The Passive Construction

10.1 Introduction

Perhaps the most extensively discussed syntactic phenomenon in generative grammar 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 that we use a lexical rule to capture the generality of that relationship.

We begin with some data to exemplify 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 nonsentences) 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 dumb ideas in children's heads.
     b. Dumb ideas are put in children's heads (by TV).
     c.*Dumb 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 active and passive pairs. In particular, the semantic roles of the arguments are the same – 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 less 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, aside from this one difference, active verbs and their corresponding passives have identical valence requirements. This is illustrated in (5), where the absence of an obligatory complement renders both the active and passive examples ungrammatical:

(5) a. Pat handed Chris *(a note).
  b. Chris was handed *(a note) (by Pat).
  c. TV puts dumb ideas *(into their heads).
  d. Dumb ideas are put *(into their heads) (by TV).

10.3 The Passive Lexical Rule

It would not be hard to formulate lexical entries for passive forms of verbs. To capture the generalizations stated informally above, however, we need to formulate a rule that can relate actives and passives. As was the case with 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 a mere listing of the passive forms for all transitive verbs.

Intuitively, then, we want a rule that does the following:
- turns the first NP complement into the subject;
- allows the subject either to turn into the object of a PP headed by *by* or to be omitted altogether;
- 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 until this point. A moment's reflection should reveal that the morphology of the passive form of a verb (or 'passive participle', as it is commonly called) is always identical to that of the past participle; this is especially clear if we consider verbs with exceptional past participles, such as *do* (*done*), *sink* (*sunk*) and *cut* (*cut*). This generalization is captured easily in our framework by invoking the same morphological function, F_{PSP}, for both the Past Participle Lexical Rule and the Passive Lexical Rule.

Before writing the Passive Lexical Rule, we need to decide what type of *l-rule* it is. The morphology of English passives is inconclusive on this point: no further affixes attach to passives. As far as the morphology is concerned, the rule could be either an *i-rule* or a *d-rule*. However, the syntactic aspects of passive are only consistent with the constraints on *d-rules*. Recall from Chapter 8 that the constraints on inflectional rules (*i-rules*) and derivational rules (*d-rules*) are as in (6) and (7), respectively.

(6)

$$i\text{-}rule : \begin{bmatrix} \text{INPUT} & \left\langle \text{X} \,, \begin{bmatrix} lexeme \\ \text{SYN} & \boxed{3} \\ \text{ARG-ST} & \boxed{A} \end{bmatrix} \right\rangle \\[3ex] \text{OUTPUT} & \left\langle \text{Y} \,, \begin{bmatrix} word \\ \text{SYN} & \boxed{3} \\ \text{ARG-ST} & \boxed{A} \end{bmatrix} \right\rangle \end{bmatrix}$$

(7)

$$d\text{-}rule : \begin{bmatrix} \text{INPUT} & \left\langle \text{X} \,, \begin{bmatrix} lexeme \\ \text{SYN} & /\boxed{3} \end{bmatrix} \right\rangle \\[3ex] \text{OUTPUT} & \left\langle \text{Y} \,, \begin{bmatrix} lexeme \\ \text{SYN} & /\boxed{3} \end{bmatrix} \right\rangle \end{bmatrix}$$

In order to change the subject and complements, the passive rule must specify either different SPR and COMPS values or different ARG-ST values on the INPUT and OUTPUT. The passive rule given immediately below specifies different ARG-ST values, but either strategy would be inconsistent with the constraints on *i-rule*. Therefore, given our theory of inflectional and derivational rules, passive must be a derivational rule.[1]

The following is a lexical rule that satisfies the desiderata given above:

(8)   Passive Lexical Rule

$$\begin{bmatrix} d\text{-}rule \\[1ex] \text{INPUT} & \left\langle \boxed{1} \,, \begin{bmatrix} tv\text{-}lxm \\ \text{ARG-ST} & \langle \, [\text{INDEX } i] \, \rangle \oplus \boxed{A} \end{bmatrix} \right\rangle \\[3ex] \text{OUPUT} & \left\langle F_{PSP}(\boxed{1}) \,, \begin{bmatrix} part\text{-}lxm \\ \text{SYN} & \begin{bmatrix} \text{HEAD} & [\text{FORM pass}] \end{bmatrix} \\ \text{ARG-ST} & \boxed{A} \oplus \left\langle \begin{bmatrix} \text{PP} \\ \text{FORM} & by \\ \text{INDEX} & i \end{bmatrix} \right\rangle \end{bmatrix} \right\rangle \end{bmatrix}$$

There are several points of explanation that need to be made here.

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[1]French again confirms this conclusion: There are four inflected forms of any given passive participle, the choice depending on the number and gender of the participle's subject NP. This indicates that the passivization rule in French feeds into various inflectional rules, and hence must be derivational.

First, like the present and past participle lexical rules, the OUTPUT of this rule is of type *part(iciple)-lxm*. This is a subtype of *const-lxm*, so passive participles, like other participles, undergo the Constant Lexeme Lexical Rule. The only effect of the Constant Lexeme Lexical Rule is to change the type of the second member of the lexical sequence to *word*. The type *word*, however, is constrained to satisfy the Argument Realization Principle. As such, OUTPUTs of the Constant Lexeme Lexical Rule will be subject to the Argument Realization Principle (Chapter 7).

Second, notice that most of the effects of the rule (which applies to any lexeme belonging to a subtype of *tv-lxm*) are in the ARG-ST. At a coarse level of description, what the rule does is rearrange the elements of the ARG-ST list. Because of the ARP, these rearrangements also affect the values of the valence features. Specifically, (8) makes the second element (corresponding to the direct object) of the input ARG-ST list be the first element (corresponding to the subject) of the output's ARG-ST list. Whatever follows the second element in the input also moves up in the list. (8) also adds a PP to the end of the ARG-ST list. The specification [FORM by] on this PP indicates that the PP must be headed by the preposition *by*. We will abbreviate 'PP[FORM by]' as 'PP[by]' (and similarly with other values of FORM). Hence a verbal lexeme with an argument structure like (9a) will give rise to a passive lexeme whose argument structure is (9b):

(9) a. $\left[\text{ARG-ST} \quad \langle \text{NP}_i , \text{NP}_j , \text{PP[to]} \rangle \right]$ (*send, give, fax...*)

    b. $\left[\text{ARG-ST} \quad \langle \text{NP}_j , \text{PP[to]} (, \text{PP[by]}_i) \rangle \right]$ (*sent, given, faxed...*)

After going through the Constant Lexeme Lexical Rule, (9b) licenses two basic kinds of word structure, both constrained by the ARP. These are shown in (10):

(10) a. $\left[\begin{array}{ll} \text{VAL} & \left[\begin{array}{ll} \text{SPR} & \langle \boxed{1} \rangle \\ \text{COMPS} & \langle \boxed{2} \rangle \end{array} \right] \\ \text{ARG-ST} & \langle \boxed{1}\text{NP}_j , \boxed{2}\text{PP[to]} \rangle \end{array} \right]$ (*sent, given, faxed...*)

    b. $\left[\begin{array}{ll} \text{VAL} & \left[\begin{array}{ll} \text{SPR} & \langle \boxed{1} \rangle \\ \text{COMPS} & \langle \boxed{2} , \boxed{3} \rangle \end{array} \right] \\ \text{ARG-ST} & \langle \boxed{1}\text{NP}_j , \boxed{2}\text{PP[to]} , \boxed{3}\text{PP[by]}_i \rangle \end{array} \right]$ (*sent, given, faxed...*)

