from Rickford and Green, in press) are given in (8).

[3]Of course, if the objective for evaluation of language varieties is getting ahead economically, then there can be little doubt that in contemporary American society, AAVE fares poorly (outside of some pockets of the entertainment industry). For this reason, virtually all American educators – including the Oakland School Board – recognize the need to teach standard English in the schools. Unfortunately, this point of agreement seems to have been lost in much of the discussion of 'Ebonics'.

[4]Our data on AAVE are taken largely from published sources, cited below. In addition, we are grateful to John Baugh, Erica Denham, Lisa Green, and Zakiyyah Langford for giving us their judgements on some examples.

[5](7a) is from Smitherman (1977; 19); (7b) is from Rickford and Green (in press).

(8) a. I done pushed it.
'I have pushed it.'

b. My dress BIN in the closet.
'My dress has been in the closet for a long time.'

c. They finna go to bed.
'They are getting ready to go to bed.'

These ASPECTUAL MARKERS, as they are often called, can be used in certain combinations to express a rich variety of temporal relations. We will concentrate our attention on the invariant *be*.

The examples in (7) are ungrammatical in SAE because stand-alone (non-imperative) sentences must be headed by a finite verb, and *be* is not finite. When we consider how to analyze these sentences in AAVE, then, the two most obvious hypotheses to consider are that *be* in AAVE is a finite verb, or that AAVE allows stand-alone (non-imperative) sentences that are not headed by finite verbs.

But there is good reason to doubt that *be* is finite, as we will demonstrate. First we show that invariant *be* is [AUX +]; then we use the fact that finite auxiliaries undergo negation, inversion, and contraction to argue that invariant *be* is not a finite auxiliary. But if it is an auxiliary and it is not a finite auxiliary, then it is not finite.

The evidence that invariant *be* is an auxiliary is simply that it can undergo the Ellipsis Lexical Rule, which is restricted to [AUX +] elements.

(9) The teacher don't be in the hallway when the students be.

As an aside, notice that the sequence *don't be* in (9) suggests that AAVE *don't* should be analyzed somewhat differently from SAE *don't*. The latter requires its complement to be [AUX –], but (9) shows that the former cannot have such a requirement. Hence, in AAVE, the analysis of the auxiliary *do* can be simplified, and it can be treated as a semantically vacuous modal verb. That is, AAVE *do* has the same syntactic properties as modals like *can* and *will*, but contributes nothing to the semantics.

Returning now to our main argument, (10) shows that invariant *be* cannot undergo any of the NICE rules except Ellipsis:

(10) a. *The students be not in the hall when the bell ring.

b. *Be the students in the hall when the bell ring?

c. *The students ben't in the hall when the bell ring.

We conclude that *be* is a non-finite auxiliary in AAVE, just as it is in SAE.

14.3.2 Missing Forms of *be*

Combined with the examples in (7), this entails that AAVE sentences do not have to be headed by finite verbs. It turns out that there is compelling independent evidence for this conclusion, for AAVE permits some sentences with no verbs whatsoever. Some examples are given in (11).

(11) a. He wild.

b. We on tape.

c. She the first one started us off.

d. He liked by everybody.

e. They looking for you.

SAE requires a form of the copula (that is, a form of *be*) in each of these sentences, but, as noted in chapter 11, many other languages (e.g. Russian and Hungarian) are like AAVE in permitting the analogues to (11) without a copula. In fact, Ferguson (1971) noted a number of similarities between the environments in which copulas may be absent across languages, including AAVE.

Labov (1995) makes a compelling case that this phenomenon in AAVE derives historically from an extension of SAE contraction of *is* and *are* to *'s* and *'re*. However, our concern here is to develop a synchronic analysis of it within our theory of grammar.

The most direct way to incorporate such an analysis would be to have a lexical entry with no phonology, which is otherwise just like *is* and *are*:[6]

(12)
$$\left\langle \emptyset \,,\ \begin{bmatrix} \textit{auxv-lxm} & \\ \text{SYN} & \begin{bmatrix}\text{HEAD} \begin{bmatrix}\text{FORM fin}\end{bmatrix}\end{bmatrix} \\ \text{ARG-ST} & \left\langle \begin{bmatrix}\ \end{bmatrix},\ \begin{bmatrix}\text{SYN} \begin{bmatrix}\text{HEAD} \begin{bmatrix}\text{PRED} +\end{bmatrix}\end{bmatrix} \\ \text{SEM} \begin{bmatrix}\text{INDEX } \boxed{2}\end{bmatrix}\end{bmatrix} \right\rangle \\ \text{SEM} & \begin{bmatrix}\text{INDEX } \boxed{2} \\ \text{RESTR } \langle\ \rangle\end{bmatrix} \end{bmatrix} \right\rangle$$

[6] Actually, (12) is not quite right, because it fails to exclude first-person singular subjects. That is, it allows examples like (i), which are ungrammatical in AAVE (though not in some other varieties of English, such as Jamaican Creole):

(i) *I hungry.

In order to exclude examples like (i), the 'silent copula' analysis would have to be modified either by allowing multiple silent copulas, with different person and number requirements on their specifiers, or by introducing a complex disjunction into the first element of the ARG-ST list.

While a silent variant of *is* and *are* would be straightforward, it is not in the spirit of the theory we have been developing. Up to this point, we have avoided positing inaudible lexical entries for 'understood' elements (such as a phrase for the subject of imperatives). Analogues to such elements do show up in places in our feature structures (notably in VALENCE feature and ARG-ST lists), but their presence is always licensed by a particular grammar rule or word. Hence our grammar fits well with a model of sentence processing that is driven only by the words that are actually present: the processing mechanism never need guess where in the string there might be silent words. This is a highly desirable design feature that we would not abandon lightly.

A Phrase Structure Rule Analysis

An alternative analysis of the missing copula in AAVE is to allow the complements to *be* (whether they are VPs, NPs, PPs, or APs) to combine directly with NP subjects and make sentences. In fact, our analysis of *be* already requires that its second argument have a nonempty SPR list. Remember, the SPR of *be* always has to be identical to the SPR of its complement, so the complement always requires something there.

Hence, unless something is added specifically to exclude them, the following expressions are all generated by our grammar as phrases that are [SPR $\langle\ \rangle$] and [COMPS $\langle\ \rangle$], differing in their part of speech types:

(13) a. It wild.

b. You in trouble.

c. Leslie the boss.

d. Somebody coming to dinner.

e. Jean interviewed by a reporter.

These strings are not well-formed stand-alone sentences in SAE because the initial symbol of our grammar is:

$$(14)\quad \begin{bmatrix} \textit{phrase} & \\ \text{SYN} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{verb} \\ \text{FORM fin} \mid \text{imp} \end{bmatrix} \\ \text{VAL} & \begin{bmatrix} \text{SPR} & \langle\ \rangle \\ \text{COMPS} & \langle\ \rangle \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

As noted earlier (chapter 9), this says that a stand-alone sentence (or what linguists sometimes call a 'root sentence') must be headed by a verb in a finite or imperative form. None of the examples in (13) contains a verb in one of these forms, so they are clearly ruled out as SAE sentences, on their own. It is worth noting that there are constructions (which we will not analyze here) that permit strings similar to those in (13) to appear as subordinate clauses, for example:

(15)
$$\text{With the cat} \left\{ \begin{array}{l} \text{away} \\ \text{in the kitchen} \\ \text{a prisoner} \\ \text{sleeping} \\ \text{locked up} \end{array} \right\}, \text{the mice will play.}$$

However, SAE does not permit (16) as independent sentences.

