

**Problem 7: French Possessive Pronouns**

Problem 6 asked you to provide an argument as to why *my* isn't [PER 1st, NUM sg], but didn't concern what the AGR value should be instead.

- A. Provide an argument, with suitable data, that the AGR value of English possessive pronouns (e.g. *my* or *our*) should be left unspecified for number.

Now consider the following data from French. French nouns, like Spanish nouns, are all assigned either masculine or feminine gender. In these examples, *pie* is feminine and *moineau* is masculine.

- (i) *ma pie*  
my magpie
- (ii) \**mon/mes pie*
- (iii) *mon moineau*  
my sparrow
- (iv) \**ma/mes moineau*
- (v) *mes pies*  
my magpies
- (vi) \**ma/mon pies*
- (vii) *mes moineaux*  
my sparrows
- (viii) \**ma/mon moineaux*

- B. Give the AGR values for *ma*, *mon*, and *mes*.

## 7

**Binding Theory****7.1 Introduction**

This chapter revisits a topic introduced very informally in Chapter 1, namely, the distribution of reflexive and nonreflexive pronouns. In that discussion, we noticed that the well-formedness of sentences containing reflexives usually depends crucially on whether there is another expression in the sentence that has the same referent as the reflexive; we called such an expression the 'antecedent' of the reflexive. Nonreflexive pronouns, on the other hand, often lack an antecedent in the same sentence. The issue for a nonreflexive pronoun is typically whether a particular NP could have the same referent (or, as linguists often put it, be coreferential with it) – that is, whether that NP could serve as the antecedent for that pronoun.

In discussing these phenomena, we will use the notation of subscripted indices to mark which expressions are intended to have the same referent and which are intended to have distinct referents. Two expressions with the same index are to be taken as coreferential, whereas two expressions with different indices are to be understood as having distinct referents.

Thus the markings in (1) indicate that *himself* must refer to the same person as *John*, and that the referent of *her* must be someone other than Susan:

- (1) a.  $\text{John}_i$  frightens  $\text{himself}_i$ .
- b. \* $\text{Susan}_i$  frightens  $\text{her}_i$ .
- c.  $\text{Susan}_i$  frightens  $\text{her}_j$ .

As mentioned in Chapter 5, the subscript notation is shorthand for the value of the feature INDEX.

In examples like (1a), the reflexive *himself* is often said to be 'bound' by its antecedent. This terminology derives from an analogy between natural language pronouns and variables in mathematical logic. The principles governing the possible pairings of pronouns and antecedents are often called BINDING PRINCIPLES, and this area of study is commonly referred to as BINDING THEORY.<sup>1</sup> The term ANAPHORIC is also used for

<sup>1</sup>Much of the literature on Binding Theory actually restricts the term 'binding' to elements in certain syntactic configurations. Specifically, an element *A* is often said to bind an element *B* if and only if: (i) they have the same index; and (ii) *A* c-commands *B*. The technical term 'c-command' has been defined in several (nonequivalent) ways in the literature; the most commonly used definition is the following:

expressions (including pronouns) whose interpretation requires them to be associated with other elements in the discourse; the relationship of anaphoric elements to their antecedents is called ANAPHORA.

With this notation and terminology in place, we are now ready to develop a more precise and empirically accurate version of the Binding Theory we introduced in Chapter 1.

## 7.2 Binding Theory of Chapter 1 Revisited

Recall that in Chapter 1, on the basis of examples like (2)–(9), we formulated the hypothesis in (10):

- (2) a. Susan<sub>i</sub> likes herself<sub>i</sub>.  
b. \*Susan<sub>i</sub> likes her<sub>i</sub>.
- (3) a. Susan<sub>i</sub> told herself<sub>i</sub> a story.  
b. \*Susan<sub>i</sub> told her<sub>i</sub> a story.
- (4) a. Susan<sub>i</sub> told a story to herself<sub>i</sub>.  
b. \*Susan<sub>i</sub> told a story to her<sub>i</sub>.
- (5) a. Susan<sub>i</sub> devoted herself<sub>i</sub> to linguistics.  
b. \*Susan<sub>i</sub> devoted her<sub>i</sub> to linguistics.
- (6) a. Nobody told Susan<sub>i</sub> about herself<sub>i</sub>.  
b. \*Nobody told Susan<sub>i</sub> about her<sub>i</sub>.
- (7) a. \*Susan<sub>i</sub> thinks that nobody likes herself<sub>i</sub>.  
b. Susan<sub>i</sub> thinks that nobody likes her<sub>i</sub>.
- (8) a. \*Susan<sub>i</sub>'s friends like herself<sub>i</sub>.  
b. Susan<sub>i</sub>'s friends like her<sub>i</sub>.
- (9) a. \*That picture of Susan<sub>i</sub> offended herself<sub>i</sub>.  
b. That picture of Susan<sub>i</sub> offended her<sub>i</sub>.
- (10) Reflexive pronouns must be coreferential with a preceding argument of the same verb; nonreflexive pronouns cannot be.