Hence passive words will automatically give rise to passive VPs like (11), thanks to the Head-Complement Rule (and the HFP and the Valence Principle):

(11)
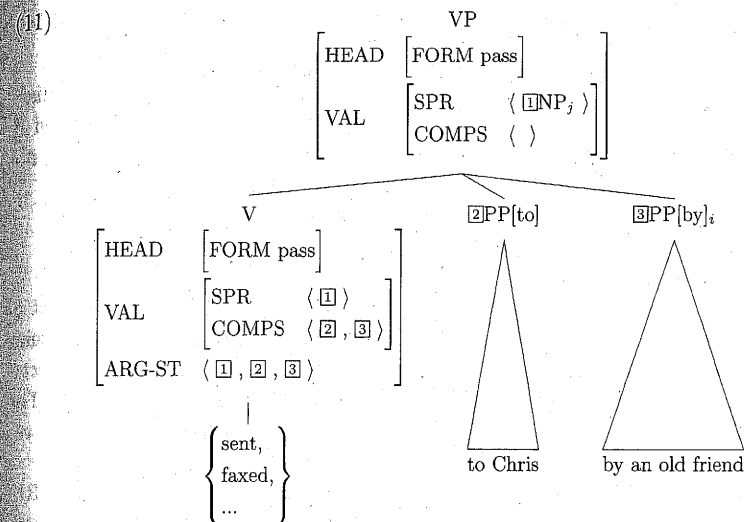
In other words, once our lexicon has passive words, our grammar already guarantees that we will have the appropriate passive VPs. These VPs can be selected as a complement by a few verbs, most notably *be*:

(12)   A message [was [sent to Chris by an old friend]].

A third noteworthy property of the Passive Lexical Rule concerns indices. Recall that subscripts indicate values of the feature INDEX; so (8) says that the optional PP[by] in the rule output has an index 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 INDEX value of the PP[by] of the passive word, and hence (since *by* is an argument-marking preposition) to the prepositional object within the PP[by] (see below). Likewise, since the verbal lexeme's object – the first element in the list $\boxed{A}$ – is identified with the subject of the passive word, it follows that the index of the subject of the passive word is the same as that of the verbal lexeme's direct object. Therefore, since the semantics remains unchanged by this lexical rule (because the rule says nothing to override the effect of the defeasible identity constraint), 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.

Fourth, note that 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 the subject of the corresponding passive participle, there is no need to 'unassign' an accusative case specification. All nonsubject arguments of verbs must be accusative, but the constraint that guarantees this (namely, the Case Constraint – see Chapter 8, Section 8.4.5) applies to lexical trees (word structures), not to lexemes. (See the definition of lexical licensing in Chapter 9, Section 9.2.7.) 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 (13):

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

    b.*Him was arrested by the police.

The nominative case of the subject in examples like (13) is determined by the auxiliary verb *was*, whose SPR value is identified 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 (14).

(14) $\left\{ \begin{array}{l} \text{Him} \\ \text{*He} \end{array} \right\}$ being arrested by the police upset many people.

Our passive rule achieves the desired effect in such instances by leaving the subject of the passive word unspecified for CASE. Hence, whatever case requirements the particular grammatical context imposes will determine the CASE value of a passive verb's subject.[2]

Fifth, the rule says that passive verbs are constrained to be [FORM pass].[3] 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 use of the FORM feature on the PP in (8), recall that FORM has so far been used primarily for distinguishing among verb forms. But in the Agent Nominalization Lexical Rule presented in Chapter 8, we already made use of the FORM feature on PPs: a PP specified as [FORM of] was meant to be one that could only be headed by the preposition *of*. In fact, we want to employ the feature FORM more generally, to mark the choice of preposition in other contexts as well. Since the set of prepositions in English is a relatively small, closed set, we might (in the limiting case) have a separate value of FORM for each preposition. In this book, we'll use only the following FORM values for prepositions:

(15)   of, by, to, at, in, about, on, for

Having FORM values for prepositions allows us, for example, to represent 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), as shown in the tree for a *by*-phrase sketched in (16):

(16)
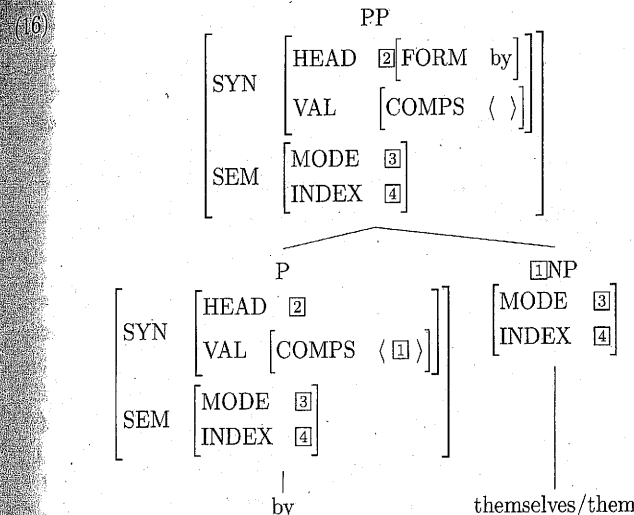
Crucially, we assume *by* is an argument-marking preposition whose INDEX and MODE values are identified with those of its NP object. Thus whatever index the passive participle assigns to the PP[by] complement will be identified with the index of the NP object within that PP.

The effect of the Passive Lexical Rule, then, is to map lexemes like (17) into lexemes like (18):[4]

(17)

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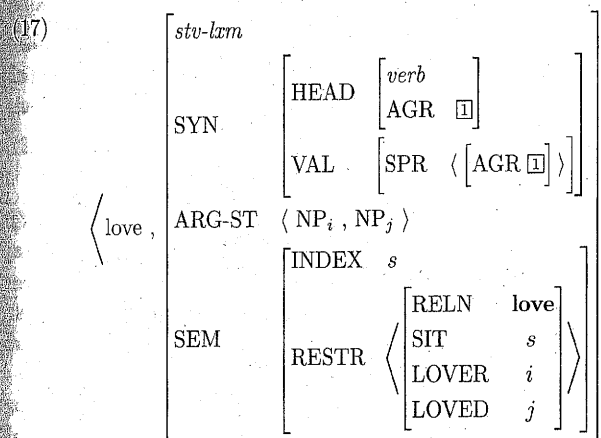
[2]Verbal gerunds like *being* in (14), for example, might lexically specify the case of their subject (which is identified with the subject of the passive participle in (14)).

[3]Note that the passive rule, like other lexical rules applying to verbs, isn't changing the FORM value, but rather further specifying it, as verbal lexemes are generally underspecified for FORM.

[4](17)–(19) represent families of lexical sequences, each of which contains more information than is shown. The optionality of the PP in (18) and (19) is just another kind of underspecification in the description. Each of the fully resolved lexical sequences that make up these families will have a fully resolved value for ARG-ST. Some will have ARG-ST values with the PP and some will have ARG-ST values without it.