(16)
$$\text{*The cat} \left\{ \begin{array}{l} \text{away} \\ \text{in the kitchen} \\ \text{a prisoner} \\ \text{sleeping} \\ \text{locked up} \end{array} \right\}.$$

Thus, we want our grammar to generate strings like those in (13) as well-formed constituents in SAE, but to make their distribution quite restricted. In particular, they do not occur as root sentences because of the initial symbol (14). Similarly, they do not occur as *that*-clauses (i.e. in combination with *that*, as subjects of verbs like *upset* or as complements to verbs like *think*) because the complementizer *that* takes a complement headed by a finite verb.

Returning now to AAVE, we could try to account for examples like (11) by modifying the initial symbol, allowing a wider range of feature structures to be root sentences. In particular, we could say that AAVE allows another alternative in addition to (14), namely, (17).

(17)
$$\begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{pos} \\ \text{PRED} + \end{bmatrix} \\ \text{VAL} & \begin{bmatrix} \text{SPR} & \langle\ \rangle \\ \text{COMPS} & \langle\ \rangle \end{bmatrix} \end{bmatrix}$$

However, this analysis is not tenable, for it incorrectly predicts that the missing copula should only be possible in root sentences.[7] But examples like (11) can easily be embedded; sentences like (18) are perfectly normal in AAVE.

(18) a. The man she looking for ain't here.

b. If you alone, watch out!

Here the strings *she looking for* and *you alone* are in positions in which SAE would require a clause headed by a finite verb (*she* **is** *looking for* and *you* **are** *alone*), but AAVE permits the copula to be missing. It seems that the grammars of SAE and AAVE differ in that, where

[7] Ferguson (1971) notes that some languages only allow the copula to be missing in main clauses, suggesting that there may be languages with initial symbols like (17).

the former permits a finite clause headed by *is* or *are*, the latter allows a clause without the copula.

We can capture this informal generalization more precisely by introducing a new phrase structure rule for AAVE, rather than an additional initial symbol. Specifically, we can handle the missing copula in AAVE with a rule that says that a sequence of a nominative NP followed by another phrase may function as a finite clause. The following rule does this:

(19) Zero Copula Rule (AAVE):

$$\begin{bmatrix} \textit{phrase} & \\ \text{HEAD} & \begin{bmatrix}\textit{verb}\\ \text{FORM fin}\end{bmatrix} \\ \text{SPR} & \langle\ \rangle \\ \text{MODE} & \text{prop} \\ \text{INDEX} & \boxed{2}\end{bmatrix} \rightarrow \boxed{1}\text{NP}\begin{bmatrix}\text{CASE} & \text{nom}\end{bmatrix} \quad \begin{bmatrix}\textit{phrase} & \\ \text{SPR} & \langle \boxed{1} \rangle \\ \text{INDEX} & \boxed{2}\end{bmatrix}$$

This rule says that wherever a finite clause is called for, AAVE allows a phrase preceded by its nominative subject. Hence, this rule yields clauses that occur where finite clauses do and look as though they are missing a verb. In some cases (where the second constituent is [PRED +]), the resulting clauses will look as though they are missing a copula; and since the copula adds nothing semantically (except tense), they will also be interpreted as if they contained a copula. The effect of (19) is thus to license SDs like the following in AAVE:[8]

(20)

$$\begin{array}{c} \text{S} \\ \begin{bmatrix} \text{FORM} & \text{fin} \\ \text{SPR} & \langle\ \rangle \\ \text{SEM} & \begin{bmatrix}\text{MODE} & \text{prop}\\ \text{INDEX} & s_1 \\ \text{RESTR} & \langle \boxed{3}, \boxed{4} \rangle\end{bmatrix}\end{bmatrix} \end{array}$$

$$\begin{array}{cc} \boxed{1}\text{NP} & \text{AP} \\ \begin{bmatrix}\text{SEM} \begin{bmatrix}\text{RESTR} \langle \boxed{3} \rangle\end{bmatrix}\end{bmatrix} & \begin{bmatrix}\text{SPR} & \langle \boxed{1} \rangle \\ \text{SEM} & \begin{bmatrix}\text{INDEX} & s_1 \\ \text{RESTR} & \langle \boxed{4} \rangle\end{bmatrix}\end{bmatrix} \\ | & \triangle \\ \text{he} & \text{wild} \end{array}$$

Thus, the rule in (19) permits generation of SDs for the zero copula sentences under discussion, without positing any unpronounced words. As stated, the rule is quite general, allowing generation of a number of other types of sentences as well. We will resume exploring the consequences of positing this rule after the following worksection.

[8]The SD in (20) includes the effect of part i of the Semantics Principle, which in our grammar of SAE only affects SDs licensed by headed rules.

Worksection: Predictions and Responses

Two analyses of examples like (11) have been introduced here: one involving a verb that goes unpronounced; and a second that treats the examples as truly verbless. These analyses make subtly different predictions. The problems in this section explore these differences.

Problem 1: The Zero Copula and Ellipsis The analyses make different predictions about the behavior of 'zero copula' sentences in elliptical constructions. Explain the differences and explain how the following AAVE data bear on the choice between the analyses.

(21) a. *They said he wild, and he.

b. *They said we on tape, and we.

Problem 2: The Auxiliary Status of the Zero Copula One response to the argument from the previous problem might be to claim that the silent variant of finite *be* should not be exactly as given in (12), but should be a non-auxiliary (i.e. [AUX –]) subject raising verb instead. This would prevent it from undergoing the Ellipsis Lexical Rule, and would block the generation of (21). It would also prevent it from undergoing other lexical rules that are limited to [AUX +] verbs. These include the Inversion, Negation, and Contraction lexical rules.

The evidence from Negation and Contraction seem to support such an analysis:

(22) a. ?*You not the winner.

b. *We n't gonna lose.

A. Explain how examples like (22) are ruled out by the phrase structure rule analysis of the missing copula.

However, if there is a silent copula that is [AUX –], then it should also fail to undergo the Inversion lexical rule. Since the silent copula is inaudible, it is a bit tricky to determine its location. Hence, some ingenuity is required to test whether it inverts. The following data (common to SAE and AAVE) indicate that the material following the question word in what linguists call *wh*-questions must be an inverted clause – that is, a clause whose head verb underwent the Inversion lexical rule.

(23) a. Where am I going? vs. *Where I'm going?

b. Who were you talking to? vs. *Who you were talking to?

c. What did they find? vs. *What they found there?

d. When can we see it? vs. *When we can see it?

B. With this knowledge about *wh*-questions in mind, use the following data to argue that an analysis positing a silent copula could not claim it was [AUX –]:

(24) a. Where he going?

b. Who you talking to?