Our task in this chapter is to reformulate something close to the generalization in (10) in terms of the theoretical machinery we have been developing in the last five chapters. We would also like to extend the empirical coverage of (10) to deal with examples that our informal statement did not adequately handle. Toward this end, let us divide (10) into two principles, one for reflexive pronouns and the other for nonreflexive pronouns. Our first try at formulating them using the new binding terminology is then the following:

node *A* in a tree *c-commands* node *B* if and only if every branching node dominating *A* dominates *B*. Intuitively, this means roughly that *A* is at least as high in the tree as *B*. Our investigations into Binding Theory will not impose any such configurational limitation, as we will be deriving a similar, arguably superior characterization of constraints on binding in terms of ARG-ST lists (see below).

Note that we are interested in determining the conditions governing the pairing of pronouns and antecedents in a sentence. We will not, however, consider what possible things outside the sentence (be they linguistic expressions or entities in the world) can serve as antecedents for pronouns.

### (11) Principle A (version I)

A reflexive pronoun must be bound by a preceding argument of the same verb.

### Principle B (version I)

A nonreflexive pronoun may not be bound by a preceding argument of the same verb.

## 7.3 A Feature-Based Formulation of Binding Theory

Our binding principles make use of several intuitive notions that need to be explicated formally within the theory we have been developing. The terms 'reflexive pronoun' and 'nonreflexive pronoun' have not been defined. What distinguishes reflexive pronouns is a semantic property, namely, that they require linguistic antecedents (of a certain kind) in order to be interpreted. Hence, we introduce a new value of the semantic feature *MODE* that we will use to distinguish reflexive pronouns; we will call that value 'ana'. Nonreflexive pronouns, like nonpronominal nouns, are [*MODE* ref].<sup>2</sup> In addition, we will assume (building on the conclusions of Problem 2 in Chapter 1) that reciprocals (that is, *each other* and perhaps *one another*) are [*MODE* ana]. This will allow us to reformulate the binding principles in terms of the feature *MODE*, keeping open the possibility that reflexives and reciprocals might not be the only elements subject to Principle A.

### 7.3.1 The Argument Structure List

Both of our binding principles contain the phrase 'a preceding argument of the same verb'. Formalizing this in terms of our theory will take a bit more work. The features that encode information about what arguments a verb takes are the valence features *SPR* and *COMPS*. Though we have not said much about the linear ordering of arguments, we have placed elements on our *COMPS* lists in the order in which they appear in the sentence. Hence, to the extent that precedence information is encoded in our feature structures, it is encoded in the valence features. So the valence features are a natural place to start trying to formalize the binding principles.

There is a problem, however. For examples like (2)–(5), the binding in question involves the subject NP and one of the nonsubject NPs; but our valence features separate the subject (specifier) and the nonsubject (complements) into two different lists. To facilitate talking about all of the arguments of a verb together, we will posit a new list-valued feature, *ARGUMENT-STRUCTURE* (*ARG-ST*), consisting of the sum (in the sense introduced in Chapter 5) of the *SPR* value (the subject) and the *COMPS* value (the complements).<sup>3</sup>

Words obey the following generalization, where '⊕' again denotes the operation we have called 'sum', appending one list onto another:<sup>4</sup>

<sup>2</sup>Note that the Semantic Inheritance Principle guarantees that NPs headed by [*MODE* ref] nouns share that specification.

<sup>3</sup>*MOD*, which we have included among the valence features, does not list arguments of the verb. So the value of *MOD* is not related to *ARG-ST*.

<sup>4</sup>We will revisit and revise the Argument Realization Principle in Chapter 14.

## (12) Argument Realization Principle (Version I)

A word's value for ARG-ST is  $\boxed{A} \oplus \boxed{B}$ , where  $\boxed{A}$  is its value for SPR and  $\boxed{B}$  is its value for COMPS.