(18)

$$
\left\langle \text{loved}, \begin{bmatrix} part\text{-}lxm \\ \text{SYN} \begin{bmatrix} \text{HEAD} \begin{bmatrix} verb \\ \text{AGR} \quad \boxed{1} \\ \text{FORM} \quad \text{pass} \end{bmatrix} \\ \text{VAL} \begin{bmatrix} \text{SPR} \ \langle [\text{AGR} \ \boxed{1}] \rangle \end{bmatrix} \end{bmatrix} \\ \text{ARG-ST} \ \left\langle \text{NP}_j , \begin{bmatrix} \text{PP} \\ \text{FORM} \quad \text{by} \\ \text{INDEX} \quad i \end{bmatrix} \right\rangle \\ \text{SEM} \begin{bmatrix} \text{INDEX} \quad s \\ \text{RESTR} \ \left\langle \begin{bmatrix} \text{RELN} & \text{love} \\ \text{SIT} & s \\ \text{LOVER} & i \\ \text{LOVED} & j \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix} \right\rangle
$$

The Constant Lexeme Lexical Rule then maps lexemes like (18) into words like (19):

(19)

$$
\left\langle \text{loved}, \begin{bmatrix} word \\ \text{SYN} \begin{bmatrix} \text{HEAD} \begin{bmatrix} verb \\ \text{AGR} \quad \boxed{1} \\ \text{FORM} \quad \text{pass} \end{bmatrix} \\ \text{VAL} \begin{bmatrix} \text{SPR} \quad \langle \boxed{2}[\text{AGR} \ \boxed{1}] \rangle \\ \text{COMPS} \quad \boxed{3} \end{bmatrix} \end{bmatrix} \\ \text{ARG-ST} \ \langle \boxed{2}\text{NP}_j \rangle \oplus \boxed{3} \left\langle , \begin{bmatrix} \text{PP} \\ \text{FORM} \quad \text{by} \\ \text{INDEX} \quad i \end{bmatrix} \right\rangle \\ \text{SEM} \begin{bmatrix} \text{INDEX} \quad s \\ \text{RESTR} \ \left\langle \begin{bmatrix} \text{RELN} & \text{love} \\ \text{SIT} & s \\ \text{LOVER} & i \\ \text{LOVED} & j \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix} \right\rangle
$$

Note that the effect of the ARP is seen in (19), since these lexical sequences involve *words*.

10.4 The Verb *Be* in Passive Sentences

What about the forms of *be*, which in all of our examples (so far) immediately precede the passive participle? The first thing to observe is that passive participles can also occur in environments that lack any form of *be*. Some examples are given in (20):

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

b. Liked by many people but respected by few, Jean will have to run an aggressive reelection 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.[5]

More precisely, our analysis needs to say that the passive *be* takes a complement that is a VP[FORM pass] like the one shown in (11) above. This means that the ARG-ST list of the lexeme *be* contains both an NP subject and a VP[FORM pass]. A few points are worth noting here. First, this is the first time we have considered VP arguments/complements in detail, though our Head-Complement Rule permits them, as we saw earlier (see Section 8.5.1 of Chapter 8). We will see many more examples of VP complements soon. Second, since FORM is a head feature, a verb's FORM value will show up on its mother VP node. Hence if a verb like *be* selects a VP[FORM pass] complement, that is sufficient to guarantee that the complement's head daughter will be a V[FORM pass].

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), repeated here as (21a), the agreement indicates that *the cat* should be treated as the subject (that is, the SPR) of *was*:

(21) a. The cat was bitten by the dog.

b.*The cat were bitten by the dog.

This is further supported by the unacceptability of (21b). But in our discussion of passive participles in the previous section, we discussed *the cat* 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.

Our analysis provides a unified account of both these observations by identifying the subject of *be* with the subject of the passive verb. That is, there is only one subject NP in the sentence, but it is identified with the first member of the ARG-ST list of both *be* and the passive verb. As the subject of *be*, it is required to satisfy the agreement constraints imposed by the relevant inflected form of *be*, i.e. *was* in (21a). As the subject of the passive verb, it will also be assigned the semantic role that the object NP would take in an active sentence (the BITTEN role, rather than the BITER role that an active

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[5]We'll return to the issue of whether we can analyze other uses of *be* in terms of this same lexical entry in Chapter 11.

form of *bite* would assign to its subject).

How exactly do we identify the subject of *was* with the subject of the passive verb *bitten*? First of all, it is important to see that half the job has already been accomplished by the Valence Principle, which requires that in a structure like (22), the SPR value of the passive verb is identical with that of the passive VP:

(22)

$$
\begin{array}{c}
\text{VP} \\
\left[\begin{array}{ll}
\text{HEAD} & \left[\text{FORM pass}\right] \\
\text{VAL} & \left[\begin{array}{ll} \text{SPR} & \langle \boxed{1}\text{NP}_j \rangle \\ \text{COMPS} & \langle\ \rangle \end{array}\right]
\end{array}\right]
\end{array}
$$

$$
\begin{array}{cc}
\text{V} & \boxed{2}\text{PP[by]}_i \\
\left[\begin{array}{ll}
\text{HEAD} & \left[\text{FORM pass}\right] \\
\text{VAL} & \left[\begin{array}{ll} \text{SPR} & \langle \boxed{1} \rangle \\ \text{COMPS} & \langle \boxed{2} \rangle \end{array}\right] \\
\text{ARG-ST} & \langle \boxed{1}, \boxed{2} \rangle
\end{array}\right] \\
\mid \\
\text{bitten} \qquad\qquad \text{by the dog}
\end{array}
$$
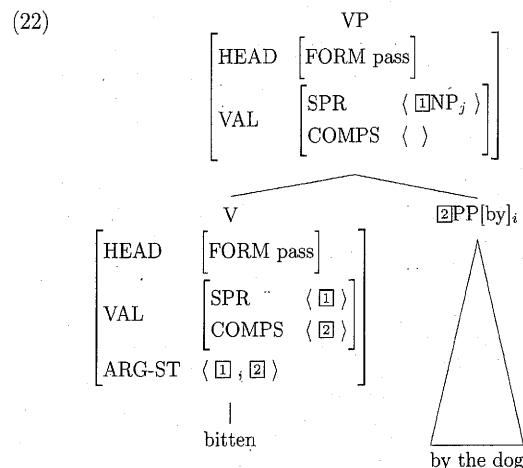
To represent the fact that *be* and its passive VP complement share the same subject, we need only add a constraint (using the familiar device of tagging) which specifies that the first argument of *be* (its subject) is identical to the SPR value of its VP[FORM pass] argument. We can now formulate the lexical entry for the passive *be* as follows:

(23)

$$
\left\langle \text{be},\
\begin{array}{l}
\left[\begin{array}{ll}
\textit{be-lxm} \\
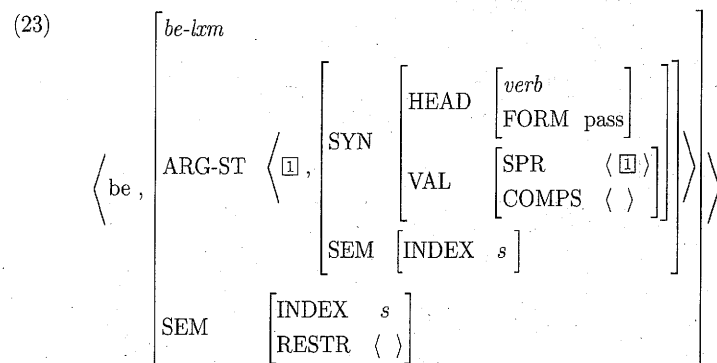\text{ARG-ST} & \left\langle \boxed{1},\ \left[\begin{array}{ll} \text{SYN} & \left[\begin{array}{ll} \text{HEAD} & \left[\begin{array}{l} \textit{verb} \\ \text{FORM pass} \end{array}\right] \\ \text{VAL} & \left[\begin{array}{ll} \text{SPR} & \langle \boxed{1} \rangle \\ \text{COMPS} & \langle\ \rangle \end{array}\right] \end{array}\right] \\ \text{SEM} & \left[\text{INDEX}\quad s\right] \end{array}\right] \right\rangle \\
\text{SEM} & \left[\begin{array}{ll} \text{INDEX} & s \\ \text{RESTR} & \langle\ \rangle \end{array}\right]
\end{array}\right]
\end{array}
\right\rangle
$$

What this entry says is that *be* belongs to a new type *be-lxm* (a subtype of *verb-lxm* whose properties do not yet concern us) and takes a VP argument specified as [FORM pass]. In addition, this *be* says that its subject must be the same as its complement's subject. This means that the subject of the sentence will also serve as the subject of the verb that heads the complement VP, according to the Valence Principle. And because *be* adds nothing to the meaning except the information that the complement's INDEX value is the same as that of *be*, (23) also guarantees that the semantics of the verb phrase headed

by *be* is identical to the semantics of *be*'s VP complement. (Note that *be-lxm* inherits the constraint [MODE prop] from the type *verb-lxm*.)

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 using lexical types can simplify lexical entries such as these.

Exercise 1: Shared Subjects

Why doesn't the lexical entry in (23) license sentences like (i)?

(i)*A cat was a cat bitten by the dog.

10.5   An Example

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

(24)

$$
\begin{array}{c}
\text{S} \\
\overbrace{\qquad\qquad\qquad\qquad} \\
\end{array}
$$

$$
\begin{array}{cc}
\text{NP} & \text{VP} \\
\mid & \left[\text{FORM fin}\right] \\
\text{Chris} & \begin{array}{cc} \text{V} & \text{VP} \\ \left[\text{FORM fin}\right] & \left[\text{FORM pass}\right] \\ \mid & \\ \text{was} & \begin{array}{ccc} \text{V} & \text{NP} & \text{PP} \\ \left[\text{FORM pass}\right] & & \\ \mid & & \\ \text{handed} & \begin{array}{cc} \text{D} & \text{N} \\ \mid & \mid \\ \text{a} & \text{note} \end{array} & \begin{array}{cc} \text{P} & \text{NP} \\ \mid & \mid \\ \text{by} & \text{Pat} \end{array} \end{array} \end{array} \end{array}
$$
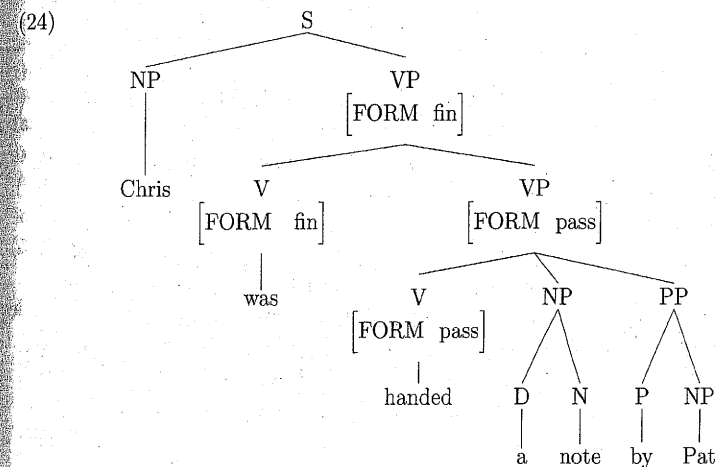
In this phrase structure, the word *was* is part of a family of lexical sequences constrained as shown in (25):

(25)

$$
\left\langle was, \begin{bmatrix} word \\ SYN & \begin{bmatrix} HEAD & \begin{bmatrix} verb \\ AGR & \boxed{5} \\ FORM & fin \end{bmatrix} \\ VAL & \begin{bmatrix} SPR & \langle \boxed{1}[AGR \ \boxed{5}] \rangle \\ COMPS & \langle \boxed{2} \rangle \end{bmatrix} \end{bmatrix} \\ ARG\text{-}ST & \left\langle \boxed{1}\begin{bmatrix} AGR & 3sing \\ CASE & nom \end{bmatrix}, \boxed{2}\begin{bmatrix} HEAD & \begin{bmatrix} verb \\ FORM & pass \end{bmatrix} \\ VAL & \begin{bmatrix} SPR & \langle \boxed{1} \rangle \\ COMPS & \langle \ \rangle \end{bmatrix} \\ INDEX & s \end{bmatrix} \right\rangle \\ SEM & \begin{bmatrix} MODE & prop \\ INDEX & s \\ RESTR & \langle \dots \rangle \end{bmatrix} \end{bmatrix} \right\rangle
$$

This is the same as (23), except that it includes constraints contributed by the Past-Tense Verb Lexical Rule. In particular (25) ensures that *was* is finite (i.e. [FORM fin]) and that it has past-tense semantics (suppressed here) and a third-person singular subject.[6] Note that the subject in (25) is identical to the complement's subject (as was the case in (23)). Further, the verb's SPR value is constrained to be identical to the first member of the ARG-ST list. This, together with the COMPS value, is the result of the ARP, which (25) must obey.

So now let us consider more closely the VP[pass], whose head is the passive participle *handed*. The lexical entry for *hand* is the following:

(26)

$$
\left\langle hand, \begin{bmatrix} dtv\text{-}lxm \\ ARG\text{-}ST & \langle X_i, Y_j, Z_k \rangle \\ SEM & \begin{bmatrix} INDEX & s \\ RESTR & \left\langle \begin{bmatrix} RELN & \mathbf{hand} \\ SIT & s \\ HANDER & i \\ RECIPIENT & j \\ HANDED & k \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix} \right\rangle
$$

The lexical sequences satisfying this lexical entry all obey (27):

(27)

$$
\left\langle hand, \begin{bmatrix} dtv\text{-}lxm \\ SYN & \begin{bmatrix} HEAD & \begin{bmatrix} verb \\ AGR & \boxed{6} \end{bmatrix} \\ VAL & \begin{bmatrix} SPR & \langle [AGR \ \boxed{6}] \rangle \end{bmatrix} \end{bmatrix} \\ ARG\text{-}ST & \langle NP_i, NP_j, NP_k \rangle \\ SEM & \begin{bmatrix} MODE & prop \\ INDEX & s \\ RESTR & \left\langle \begin{bmatrix} RELN & \mathbf{hand} \\ SIT & s \\ HANDER & i \\ RECIPIENT & j \\ HANDED & k \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix} \right\rangle
$$