C. Given the conclusion in part B, explain why the data in (22) are problematical for the silent copula analysis.

Further Consequences of the Zero Copula Rule

Returning now to the formulation of the Zero Copula Rule in (20), let us consider what happens when the second constituent is not [PRED +]. This constituent will typically be a VP whose FORM value is something other than 'prp' or 'pass', for [PRED –] NPs, PPs, and APs would normally not take an NP specifier. Consequently, in addition to sentences that look as though they are missing a copula, (20) will generate sentences whose main verbs are [FORM inf] and [FORM psp].[9]

Except in the case of *be*, English does not distinguish morphologically between [FORM inf] verbs and present tense forms that are not third-person singular. Putting *be* aside for the moment, then, the only consequence of permitting the second constituent introduced by (20) to be a [FORM inf] VP is that we would get sentences with third person singular subjects whose verbs did not have the *-s* suffix. But this is, in fact, characteristic of AAVE.

(25) a. He see us.

b. She like me.

Similarly, in AAVE (though not in SAE), past participles (that is, [FORM psp] verbs) other than *been* are morphologically indistinguishable from past tense verbs (see Fasold and Wolfram (1970: 62)). Hence, if the second constituent introduced by (20) is a [FORM psp] verb, we get sentences that look exactly like past tense sentences and are difficult if not impossible to distinguish from them semantically.

What about the infinitival and past participial forms of *be*? Rule (20) says that they could appear in sentences where SAE would require a finite verb form. They would still require a [PRED +] complement – that is, a predicative NP, PP, or AP, or a present participial or passive participial VP. In other words, we predict the existence of sentences like (26) and (27); and these are, in fact, grammatical in AAVE ((26) from Fasold (1972), (27b,c,e) from Smitherman (1977), and (27d) from Hurston (1937)):

(26) a. Just so it be a safe Christmas and a happy Christmas.

b. I be on my porch.

c. I be so happy.

d. ...they be writing back to him.

[9](20) will need some further restrictions to prevent it from generating examples like **You to help me*, in which the second constituent is a CP. In addition, like the silent verb analysis, this analysis would require some complication in order to exclude first-person singular subjects. See Wasow and Sag (to appear) for an account of these restrictions.

e. I went on Saturday for the battery but the man be closed up.

(27) a. He been a fool.

b. They been there before.

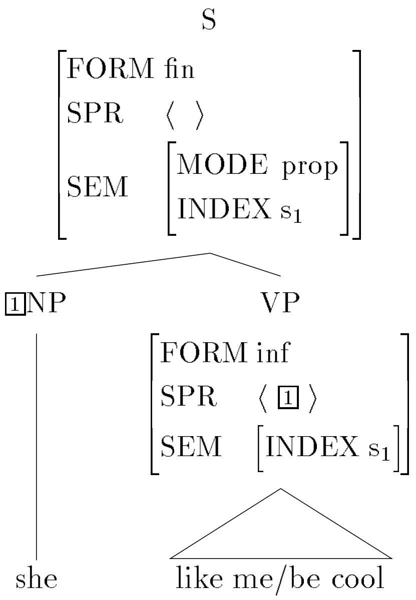
c. She been tardy twice last semester.

d. How long you been 'lowin' Johnny Taylor to kiss you?

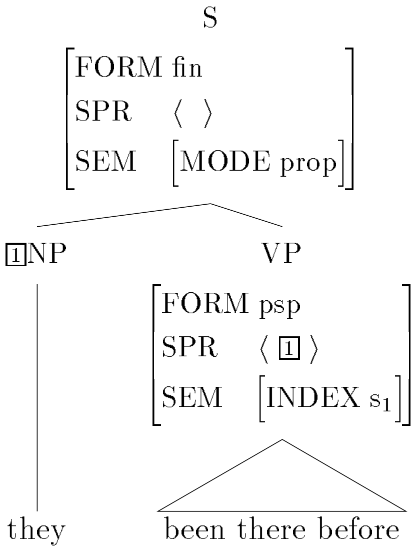
e. Tony been seen at her house yesterday.

Notice that the examples in (26) involve the invariant *be* that we discussed earlier. Indeed, we now see that it is no coincidence that AAVE allows both the invariant *be* and verbless sentences that appear to be missing a form of *be*. Both fall under a single generalization differentiating AAVE from SAE, namely, that where SAE requires clauses to be headed by a finite verb, AAVE does not. This is captured formally by the Zero Copula Rule, (19). This rule also licenses two other sorts of sentences that are ungrammatical in SAE, namely those exemplified in (25) and (27). And, as predicted, they are well-formed in AAVE and are assigned SDs like the following:

(28) a.



b.



14.3.3 Associated Meanings

As noted earlier, the invariant *be* in AAVE is often associated with an habitual interpretation. Our analysis does not predict that this form should have any special meaning. But not all instances of invariant *be* have this habitual interpretation. Invariant *be* can also be associated with assertions about the future, about hypothetical situations, or about timeless relations; these are illustrated in (29)[10]:

(29) a. 'Cause next year I just be in the seventh grade.

b. Speaker A: What would you do in the post office?
Speaker B: I probably be a mail carrier.

c. Hey baby, this be Heywood!

Some authors have taken this variety of interpretations for invariant *be* to indicate that there are multiple lexical items, or that some arise by deletion of other words in the context. We claim instead that invariant *be* simply lacks a semantic specification for time. The availability, in the same contexts, of finite forms of *be*, which do constrain the time reference in their semantics, leads listeners to infer that the choice of the timeless variant is intended to convey information. With verb phrases denoting concrete actions, if the speaker indicates their time cannot be identified, it suggests that they happen repeatedly. This is the habitual interpretation. Sometimes, however, the context will suggest some other temporal interpretation that is different from those that could be expressed with present or past tense, and such interpretations do in fact occur. Thus, under our analysis, the use of *be* as an aspectual marker does not require positing a separate lexical item for it. Rather, the habitual interpretation associated with invariant *be* is a natural consequence of its lack of time specification.

[10](29a,b) from Fasold (1972), and (29c) from Labov, et al (1968).

It is tempting also to identify the aspectual marker *BIN* with the *been* that occurs in sentences like (28). However, this would be a mistake. *BIN* occurs in contexts where unstressed *been* (or *have been*) would be syntactically impossible, e.g. (30), from Rickford and Green (to appear).

(30) a. I BIN got it.

b. Yeah, I BIN called her.

c. I thought I would'a BIN had a copy of that tape.

Thus, *BIN* is a separate lexical item. While it is very likely historically derived from *been* there seems to be no reason to relate them in the grammar of modern AAVE.

Finally, something should be said about the interpretation of verbless sentences like (15). Labov (1995) notes that such sentences are always interpreted like present tense sentences and uses this fact as an argument for deriving them by means of a rule that deletes a present tense form of *be*. But verbless utterances are normally interpreted as referring to the present context, even when they do not look like sentences missing a copula. For example, if someone exclaims: *A snake!*, it will normally be interpreted to mean that a snake is in the vicinity at the time of utterance. The time (and place) of an utterance is the default location for the meaning of that utterance. The verbal systems of many natural languages, including English, provide devices for making reference to a variety of other temporal locations, but utterances lacking verbs tend to receive the default interpretation – that is, the time of utterance. So once again, the grammar of AAVE need not specify a particular temporal meaning for sentences lacking verbs.