So, if a verb is specified as [SPR  $\langle$  NP  $\rangle$ ] and [COMPS  $\langle$  NP  $\rangle$ ], then the verb's argument structure list is  $\langle$  NP, NP  $\rangle$ . And if some other verb is specified as [SPR  $\langle$  NP  $\rangle$ ] and [COMPS  $\langle$  PP, VP  $\rangle$ ], then that verb's argument structure list is  $\langle$  NP, PP, VP  $\rangle$ , and so on.

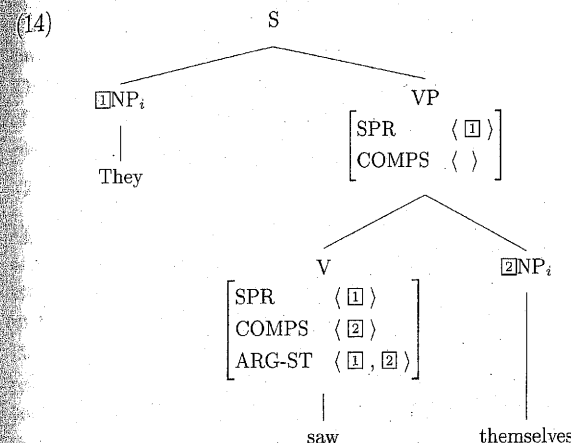
**Exercise 1: Practice ARG-ST lists**

What would be the value of ARG-ST in the lexical entries of each of the following verbs: *devour*, *elapse*, *put*, and *rely*? As defined, any word with valence features will have an ARG-ST value. So what would the ARG-ST values be for *letter*, *of*, *today*, and *Venezuela*?

Of course we mean real identity between the members of these lists, as shown by the specifications in (13):

- (13) a.  $\left[ \begin{array}{l} \text{SYN} \\ \text{ARG-ST } \langle \boxed{1}\text{NP}, \boxed{2}\text{NP} \rangle \end{array} \right] \left[ \begin{array}{l} \text{VAL} \\ \text{SPR } \langle \boxed{1} \rangle \\ \text{COMPS } \langle \boxed{2} \rangle \end{array} \right]$
- b.  $\left[ \begin{array}{l} \text{SYN} \\ \text{ARG-ST } \langle \boxed{1}\text{NP}, \boxed{2}\text{PP}, \boxed{3}\text{VP} \rangle \end{array} \right] \left[ \begin{array}{l} \text{VAL} \\ \text{SPR } \langle \boxed{1} \rangle \\ \text{COMPS } \langle \boxed{2}, \boxed{3} \rangle \end{array} \right]$

These identities are crucial, as they have the side effect of ensuring that the binding properties of the complements are actually merged into the verb's argument structure, where they will be governed by our binding principles. For example, the Head-Specifier Rule identifies a subject's feature structure with the sole member of the VP's SPR list. It follows (from the Valence Principle) that the subject's feature structure is also the sole member of the verb's SPR list. This, in turn, entails (by the Argument Realization Principle) that the subject's feature structure is the first member of the verb's ARG-ST list. Thus once the distinctions relevant to Binding Theory are encoded in the feature structures of reflexive and nonreflexive NPs, this same information will be present in the ARG-ST of the lexical head of the sentence, where the binding principles can be enforced. This is illustrated in (14):



The generalization in (12) holds only of words; in fact, it is only word structures that have the feature ARG-ST. Despite its close relationship to the valence features, ARG-ST serves a different function and hence has different formal properties. SPR and COMPS, with the help of the Valence Principle, keep track of elements that a given expression needs to combine with. As successively larger pieces of a tree are constructed, the list values of these features get shorter. By contrast, we introduced the argument structure list as a locus for stating more formal versions of the binding principles. Through a series of identities enforced by the Argument Realization Principle, the phrase structure rules and the Valence Principle, the ARG-ST list of a verb occurring in a tree contains all of the information about that verb's arguments that a precise version of the binding principles needs. It is part of neither SYN nor SEM, but rather serves to express certain relations at the interface of syntax and semantics. These relations can be stated once and for all on the ARG-ST of the lexical head. There is no need to copy the information up to higher levels of the tree, and so ARG-ST is posited only as a feature of *words*, not *phrases*.

The elements of an ARG-ST list are ordered, and they correspond to phrases in the phrase structure tree. We can thus use the ordering on the ARG-ST list to impose a ranking on the phrases in the tree. A bit more precisely, we can say:

- (15) If *A* precedes *B* on some argument structure (ARG-ST) list, we say that *A* **OUT-RANKS** *B*.