In addition, they may undergo the Passive Lexical Rule, yielding lexical sequences like the following:

(28)

$$
\left\langle handed, \begin{bmatrix} part\text{-}lxm \\ SYN & \begin{bmatrix} HEAD & \begin{bmatrix} verb \\ AGR & \boxed{6} \\ FORM & pass \end{bmatrix} \\ VAL & \begin{bmatrix} SPR & \langle [AGR \ \boxed{6}] \rangle \end{bmatrix} \end{bmatrix} \\ ARG\text{-}ST & \left\langle NP_j, NP_k \left(, \begin{bmatrix} PP \\ FORM & by \\ INDEX & i \end{bmatrix} \right) \right\rangle \\ SEM & \begin{bmatrix} MODE & prop \\ INDEX & s \\ RESTR & \left\langle \begin{bmatrix} RELN & \mathbf{hand} \\ SIT & s \\ HANDER & i \\ RECIPIENT & j \\ HANDED & k \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix} \right\rangle
$$

And these may undergo the Constant Lexeme Lexical Rule to give sequences like (29): (Note that as words, these are subject to the ARP.)

---

[6]The verb *be* is unique among English verbs in distinguishing different forms (*was* and *were*) in the past tense. See note 34 of Chapter 8.

(29)

$$
\left\langle \text{handed} \,,\;
\begin{bmatrix}
word \\[4pt]
\text{SYN} \begin{bmatrix}
\text{HEAD} \begin{bmatrix} verb \\ \text{AGR} \quad \boxed{6} \\ \text{FORM} \quad pass \end{bmatrix} \\[10pt]
\text{VAL} \begin{bmatrix} \text{SPR} \quad \langle \boxed{1}[\text{AGR } \boxed{6}] \rangle \\ \text{COMPS} \quad \boxed{B} \end{bmatrix}
\end{bmatrix} \\[24pt]
\text{ARG-ST} \; \langle \boxed{1}\text{NP}_j \rangle \oplus \boxed{B} \left\langle \text{NP}_k \left(, \begin{bmatrix} \text{PP} \\ \text{FORM} \quad by \\ \text{INDEX} \quad i \end{bmatrix} \right) \right\rangle \\[24pt]
\text{SEM} \begin{bmatrix}
\text{MODE} \quad prop \\
\text{INDEX} \quad s \\
\text{RESTR} \left\langle \begin{bmatrix} \text{RELN} & \mathbf{hand} \\ \text{SIT} & s \\ \text{HANDER} & i \\ \text{RECIPIENT} & j \\ \text{HANDED} & k \end{bmatrix} \right\rangle
\end{bmatrix}
\end{bmatrix}
\right\rangle
$$
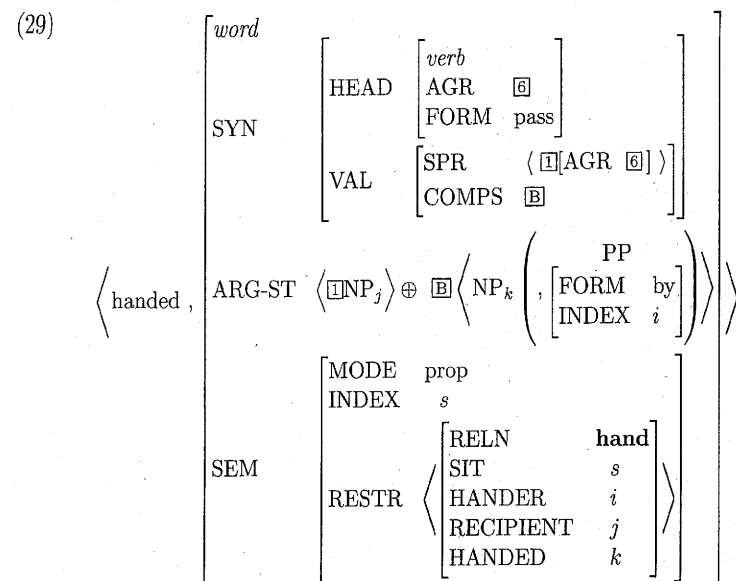
Lexical sequences like (29) form the basis for word structures like (30), where the optionality of the PP is resolved, and the Case Constraint and the Binding Theory come into play:

(30)

$$
\begin{bmatrix}
word \\[4pt]
\text{SYN} \begin{bmatrix}
\text{HEAD} \begin{bmatrix} verb \\ \text{AGR} \quad \boxed{6} \\ \text{FORM} \quad pass \end{bmatrix} \\[10pt]
\text{VAL} \begin{bmatrix} \text{SPR} \quad \langle \boxed{1}[\text{AGR } \boxed{6}] \rangle \\ \text{COMPS} \quad \langle \boxed{2}, \boxed{3} \rangle \end{bmatrix}
\end{bmatrix} \\[24pt]
\text{ARG-ST} \; \left\langle \boxed{1}\text{NP}_j \,, \boxed{2}\text{NP}_k[acc] \,, \begin{bmatrix} \boxed{3}\text{PP} \\ \text{FORM} \quad by \\ \text{INDEX} \quad i \end{bmatrix} \right\rangle \\[24pt]
\text{SEM} \begin{bmatrix}
\text{MODE} \quad prop \\
\text{INDEX} \quad s \\
\text{RESTR} \left\langle \begin{bmatrix} \text{RELN} & \mathbf{hand} \\ \text{SIT} & s \\ \text{HANDER} & i \\ \text{RECIPIENT} & j \\ \text{HANDED} & k \end{bmatrix} \right\rangle
\end{bmatrix}
\end{bmatrix}
$$