14.4 Conclusion

There is much more that could be said about variation in the English auxiliary system. Our superficial look at a few cases of linguistic variation was meant only to demonstrate that the theory of grammar developed here can accommodate such variation naturally. In the case of the main verb *have*, careful analysis revealed a close link between the variable syntactic properties and the semantics. In the case of AAVE, we were able to identify one difference between the grammars of AAVE and SAE (the Zero Copula Rule) that accounted for four superficially unrelated phenomena: verbless sentences, sentences with invariant *be*, sentences with invariant *been*, and sentences with third person singular subjects whose verbs lack the SAE *-s* agreement suffix. By providing careful formal analyses of these phenomena we have seen connections among them that had previously gone unnoticed.

14.5 Further Reading

Much of the pioneering work on AAVE was done by William Labov and his collaborators and students. Among the most important works are Labov, et al. (1968), Labov (1969, 1972), Baugh (1983), and Rickford and Green (in press). Labov (1995) is a very clear presentation of a different analysis of some of the same phenomena discussed in this chapter. Some discussion of the dialect variation with respect to the main verb *have* can be found in Chomsky (1957) and Pullum and Wilson (1977).

Chapter 15

Long Distance Dependencies

15.1 Introduction

One of the principal tasks of a theory of grammar is to provide mechanisms that make it possible to state economically the sorts of cooccurrence restrictions that exist in natural languages. Earlier chapters have developed a rich set of mechanisms for handling such things as differences in the valence of particular verbs, agreement between subject and verb, agreement between determiner and head noun, and restrictions on the distribution of dummy NPs. All of these cooccurrence restrictions are quite local, in the sense that they involve limitations on what can occur together as elements of a single clause. This locality was extended slightly with the analysis of raising, since it permits the cooccurrence restrictions of one verb in effect to be transmitted to a higher verb.

The present chapter introduces a new type of construction in which the locality of cooccurrence restrictions appears to be violated in a more radical way. In these cases, two elements (say, an NP and a verb) may appear arbitrarily far from one another in a sentence, despite the fact that there is a syntactic dependency (such as case marking or agreement) between them. Handling these 'long distance dependencies' (or LDDs, as we will call them) will require several changes to our theory:

- a new feature
- a reformulation of one of our principles
- a new principle, and
- a new phrase structure rule
- a new lexical rule

15.2 Some Data

It is a consequence of our current grammar that we correctly rule out examples like the following:

(1) a. *They handed to the baby.

b. *They handed the toy to.

c. *You have talked to.

d. *The children discover.

That is, because the lexical entry for *hand* specifies that its COMPS list has both an object NP and a PP on it, (1a,b) are ruled out through an interaction of the lexicon, the headed grammar rules, the Argument Realization Principle, and the Valence Principle. Similarly, (1c,d) are ruled out because both the preposition *to* and the verb *discover* require an object NP, which is missing from these examples.

So it's interesting to find that there are grammatical sentences that contain exactly the ungrammatical strings of words in (1). For example, there are questions containing *wh*-words (usually just called *WH*-QUESTIONS) like the following:

(2) a. What did they hand to the baby?

b. Who(m) did they hand the toy?

c. Who(m) should you have talked to?

d. What will the children discover?

There are also NPs modified by RELATIVE CLAUSES that contain the same ungrammatical strings:

(3) a. The toy which they handed to the baby...

b. The baby that they handed the toy to...

c. The people who(m) you have talked to...

d. The presents that the children discover...

And finally there is a kind of sentence which is used for emphasis of a certain sort that is usually called just a TOPICALIZED sentence. In this kind of sentence, a topicalized element may be followed by one of those same ungrammatical word sequences in (1):[1]

[1]When examples like (4) are first presented, some students claim that they find them unacceptable, but examination of actual usage indicates that topicalization is quite common, e.g. in examples like the following (from a cartoon in the newspaper):

(i) Me, you bring an empty food dish; him, you bring a leash.

The name 'topicalization' is actually rather misleading. To be sure, the fronted element refers to an entity whose role in the discourse is distinguished in some way, but that entity need not correspond to the 'topic of discussion' in any straightforward way, as (i) indicates.

To illustrate these points, consider a context like the following, where an example like (4b) seems quite natural:

(4) a. That toy, they handed to the baby.

b. The baby, they handed a toy to.

c. This kind of person, you have talked to.

d. Presents that come from grandma, the children (always) discover.

In each of the examples in (2)-(4), there is a dependency between an 'extra' phrase or 'filler' at the beginning of a clause and a 'gap' somewhere within the clause. As we've seen, elements that cannot normally be missing from a clause are allowed to be missing if there is an appropriate filler in the right place. Likewise, if there is a filler, then there must be a gap somewhere within the sentence that follows the filler:

(5) a. *What did Kim hand the toys to the baby?

b. *The dolls that Kim handed the toys to the baby....

c. *The dolls, Kim handed the toys to the baby.

In these constructions, the filler may be separated from the gap by extra clauses, as indicated in (6)-(8).

(6) a. What did you say they handed __ to the baby?

b. Who(m) did he claim that they handed the toy to __ ?

c. Who(m) do you think you have talked to __ ?

d. What will he predict that the children discover __ ?

(7) a. The toy which we believe they handed __ to the baby...

b. The baby that I think they handed the toy to __ ...

c. The person who(m) everyone thinks you have talked to __ ...

d. The presents that it annoys me that the children discover __ ...

(8) a. That toy, I think they handed __ to the baby.

b. This baby, I know that they handed a toy to __ .

c. That kind of person, you know you have talked to __ .

d. Presents that come from grandma, I know that the children (always) discover __ .

In fact, there may be multiple extra clauses intervening:

(9) What did you think Pat claimed I said they handed __ to the baby?

(v) A: How did they deal with all the screaming kids?
B: They promised to take the twins to a movie; they tossed new baseball gloves at Pat and Chris; and the baby, they handed a toy to.

15.3 Formulating the Problem

We want to be able to build clauses with elements missing within them. But somehow we have to keep track of the fact that something is missing. Furthermore, as the following contrasts show, we need to keep track of just what is missing:

(10) a. This, you can rely on.

b. *This, you can rely.

c. *On this, you can rely on.

d. On this, you can rely.

e. *On this, you can trust.

(11) a. Him, you can rely on.

b. *He, you can rely on

(12) a. The twins, I can't tell the difference between.

b. *That couple, I can't tell the difference between.

We can think of this as an information problem. We have to make sure that the phrases within the sentence keep track of what's missing from them as they get built. This has to be done just right, so as to make sure that sentences missing a phrase of type X (no matter how deeply embedded the X-type gap may be) combine with a filler of type X, and that fillers are only allowed when there is a gap for them to fill.

15.4 The Feature GAP

Suppose we use a feature, call it GAP, to encode the fact that a phrase is missing a certain kind of element. Although we won't get to sentences like this in this course, there are examples of clauses where more than one phrase is missing:[2]

(13) a. Problems this involved, my friends on the East Coast are difficult to talk to __ about __ .

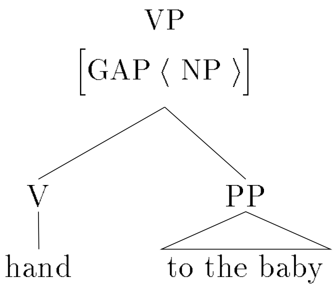
b. ?That mass murderer in San Quentin, I couldn't figure out which picture of __ I could print __ .

[2]Or, as linguists sometimes say (though it is somewhat of an oxymoron): 'where more than one gap appears'.