Incorporating both our characterization of reflexive pronouns in terms of MODE and our definition of 'outrank', we can now reformulate our binding principles as follows:

- (16) Principle A (Final Version)

A [MODE ana] element must be outranked by a coindexed element.

Principle B (Final Version)

A [MODE ref] element must not be outranked by a coindexed element.

Notice that in this reformulation, Principle B now applies more generally, so as to govern nonpronominal elements like proper names and quantified NPs. This is a happy result,

given the following examples, which are now correctly predicted to be ungrammatical:

- (17) a. \*Sandy<sub>i</sub> offended Jason<sub>i</sub>.  
 b. \*He<sub>i</sub> offended Sandy<sub>i</sub>.  
 c. \*He<sub>i</sub> offended each lawyer<sub>i</sub>.

## 7.4 Two Problems for Binding Theory

These formulations have certain problems, requiring further discussion and refinement.

### 7.4.1 Pronominal Agreement

First, (16) says nothing about agreement between pronouns and antecedents; but we do not want Principle A to license examples like (18):

- (18) a. \*I enjoy yourself.  
 b. \*He enjoys themselves.  
 c. \*She enjoys himself.

We could rule these out by adding a stipulation to Principle A, requiring a reflexive and its antecedent to agree. But this *ad hoc* approach wouldn't explain much. It is intuitively clear why coindexed elements should exhibit a form of agreement: coindexation indicates that the expressions denote the same entity, and the properties indicated by agreement features are characteristically properties of the entity referred to (the expression's DENOTATION). Thus, for example, singular NPs normally denote single entities, whereas plural NPs denote collections. Hence a singular pronoun cannot normally be coindexed with a plural NP, because they cannot have the same denotation.

We will consequently refrain from any mention of agreement in the binding principles. Instead, we adopt the following general constraint:<sup>5</sup>

- (19) Anaphoric Agreement Principle (AAP)

Coindexed NPs agree.

By 'agree', we mean 'have the same values for AGR'. Recall that AGR was introduced in Chapter 3 as a feature whose value is a feature structure specifying values for the features PER (person), NUM (number), and (in the case of *3sing* AGR values) GEND (gender). Only PER and NUM matter for the purposes of subject-verb agreement, but pronouns must also agree with their antecedents in gender, as illustrated in (18c). Since GEND is part of AGR, it is covered by the AAP.

One important advantage of leaving agreement out of the formulation of binding principles themselves is that the AAP also covers agreement between nonreflexive pronouns and their antecedents. Since Principle B only says which expressions must NOT be coindexed with nonreflexive pronouns, it says nothing about cases in which such pronouns ARE legally coindexed with something. The AAP rules out examples like (20), which are not ruled out by our formulation of Principle B.

- (20) \*I<sub>i</sub> thought that nobody liked him<sub>i</sub>.

<sup>5</sup>The use of the term 'anaphoric' in (19) is intended to underscore that coindexing is used to represent the informal notion of anaphora.

It is important to realize that coindexing is not the same thing as coreference; any two coindexed NPs are coreferential, but not all pairs of coreferential NPs are coindexed. There are some tricky cases that might seem to be counterexamples to the AAP, and all of which turn out to be consistent with the AAP, once we make the distinction between coindexing and coreference. One such example is the following:

- (21) The solution to this problem is rest and relaxation.

Here the singular NP *the solution to this problem* appears to refer to the same thing as the plural NP *rest and relaxation*. And indeed we would say that the two NPs are coreferential, but they are not coindexed. Thus while coindexing and coreference usually go hand in hand, they don't in this case. The whole point of identity sentences of this kind is to convey the information that two distinct (i.e. distinctly indexed) expressions refer to the same thing. If you are familiar with mathematical logic, this might remind you of situations in which two distinct variables are assigned the same value (making, e.g. ' $x = y$ ' true). Indices are like variables; thus Binding Theory constrains variable identity, not the assignments of values to variables.

Other examples that appear to violate the AAP turn out to be cases where the pronoun isn't even coreferential with its apparent antecedent. Rather, the phrase that the pronoun is 'referring back to' only indirectly introduces the referent of the pronoun into the domain of discourse. For example, consider the sentence in (22):

- (22) An interesting couple walked in. He was four foot nine; she was six foot two.