|
handed
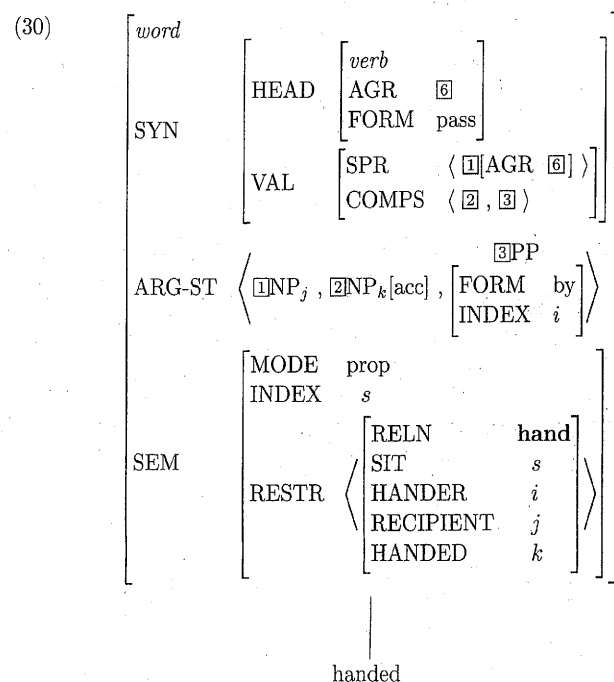
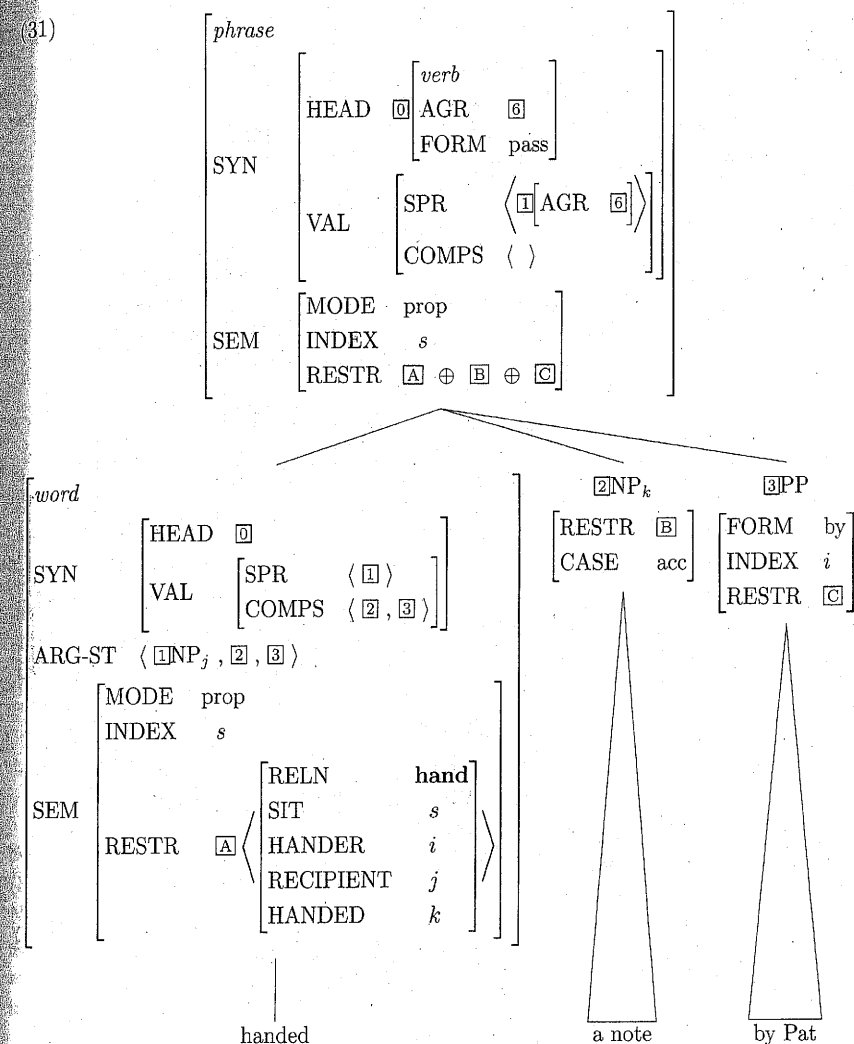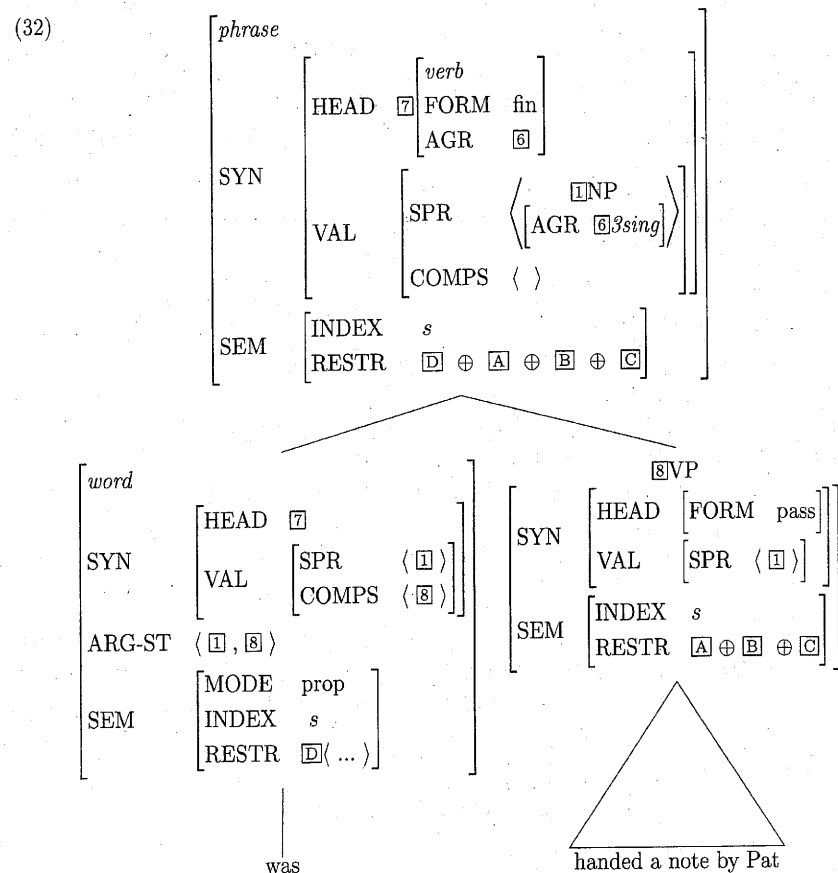This is consistent with the use of *handed* in (24). (30) fits into the larger tree corresponding to the VP[pass] shown in (31):

(31)

$$
\begin{bmatrix}
phrase \\[4pt]
\text{SYN} \begin{bmatrix}
\text{HEAD} \boxed{0} \begin{bmatrix} verb \\ \text{AGR} \quad \boxed{6} \\ \text{FORM} \quad pass \end{bmatrix} \\[10pt]
\text{VAL} \begin{bmatrix} \text{SPR} \quad \langle \boxed{1}[\text{AGR } \boxed{6}] \rangle \\ \text{COMPS} \quad \langle \; \rangle \end{bmatrix}
\end{bmatrix} \\[24pt]
\text{SEM} \begin{bmatrix}
\text{MODE} \quad prop \\
\text{INDEX} \quad s \\
\text{RESTR} \quad \boxed{A} \oplus \boxed{B} \oplus \boxed{C}
\end{bmatrix}
\end{bmatrix}
$$

$$
\begin{bmatrix}
word \\[4pt]
\text{SYN} \begin{bmatrix}
\text{HEAD} \quad \boxed{0} \\[6pt]
\text{VAL} \begin{bmatrix} \text{SPR} \quad \langle \boxed{1} \rangle \\ \text{COMPS} \quad \langle \boxed{2}, \boxed{3} \rangle \end{bmatrix}
\end{bmatrix} \\[18pt]
\text{ARG-ST} \; \langle \boxed{1}\text{NP}_j \,, \boxed{2}, \boxed{3} \rangle \\[18pt]
\text{SEM} \begin{bmatrix}
\text{MODE} \quad prop \\
\text{INDEX} \quad s \\
\text{RESTR} \quad \boxed{A} \left\langle \begin{bmatrix} \text{RELN} & \mathbf{hand} \\ \text{SIT} & s \\ \text{HANDER} & i \\ \text{RECIPIENT} & j \\ \text{HANDED} & k \end{bmatrix} \right\rangle
\end{bmatrix}
\end{bmatrix}
$$