For this reason, it seems plausible to think that we need a mechanism that can, at least in principle, keep track of *many* missing elements. This suggests, given the tools at our disposal, that we introduce a feature whose value, like the features COMPS, SPR, and ARG-ST, is a list of feature structures. We will call this feature GAP.

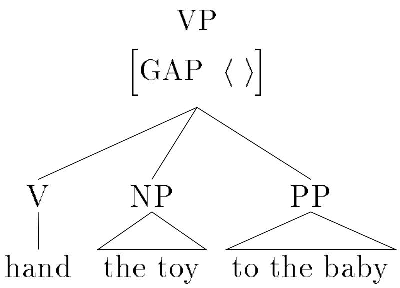
The intuitive significance of a phrase specified as, say, [GAP ⟨ NP ⟩] is that it is missing exactly one NP. The trick will be to make GAP have the right values in the right places. What we want is to allow a transitive verb or preposition to build a VP or PP without ever combining with an object NP. Furthermore, we want to make sure that it is only when an NP is missing that the relevant phrase is specified as [GAP ⟨ NP ⟩], as illustrated in (14).

(14)



When nothing is missing, we want the relevant phrase to be [GAP ⟨ ⟩], as in (15).

(15)



We will deal with this latest kind of seemingly 'missing' elements as an instance of something present in argument structure but absent from the valence features. We could accomplish this by means of a lexical rule, but a more general solution is to modify the Argument Structure Principle. Our current version of the principle says that a lexical SD is well formed only if the valence lists (SPR and COMPS) add up to the argument structure (ARG-ST). We now want to allow for the possibility that some element or elements of ARG-ST are on neither the SPR list nor the COMPS list, but on the GAP list instead.

In order to make this modification precise, we will introduce a kind of subtraction operation on lists, which we will mark with the symbol $\ominus$. Intuitively, if A and B are lists, then A $\ominus$ B is just a list that results from removing the elements of B from A. A couple of caveats are in order here. First, we want A $\ominus$ B to be defined only when the elements of B all occur in A, and in the same order. So there are many pairs of lists for which this kind of list subtraction is undefined. This is unlike our form of list addition ($\oplus$), which is defined for any pair of lists. Second, when A $\ominus$ B is defined, it need not be unique. For example, if A = ⟨NP, PP, NP⟩ and B = ⟨ NP ⟩, then there are two possible values for A $\ominus$ B, namely ⟨NP, PP⟩ and ⟨PP, NP⟩. We will interpret an equation like A $\ominus$ B = C to mean that there is some value for A $\ominus$ B that is identical to C.

With this new tool in hand, we can restate the Argument Structure Principle as indicated in following revised Lexical SD definition:

(16) Lexical SDs:

$$\begin{array}{c}\Delta\\ |\\ \omega\end{array}$$

is a well-formed lexical SD just in case

1. $\langle \omega, D\rangle$ is a lexical entry and Δ is the unification of D with the following feature structure description (Argument Realization Principle):

$$\begin{bmatrix} \text{SYN} & \begin{bmatrix} \text{VAL} & \begin{bmatrix}\text{SPR} & \boxed{1}\\ \text{COMPS} & \boxed{2} \ominus \boxed{3}\end{bmatrix}\\ \text{GAP} & \boxed{3}\end{bmatrix}\\ \text{ARG-ST} & \boxed{1} \oplus \boxed{2}\end{bmatrix} \quad \text{and}$$

2. An NP in a noninitial position of a word's ARG-ST list is [CASE acc] (Case Constraint). ...

Intuitively, (16) guarantees that any argument that could appear on a word's COMPS list can appear on its GAP list instead. (If a word has a nonempty SPR value, then the first argument corresponds to the specifier, not a member of the GAP list.) (16) further guarantees that whenever an argument is missing, any cooccurrence restrictions the word imposes on that argument will be registered on the element that appears on the GAP list.

Because of the result of list subtraction (as we have defined it, namely, $\ominus$) is not always unique, when we specify the ARG-ST in a verb's lexical entry without also specifying its VAL and GAP values, we are actually providing an underspecified lexical entry that can give rise to multiple lexical SDs. Consider, for example, the lexical entry for the lexeme *hand* as specified in (17).

(17)
$$\left\langle \text{hand}\ ,\ \begin{bmatrix} \textit{ttv-lxm} & \\ \text{ARG-ST} & \left\langle [\ ]_i\ ,\ [\ ]_k\ ,\ [\text{P-OBJ}\ \ \text{NP}_j] \right\rangle \\ \text{SEM} & \begin{bmatrix} \text{INDEX} & \text{s}\\ \text{RESTR} & \left\langle \begin{bmatrix} \text{RELN} & \text{hand}\\ \text{SIT} & \text{s}\\ \text{HANDER} & \text{i}\\ \text{HANDED-TO} & \text{j}\\ \text{HANDED-ITEM} & \text{k}\end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix} \right\rangle$$

There are numerous different lexical SDs that (words formed from) this lexical entry can give rise to. They differ with respect to specifications for the features VAL and GAP. In particular, each of the following lexical SDs (omitting the semantics, which is of no concern in the present context) illustrates a distinct way that a single word description can satisfy the ARP:

(18)
$$\begin{array}{c}\left[\begin{array}{ll}\textit{word} & \\ \mathrm{SYN} & \left[\begin{array}{ll}\mathrm{VAL} & \left[\begin{array}{ll}\mathrm{SPR} & \langle\, \boxed{1} \,\rangle \\ \mathrm{COMPS} & \langle\, \boxed{2}\mathrm{NP[acc]}\ ,\ \boxed{3}\mathrm{PP} \,\rangle\end{array}\right] \\ \mathrm{GAP}\ \langle\ \ \rangle & \end{array}\right] \\ \mathrm{ARG\text{-}ST} & \left\langle \begin{array}{c}\boxed{1}\mathrm{NP} \\ \left[\begin{array}{ll}\mathrm{CASE} & \mathrm{nom} \\ \mathrm{AGR} & \textit{non-3sing}\end{array}\right]\end{array}, \boxed{2}\ ,\ \boxed{3} \right\rangle\end{array}\right] \\ | \\ \text{hand}\end{array}$$

(19)
$$\begin{array}{c}\left[\begin{array}{ll}\textit{word} & \\ \mathrm{SYN} & \left[\begin{array}{ll}\mathrm{VAL} & \left[\begin{array}{ll}\mathrm{SPR} & \langle\, \boxed{1} \,\rangle \\ \mathrm{COMPS} & \langle\, \boxed{3}\mathrm{PP} \,\rangle\end{array}\right] \\ \mathrm{GAP}\ \langle\, \boxed{2}\mathrm{NP[acc]} \,\rangle & \end{array}\right] \\ \mathrm{ARG\text{-}ST} & \left\langle \begin{array}{c}\boxed{1}\mathrm{NP} \\ \left[\begin{array}{ll}\mathrm{CASE} & \mathrm{nom} \\ \mathrm{AGR} & \textit{non-3sing}\end{array}\right]\end{array}, \boxed{2}\ ,\ \boxed{3} \right\rangle\end{array}\right] \\ | \\ \text{hand}\end{array}$$

(20)
$$\begin{array}{c}\left[\begin{array}{ll}\textit{word} & \\ \mathrm{SYN} & \left[\begin{array}{ll}\mathrm{VAL} & \left[\begin{array}{ll}\mathrm{SPR} & \langle\, \boxed{1} \,\rangle \\ \mathrm{COMPS} & \langle\, \boxed{2}\mathrm{NP[acc]} \,\rangle\end{array}\right] \\ \mathrm{GAP}\ \langle\, \boxed{3}\mathrm{PP} \,\rangle & \end{array}\right] \\ \mathrm{ARG\text{-}ST} & \left\langle \begin{array}{c}\boxed{1}\mathrm{NP} \\ \left[\begin{array}{ll}\mathrm{CASE} & \mathrm{nom} \\ \mathrm{AGR} & \textit{non-3sing}\end{array}\right]\end{array}, \boxed{2}\ ,\ \boxed{3} \right\rangle\end{array}\right] \\ | \\ \text{hand}\end{array}$$

All of these are legitimate lexical SDs, and they serve as the bases for distinct phrasal SDs and hence distinct sentences: (18) describes *hand* in sentences like (21a); (18) in sentences like (21b); and (18) is the basis for our description of sentences like (21c).[3]

(21) a. You handed the toy to the baby.

b. What did you hand to the baby?

c. To whom did you hand the toy?

The preposition in (22) will now give rise to the lexical SDs in (23) and (24) (again omitting the semantics).

(22)
$$\left\langle \text{to}\ ,\ \begin{bmatrix} \textit{mkp-lxm} & \\ \text{SYN} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{prep} \end{bmatrix} \\ \text{VAL} & \begin{bmatrix} \text{SPR}\ \langle\ \rangle \end{bmatrix} \end{bmatrix} \\ \text{ARG-ST} & \left\langle \boxed{1}\text{NP[acc]} \right\rangle \end{bmatrix} \right\rangle$$

(23)
$$\begin{array}{c} \begin{bmatrix} \textit{word} & \\ \text{SYN} & \begin{bmatrix} \text{VAL} & \begin{bmatrix} \text{SPR} & \langle\ \rangle \\ \text{COMPS} & \langle\ \boxed{2}\text{NP[acc]}\ \rangle \end{bmatrix} \\ \text{GAP} & \langle\ \rangle \end{bmatrix} \\ \text{ARG-ST} & \langle\ \boxed{2}\ \rangle \end{bmatrix} \\ \Big| \\ \text{to} \end{array}$$

(24)
$$\begin{array}{c} \begin{bmatrix} \textit{word} & \\ \text{SYN} & \begin{bmatrix} \text{VAL} & \begin{bmatrix} \text{SPR} & \langle\ \rangle \\ \text{COMPS} & \langle\ \rangle \end{bmatrix} \\ \text{GAP} & \langle\ \boxed{2}\text{NP[acc]}\ \rangle \end{bmatrix} \\ \text{ARG-ST} & \langle\ \boxed{2}\ \rangle \end{bmatrix} \\ \Big| \\ \text{to} \end{array}$$

This last lexical SD is the one that appears as part of the description of sentences like (25).

[3] The ARP also allows for a lexical SD in which both the NP and PP complements are in the GAP list, rather than the COMPS list. As noted above, however, consideration of examples with multiple gaps (which are relatively rare in English) goes beyond the scope of this text.

(25) Which baby did you hand the toy to?

The GAP feature tells us which of a word's arguments is missing. The Argument Realization Principle, as we have reformulated it, permits us to freely instantiate gaps (other than elements that must be on the SPR list). Now we need some way of passing the information in the GAP value up from words like those just illustrated so that the phrases that they head will register the fact that something is missing. In fact, we need to pass up[4] the GAP information more generally, as we'll see in a moment, so we will adopt the more general principle in (26).

(26) The GAP Principle
(part of the definition of well-formed phrasal SD):

Unless R says otherwise, if D_h is the head of D_0 in the rule R, then, Δ is the result of unifying the SD in 1. with all of the following SDs:

...

e.
$$\begin{array}{ccc} & \left[\text{GAP } \boxed{1} \oplus ... \oplus \boxed{n}\right] & \\ [\text{GAP } \boxed{1}] & \dots & [\text{GAP } \boxed{n}] \\ \triangle & & \triangle \end{array}$$

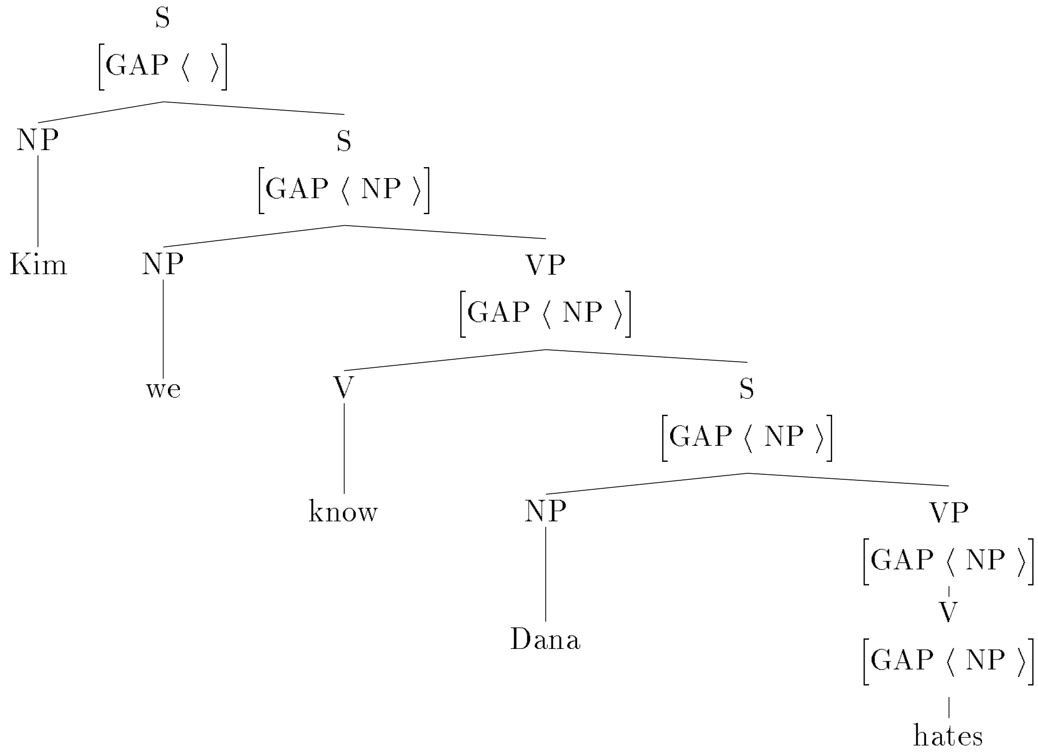
In other words, in a phrase sanctioned by a headed rule R, unless R explictly says otherwise, the GAP values of all the daughters must add up to be the GAP value of the mother.

The notion of lists 'adding up to' something is the same one we have employed before, namely the operation that we denote with the symbol '$\oplus$'. In most cases, most of the lists that are added up in this way are in fact empty, so that the addition is quite trivial. The purpose of this principle, once again, is to make sure that any information represented in the GAP value of a node will also be represented on that node's mother,[5] but most constituents don't contain gaps. The effect of (26), then, given our lexical entries (and the SDs they sanction in virtue of our revision of the ARP), is illustrated in (27):

[4] The metaphor of passing information between nodes should not be taken too literally. What the principle in (26) does is similar to what the Head Feature Principle and Valence Principle do, namely, enforce a particular relationship between certain feature values in mothers and daughters in phrasal SDs. That is, it is simply part of the our complex definition of well-formedness for SDs (and hence for the phrase structures that they describe).