$$
\boxed{2}\text{NP}_k \begin{bmatrix} \text{RESTR} & \boxed{B} \\ \text{CASE} & acc \end{bmatrix}
\qquad
\boxed{3}\text{PP} \begin{bmatrix} \text{FORM} & by \\ \text{INDEX} & i \\ \text{RESTR} & \boxed{C} \end{bmatrix}
$$

|
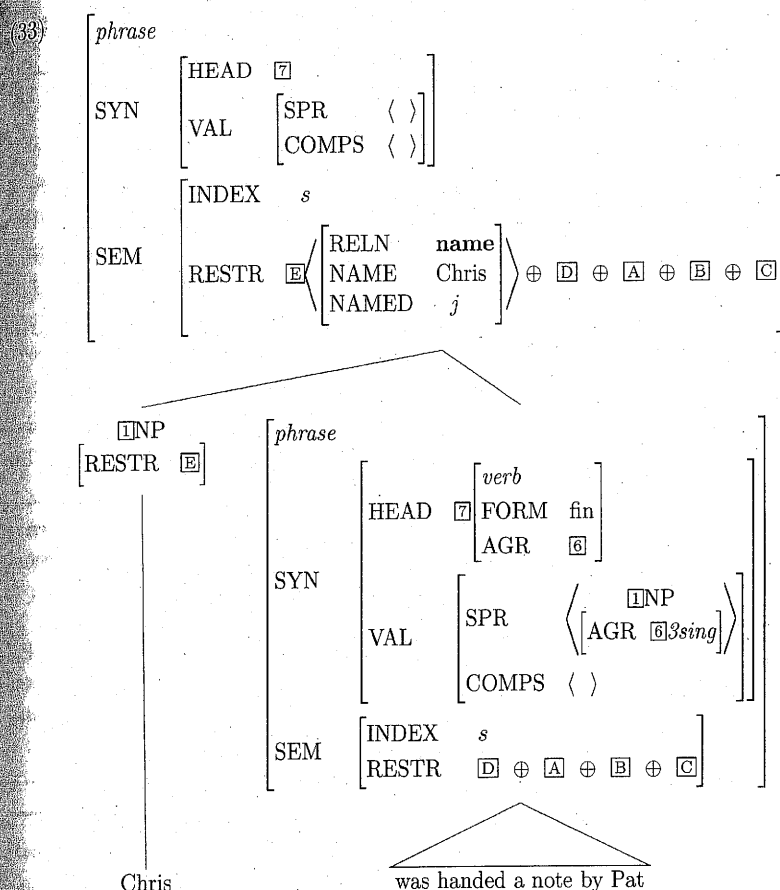handed   a note   by Pat

As usual, the HEAD, SPR, and INDEX values of the mother are the same as those of the head daughter (courtesy of the HFP, the Valence Principle, and the Semantic Inheritance Principle, respectively), and the mother's RESTR value is the sum of the daughters' RESTR values (courtesy of the Semantic Compositionality Principle).

This VP[pass] combines with a word structure licensed by the lexical sequence in (25) to form the VP[fin] in (24), which is shown in more detail in (32):

(32)

$$
\begin{bmatrix}
phrase \\
\text{SYN} \begin{bmatrix} \text{HEAD} & \boxed{7} \begin{bmatrix} verb \\ \text{FORM} & \text{fin} \\ \text{AGR} & \boxed{6} \end{bmatrix} \\ \text{VAL} & \begin{bmatrix} \text{SPR} & \left\langle \boxed{1}\text{NP} \atop [\text{AGR } \boxed{6}3sing] \right\rangle \\ \text{COMPS} & \langle \ \rangle \end{bmatrix} \end{bmatrix} \\
\text{SEM} \begin{bmatrix} \text{INDEX} & s \\ \text{RESTR} & \boxed{D} \oplus \boxed{A} \oplus \boxed{B} \oplus \boxed{C} \end{bmatrix}
\end{bmatrix}
$$

$$
\begin{bmatrix}
word \\
\text{SYN} \begin{bmatrix} \text{HEAD} & \boxed{7} \\ \text{VAL} & \begin{bmatrix} \text{SPR} & \langle \boxed{1} \rangle \\ \text{COMPS} & \langle \boxed{8} \rangle \end{bmatrix} \end{bmatrix} \\
\text{ARG-ST} & \langle \boxed{1}, \boxed{8} \rangle \\
\text{SEM} \begin{bmatrix} \text{MODE} & \text{prop} \\ \text{INDEX} & s \\ \text{RESTR} & \boxed{D}\langle \dots \rangle \end{bmatrix}
\end{bmatrix}
\qquad
\boxed{8}\text{VP} \begin{bmatrix} \text{SYN} \begin{bmatrix} \text{HEAD} & [\text{FORM} \ \text{pass}] \\ \text{VAL} & [\text{SPR} \ \langle \boxed{1} \rangle] \end{bmatrix} \\ \text{SEM} \begin{bmatrix} \text{INDEX} & s \\ \text{RESTR} & \boxed{A} \oplus \boxed{B} \oplus \boxed{C} \end{bmatrix} \end{bmatrix}
$$

was   handed a note by Pat

Again note the effect of the HFP, the Valence Principle, the Semantic Compositionality Principle, and the Semantic Inheritance Principle.

And finally, this VP combines with the subject NP, as shown in (33):

(33)

$$
\begin{bmatrix}
phrase \\
\text{SYN} \begin{bmatrix} \text{HEAD} & \boxed{7} \\ \text{VAL} & \begin{bmatrix} \text{SPR} & \langle \ \rangle \\ \text{COMPS} & \langle \ \rangle \end{bmatrix} \end{bmatrix} \\
\text{SEM} \begin{bmatrix} \text{INDEX} & s \\ \text{RESTR} & \boxed{E}\left\langle \begin{bmatrix} \text{RELN} & \textbf{name} \\ \text{NAME} & \text{Chris} \\ \text{NAMED} & j \end{bmatrix} \right\rangle \oplus \boxed{D} \oplus \boxed{A} \oplus \boxed{B} \oplus \boxed{C} \end{bmatrix}
\end{bmatrix}
$$

$$
\boxed{1}\text{NP} \begin{bmatrix} \text{RESTR} & \boxed{E} \end{bmatrix}
\qquad
\begin{bmatrix}
phrase \\
\text{SYN} \begin{bmatrix} \text{HEAD} & \boxed{7} \begin{bmatrix} verb \\ \text{FORM} & \text{fin} \\ \text{AGR} & \boxed{6} \end{bmatrix} \\ \text{VAL} & \begin{bmatrix} \text{SPR} & \left\langle \boxed{1}\text{NP} \atop [\text{AGR } \boxed{6}3sing] \right\rangle \\ \text{COMPS} & \langle \ \rangle \end{bmatrix} \end{bmatrix} \\
\text{SEM} \begin{bmatrix} \text{INDEX} & s \\ \text{RESTR} & \boxed{D} \oplus \boxed{A} \oplus \boxed{B} \oplus \boxed{C} \end{bmatrix}
\end{bmatrix}
$$

Chris   was handed a note by Pat

Since the NP dominating *Chris* is singular, it is consistent with the SPR specification in (33). Because of the identity of subjects established in *be-lxm*, *Chris* (more precisely the NP 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 (31).