[5] Here we are temporarily ignoring the exception clause, 'unless R explicitly says otherwise'. In fact this clause is a crucial component of the overall analysis. We will return to it shortly.

(27)



Note that we are suppressing empty GAP specifications on lots of nodes. But it is true everywhere in (27) (except the highest one, which we will deal with directly), that the GAP values of the daughters add up to the mother's GAP value. $((\langle\ \rangle \oplus \langle NP \rangle) = \langle NP \rangle = (\langle NP \rangle \oplus \langle\ \rangle))$.

We have not yet accounted for the disappearance of the NP from the GAP value at the topmost node of (27). Intuitively, what is going on here is that the filler NP (*Kim*) is introduced, thus discharging the obligation encoded in the GAP value. In order to formalize this intuition, we introduce a new phrase structure rule.

(28) Head-Filler Rule:

$$\begin{bmatrix} \textit{phrase} \\ \text{GAP} \quad \langle\ \rangle \end{bmatrix} \rightarrow \boxed{1}\begin{bmatrix} \textit{phrase} \\ \text{GAP} \quad \langle\ \rangle \end{bmatrix} \quad \text{H}\begin{bmatrix} \textit{phrase} \\ \text{FORM fin} \\ \text{SPR} \quad \langle\ \rangle \\ \text{GAP} \quad \langle \boxed{1} \rangle \end{bmatrix}$$

The GAP Principle (like the Valence Principle) allows for the propagation of the gap information upward through the SD to be stopped by a specification in a rule. (28) is the rule that does this. It introduces the filler as its first daughter, specifying that it is identical to the value of the GAP feature in the second daughter. The top structure in (27) satisfies the second clause of the Gap Principle with respect to this rule.

The mechanisms introduced to handle fillers and gaps guarantee that whenever a node of an SD is licensed by the Head Filler Rule, it follows that somewhere down inside of the finite S (which is the head), there will have to be exactly one word with a non-empty GAP list. This is the only way we have of licensing the removal of elements from a GAP list.

More precisely, this is our only way to license a node that is [GAP $\langle\ \rangle$] itself but dominates another node that has something on its GAP list. Consequently, the analysis presented introduces a filler if and only if there is a gap for it to fill.

We need one more modification in our grammar to ensure that all gaps ultimately get filled. We do this by revising our initial symbol to include a specification that it must have an empty GAP list. That is, our initial symbol is now the following:

(29)
$$\left[\begin{array}{ll} \textit{phrase} & \\ \text{SYN} & \left[\begin{array}{ll} \text{HEAD} & \left[\begin{array}{l} \textit{verb} \\ \text{FORM fin} \mid \text{imp} \end{array}\right] \\ \text{VAL} & \left[\begin{array}{ll} \text{SPR} & \langle\ \rangle \\ \text{COMPS} & \langle\ \rangle \end{array}\right] \\ \text{GAP} & \langle\ \rangle \end{array}\right] \end{array}\right]$$

Problem 1: An SD with a Gap Draw an SD for (8b). You should provide about the same level of formal detail as in (28).

◊**Problem 2: Blocking Filled Gaps** Examples (i) and (ii) are well-formed, but example (iii) is ungrammatical.

(i) Pat thinks that I rely on some sort of trick.

(ii) This mnemonic, Pat thinks that I rely on.

(iii) *This mnemonic, Pat thinks that I rely on some sort of trick.

Explain in detail why the mechanisms that license (i) and (ii) do not also permit (iii).

15.5 Subject Gaps

We have covered only the basic cases of LDDs. There are many additional complexities. For example, we have not discussed cases in which the gaps are not complements, but subjects or modifiers. In addition, we have not discussed the distribution of '*wh*-words' (such as *who, what, which*, etc.) in questions and relative clauses, nor the obligatory inverted order of subject and auxiliary verb in many questions. There is a rich literature investigating these and many other questions associated with LDDs, but such matters are beyond the scope of this text. In this section we sketch the basics of an account of subject extraction.

Our present account does not yet deal with examples like (30), because it is a general property of verbs (analyzed in terms of a constraint inherited from the type *verb-lexeme*) that they must have a singleton SPR list, rather than an empty one:

(30) a. Which candidates do you think like raw oysters?

b. That candidate, I think likes raw oysters.

That is, the ARP now requires that any member of a word's SPR list correspond to the first member of the ARG-ST (the verb's subject, in the present case). Hence whatever elements appear on a verb's GAP list must correspond to noninitial members of the ARG-ST list. Hence there is no way for a subject argument of a verb like *likes* to end up on the GAP list, and hence no account (yet) of examples like (30).

Subject Extraction is subject to special constraints in many languages. Hence it is not unreasonable for us to treat it in terms of a special rule, in this case the following lexical rule:

(31) Subject Extraction Lexical Rule:

$$\left\langle \boxed{0}, \begin{bmatrix} \textit{word} & \\ \text{SYN} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{verb} \\ \text{FORM fin} \end{bmatrix} \\ \text{VAL} & \begin{bmatrix} \text{SPR} \langle [\ ] \rangle \end{bmatrix} \\ \text{GAP} & \langle\ \rangle \end{bmatrix} \end{bmatrix} \right\rangle \Rightarrow \left\langle \boxed{0}, \begin{bmatrix} \textit{word} & \\ \text{SYN} & \begin{bmatrix} \text{VAL} \begin{bmatrix} \text{SPR} \langle\ \rangle \end{bmatrix} \\ \text{GAP} \langle \boxed{1} \rangle \end{bmatrix} \\ \text{ARG-ST} \left\langle \boxed{1}, ... \right\rangle & \end{bmatrix} \right\rangle$$

This rule maps any lexical entry for a finite verb form into a new lexical entry with an empty SPR list and a GAP list containing an element identified with the first argument – the subject of the verb. Lexical entries that are outputs of this rule will give rise to lexical SDs like (32).

(32)

$$\begin{bmatrix} \textit{word} & \\ \text{SYN} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{verb} \\ \text{FORM fin} \end{bmatrix} \\ \text{VAL} & \begin{bmatrix} \text{SPR} & \langle\ \rangle \\ \text{COMPS} & \langle \boxed{2}\text{NP[acc]} \rangle \end{bmatrix} \\ \text{GAP} & \left\langle \boxed{1}\begin{bmatrix} \text{AGR } \textit{3sing} \end{bmatrix} \right\rangle \end{bmatrix} \\ \text{ARG-ST} \langle \boxed{1}, \boxed{2} \rangle & \end{bmatrix}$$

likes

Note that the ARP is satisfied: the SPR list is empty, and the rest of the ARG-ST list (i.e. the whole ARG-ST list) is in the appropriate relation with the list values of COMPS and GAP.

Problem 3: Subject Gaps This problem is to make sure you understand how our analysis accounts for examples like (30).

(a) Sketch the lexical entry for *likes* that is the input to the Subject Extraction Lexical Rule.

(b) Sketch the lexical entry for *likes* that is the output of the Subject Extraction Lexical Rule.