10.6 Summary

Our treatment of the active/passive alternation in English is based on a relationship between verb forms. We formalize this with a derivational lexical rule that modifies the lexeme type, the morphology, the argument structure, and some details of the HEAD values. Passive participles usually follow a form of *be*; this chapter introduced a lexical entry for this use of *be*. Passive participles and the form of *be* that precedes them share the same subject. Our lexical entry for *be* encodes this fact, anticipating a central topic of Chapter 12.

10.7 Changes to the Grammar

In this chapter, we added the following lexical rule to the grammar:

Passive Lexical Rule

$$
\begin{bmatrix}
d\text{-}rule \\[4pt]
\text{INPUT} \quad \left\langle \boxed{1}, \begin{bmatrix} tv\text{-}lxm \\ \text{ARG-ST} \quad \langle\, [\text{INDEX}\ i]\, \rangle\ \oplus\ \boxed{A} \end{bmatrix} \right\rangle \\[20pt]
\text{OUPUT} \quad \left\langle \mathrm{F}_{PSP}(\boxed{1}), \begin{bmatrix} part\text{-}lxm \\ \text{SYN} \quad \begin{bmatrix} \text{HEAD} \ [\text{FORM}\ pass\,] \end{bmatrix} \\ \text{ARG-ST} \quad \boxed{A}\ \oplus\ \left\langle \begin{bmatrix} PP \\ \begin{bmatrix} \text{FORM} \quad by \\ \text{INDEX} \quad i \end{bmatrix} \end{bmatrix} \right\rangle \end{bmatrix} \right\rangle
\end{bmatrix}
$$

We also added a lexeme *be*, which is distinguished from other verb lexemes we've seen so far in that it identifies the first member of its ARG-ST list with the SPR of the second member:

$$
\left\langle be, \begin{bmatrix} be\text{-}lxm \\[4pt] \text{ARG-ST} \ \left\langle \boxed{1}, \begin{bmatrix} \text{SYN} \begin{bmatrix} \text{HEAD} \begin{bmatrix} verb \\ \text{FORM}\ pass \end{bmatrix} \\ \text{VAL} \begin{bmatrix} \text{SPR} \quad \langle\ \boxed{1}\ \rangle \\ \text{COMPS} \ \langle\ \rangle \end{bmatrix} \end{bmatrix} \\ \text{SEM} \ [\text{INDEX}\ s] \end{bmatrix} \right\rangle \\[20pt] \text{SEM} \quad \begin{bmatrix} \text{INDEX} \quad s \\ \text{RESTR} \quad \langle\ \rangle \end{bmatrix} \end{bmatrix} \right\rangle
$$

The constraints in (33) will be revised somewhat in Chapters 11 and 13, but this key property will remain constant.

10.8 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, 1965, and 1970; Perlmutter and Postal 1977; Wasow 1977; Bresnan 1982c; Burzio 1986; and Postal 1986.

10.9 Problems

Problem 1: Passive and Binding Theory

The analysis of passive just sketched makes some predictions about binding possibilities in passive sentences. Consider the following data:[7]

(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 (only) by him$_i$.

(v) The students$_i$ were introduced to each other$_i$ (by Leslie).

(vi) *The students$_i$ were introduced to them$_i$ (by Leslie).

(vii) Kim was introduced to Larry$_i$ by himself$_i$.

(viii) *Kim was introduced to himself$_i$ by Larry$_i$.

Assuming that *to* and *by* in these examples are uniformly treated as argument-marking prepositions, does the treatment of passives sketched in the text correctly predict the judgements in (i)–(viii)? If so, explain why; if not, discuss the inadequacy of the analysis in precise terms.

An ideal answer should examine each one of the eight sentences and determine if it follows the binding principles. That is, the analysis of passive presented in this chapter associates a particular ARG-ST list with the passive verb form in each example and these lists interact with the binding principles of Chapter 7 to make predictions. Check to see if the predictions made by our Binding Theory match the grammaticality judgements given.

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.

---

[7] 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, examples 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 needed to convey that one's own olfactory self-impression was strange (in whatever odd context such a need might arise), then *I smell funny to myself* is probably the most straightforward way the grammar of English has for allowing such a meaning to be expressed.

B. Give the ARG-ST and RESTR values for one of the passive participles in (i)–(iii), along with the ARG-ST and RESTR values of the corresponding active form.

C. Propose an additional lexical rule that will produce appropriate lexical sequences for the passive participles in these sentences.

[*Hints: Your new rule should be similar to our existing Passive Lexical Rule. Assume that the prepositions involved in examples of this sort are all argument-marking prepositions – that is, they all share INDEX and MODE values with their object NPs. Your rule will need to use these INDEX values (and the FORM values of the prepositions) in producing the passive lexemes needed to license examples like (i)–(iii).*]

D. Explain how your lexical rule relates the ARG-ST values you gave in (B) to each other.

E. Assuming the lexical entry in (iv), does the rule you formulated in (C) predict that both (iii) and (v) are grammatical?

(iv) $\left\langle \text{talk} , \begin{bmatrix} new\text{-}v\text{-}lxm \\ \text{ARG-ST} \quad \langle \text{NP} (, \text{PP[to]}) (, \text{PP[about]}) \rangle \end{bmatrix} \right\rangle$

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

Explain your answer.

Problem 3: The Dative Alternation

In Chapter 8, we mentioned the possibility of formulating a lexical rule describing the 'dative alternation' – that is, a class of verbs that appear in both of the valence patterns exemplified in (i) and (ii):

(i)

Dale $\left\{ \begin{array}{l} \text{gave} \\ \text{handed} \\ \text{sold} \\ \text{loaned} \\ \text{mailed} \end{array} \right\}$ Merle a book.

(ii)

Dale $\left\{ \begin{array}{l} \text{gave} \\ \text{handed} \\ \text{sold} \\ \text{loaned} \\ \text{mailed} \end{array} \right\}$ a book to Merle.

A. Is this alternation productive? Justify your answer with at least two examples.
[*Hint: See the discussion of productive lexical rules at the end of Section 8.1 of Chapter 8.*]

B. Formulate a lexical rule for the dative alternation.
[*Hint: Consider which kind of l-rule (i-rule or d-rule) this should be, based on the kind of constraints you need to write. You can choose either of the valences*

illustrated in (i) and (ii) as the input and the other as the output. It should not be easier one way than the other.]

C. Show how your rule interacts with the Passive Lexical Rule to make possible the generation of both (iii) and (iv). Your answer should include ARG-ST values showing the effect of applying the rules. [*Hint: First consider which order the rules apply in, based on the types of the INPUT and OUTPUT values of each rule.*]

(iii) Merle was handed a book by Dale.

(iv) A book was handed to Merle by Dale.

D. Explain why your rule correctly fails to license (v) (or, more precisely, fails to license (v) with the sensible meaning that the book was the thing handed to Merle).

(v) ?*A book was handed Merle by Dale.