(c) Sketch the entire SD for the sentence in (30b). Be sure to explain how our grammar ensures that all relevant feature specifications are as they are in your sketch.

(d) Does our analysis correctly predict the contrast between (30b) and (i)?
(i) *Those candidates, I think likes raw oysters.
Explain why or why not.

Problem 4: Irish Complementizers Consider the following example that shows the typical word order pattern of Modern Irish [data from McCloskey (1979)]:

(i) Shîl mé *goN* mbeadh sé ann
thought I COMP would-be he there
'I thought that he would be there.' [M 2a]

Irish is a VSO language, one which we might describe in terms of a head-spr-comp rule that introduced both kinds of dependents as sisters of the lexical head. Formulate such a rule and show the structure for sentence (i).

Now consider some further Irish data:

(ii) Dúirt mé *gurL* shîl mé *goN* mbeadh sé ann
said I goN+past thought I COMP would-be he there
'I said that I thought that he would be there.' [M 3a]

(iii) an fear *aL* shîl mé *aL* bheadh ann
[the man]$_j$ COMP thought I COMP would-be e_j there
'the man that I thought would be there' [M 2b]

(iv) an fear *aL* dúirt mé *aL* shil mé *aL* bheadh ann
[the man]$_j$ COMP said I COMP thought I COMP would-be e_j there
'the man that I said I thought would be there' [M 3a]

(v) an fear *aL* shil *goN* mbeadh sé ann
[the man]$_j$ COMP thought e_j COMP would-be he there
'the man that thought he would be there' [M 4a]

(vi) an fear *aL* dúirt sé *aL* shî *goN* mbeadh sé ann
[the man]$_j$ COMP said he COMP thought e_j COMP would-be he there
'the man that he said thought he would be there' [M 4c]

These data show that the complementizers *goN* and *aL* are in complementary distribution. That is, wherever *goN* is possible in these examples, *aL* is not, and vice versa.[6] Assume that both these elements project CPs similar to those projected from *that* complementizers in English. If we then make the further assumption that LDDs in

[6] For the purposes of this problem, you should ignore the difference between *gurL* and *goN*.

Irish work much as they do in English, we have all the tools we need to analyze the contrasts in (i) – (vi). Provide lexical entries for these two complementizers and show how your analysis will successfully explain the distributional differences between them.

15.6 The Coordinate Structure Constraint

One of the most discussed topics related to LDDs concerns restrictions on possible pairings of fillers and gaps. Although the position of filler and gap may be arbitrarily far apart, there are certain configurations that do not permit LDDs. Such configurations are known as 'islands' (a term due to Ross (1967)), and a major goal of syntactic research over the past three decades has been to understand where islands occur and why. In this section, we will look at one type of island, and show how our grammar correctly predicts its existence and its properties.

The following examples illustrate what Ross called the 'Coordinate Structure Constraint':

(33) a. *Here is the student that [the principal suspended [__ and Sandy]].

b. *Here is the student that [the principal suspended [Sandy and __]].

(34) a. *Here is the student that [the principal suspended __ and Sandy defended him].

b. *Here is the student that [the student council passed new rules and the principal suspended __].

(35) a. *Apple bagels, I can assure you that [Leslie likes __ and Sandy hates cream cheese].

b. *Apple bagels, I can assure you that [Leslie likes cream cheese and Sandy hates __].

Translating Ross's transformation-based formulation of the constraint into the language of fillers and gaps that we have been using, it can be stated as follows:

(36) In a coordinate structure,

(a) no conjunct may be a gap,

(b) nor may a gap be contained in a conjunct if its filler is outside of that conjunct.

Ross also noticed a systematic class of exceptions to this constraint, illustrated by (37).

(37) a. This is the dancer that [we bought [a portrait of __ and two photos of __]].

b. Here is the student that [the principal suspended __ and the teacher defended __].

c. Apple bagels, I can assure you that [Leslie likes __ and Sandy hates __].

To handle these, he appended an additional clause to the constraint, which we can formulate as follows:

(38) 'Across-the-Board' Exception (addendum to CSC):

...unless each conjunct has a gap paired with the same filler.

As presented, the Coordinate Structure Constraint seems quite arbitrary, and the Across-the-Board Exception is just an added complication. (36) and (38) are descriptive generalizations, which, ideally, should not have to be stipulated. It would be preferable if they emerged as consequences of independently motivated aspects of the analyses of LDDs and coordination. And in fact, we will see below that our accounts of LDDs and coordination interact to make precisely the right predictions in this domain.

Recall the grammar rule for coordination:

(39) $\left[\text{SYN } \boxed{1}\right] \rightarrow \left[\text{SYN } \boxed{1}\right]^{+} \quad \text{CONJ} \quad \left[\text{SYN } \boxed{1}\right]$

Intuitively, this allows any number of elements with the same SYN value to be conjoined. But GAP is part of SYN, so two phrases with different GAP values will have different SYN values. Consequently, two conjuncts in a coordinate structure cannot differ in their GAP value. If one has an empty GAP list and the other has a non-empty GAP list (as in (33)-(35)), then the structure is not licensed. On the other hand, it is possible for conjuncts to have non-empty GAP lists if they are ALL non-empty and all share the same value. This is what is illustrated in (37). In short, both the Coordinate Structure Constraint and the Across-the-Board exception to it fall out of our analysis as simple consequences.

We close this discussion with one final observation about LDDs and coordinate structures. There is an exception to (38), illustrated by (40):

(40) *Here is the student that [the principal suspended [__ and __]].

Our statements of the generalizations in (36) and (38), like Ross's original formulations of them, would in fact permit (40). But our analysis does not permit ANY sentences in which a gap constitutes a full conjunct. This is because non-empty GAP values in the lexicon are licensed by the Argument Realization Principle. Hence, the GAP must correspond to an argument of some lexical head, not to some phonetically empty consituent (a 'trace'). But conjuncts by themselves are always constituents. Therefore, by eliminating such empty consituents from the grammar of extraction dependencies, we provide an immediate account of the deviance of (40) (and also for the examples in (33). The Coordinate Structure Constraint AND ITS EXCEPTIONS are thus explained in the analysis we have developed.

15.7 Conclusion

The deduction of the Coordinate Structure Constraint and its exceptions from our analyses of coordination and LDDs is an elegant result,[7] providing significant support for our general approach to syntax.

[7] Essentially this account was first developed by Gerald Gazdar (1981), within the theory of Generalized Phrase Structure Grammar.

We will not examine other island constraints in this text. As with the Coordinate Structure Constraint, linguists have not been content to catalogue the environments in which filler-gap pairings are impossible. Rather, a great deal of effort has gone into the search for explanations of the islands, either in terms of the interaction of independently motivated elements of the theory (as in the example given above), or in terms of such factors as the architecture of the human language processing mechanisms. This is a fertile area of research, in which definitive answers have not yet been found.

15.8 Further Reading

Ross (1967) is probably the most influential work to date on the topic of long-distance dependencies. Chomsky (1973, 1977, 1986b) developed the most widely accepted approach to analyzing these constructions. Non-transformational treatments are presented by Zaenen (1983) and Gazdar (1981). The treatment presented here is unusual in not positing an empty category (a 'trace') in the position of the gap. Arguments for such a traceless analysis are presented by Sag and Fodor (1994).