Here, the NP *an interesting couple* refers to the two people denoted by *he* and *she*, but these three expressions all have distinct indices. This is consistent with the AAP. In fact, the referent of the NP *an interesting couple* is just one entity – the couple, which is a collection of two individuals. As the collection is introduced into the discourse, however, it also makes salient each individual that is in the collection, and it is these individuals that the pronouns in the next sentence refer to. Thus in this discourse, the NP *an interesting couple*, the pronoun *he* and the pronoun *she* all refer to different things. So the AAP doesn't apply.

Similar examples involve collective nouns like *family*, which can denote a single entity, as shown by the singular verb agreement in (23), but which can, as a 'side effect', introduce a collection of entities that can serve as the antecedent for a subsequent plural pronoun:

- (23) My family hates cornflakes. But they love granola.

Again there are two distinct entities being referred to by distinct indices.<sup>6</sup>

### 7.4.2 Binding in Prepositional Phrases

A second problem with our formulation of the binding principles is that reflexives and their antecedents can be objects of prepositions. A PP that consists of a prepositional head daughter like *to* or *about* and a reflexive NP object can then become a complement

<sup>6</sup>For some speakers, this is even possible in the context of reflexive pronouns, i.e. in examples like (i):

- (i) Pat's family is enjoying themselves.

The theory we develop does not allow examples of this sort.

of the verb; and when this happens, the reflexive NP inside the PP enters into binding relations with the other arguments of the verb. Similarly, when a nonreflexive pronoun functions as a prepositional object, it can behave like an argument of the verb for purposes of binding. Thus we find the pattern of binding illustrated in (24) and (25):

- (24) a. They<sub>i</sub> talk [to themselves<sub>i</sub>].  
       b. \*They<sub>i</sub> talk [to them<sub>i</sub>].
- (25) a. Nobody told Susan<sub>i</sub> [about herself<sub>i</sub>].  
       b. \*Nobody told Susan<sub>i</sub> [about her<sub>i</sub>].

And in similar examples, the prepositional object can serve as the binder of a reflexive, but not of a nonreflexive:

- (26) a. Nobody talked [to Susan<sub>i</sub>] [about herself<sub>i</sub>].  
       b. \*Nobody talked [to Susan<sub>i</sub>] [about her<sub>i</sub>].

In examples like these, the binding principles, as formulated above, make the wrong predictions: the Argument Realization Principle (henceforth ARP) requires that the verb's ARG-ST contain the feature structure of the PP, not that of the NP within the PP. Hence if a reflexive pronoun is inside a PP that is a complement to a verb, the reflexive's feature structure will not appear on the same ARG-ST list as (the feature structures of) the verb's subject and object NPs. The Binding Theory, as formulated, thus fails to take into account the fact that certain prepositions seem to be transparent for binding purposes. That is, if prepositions such as these were simply not there and the prepositional object were an object of the verb, then Binding Theory would make just the right predictions about (24)–(26) and related examples.

This problem raises both empirical and formal questions. The empirical question is the issue of precisely when objects of prepositions can enter into binding relations with elements outside the PP. As we noted in our initial discussion of Binding Theory in Chapter 1, there is some variability about the binding possibilities of objects of prepositions. This is illustrated in (27):<sup>7</sup>

- (27) a. The house<sub>i</sub> had a fence around  $\left\{ \begin{array}{l} \text{it}_i \\ * \text{itself}_i \end{array} \right\}$ .
- b. To make a noose, you wind the rope<sub>i</sub> around  $\left\{ \begin{array}{l} \text{itself}_i \\ * \text{it}_i \end{array} \right\}$ .
- c. Susan<sub>i</sub> wrapped the blanket around  $\left\{ \begin{array}{l} \text{her}_i \\ \text{herself}_i \end{array} \right\}$ .

<sup>7</sup>Some readers may have a strong preference for one version of (27c) over the other. It appears that there is some cross-speaker variation regarding such examples. For readers who do not accept both versions of (27c), here are some additional examples in which many speakers accept both reflexive and nonreflexive pronouns:

- (i) Jane<sub>i</sub> put the TV remote down beside  $\left\{ \begin{array}{l} \text{her}_i \\ \text{herself}_i \end{array} \right\}$ .
- (ii) Mary<sub>i</sub> took a quick look behind  $\left\{ \begin{array}{l} \text{her}_i \\ \text{herself}_i \end{array} \right\}$ .

These examples also show that it is not simply the choice of preposition that determines whether a prepositional object can be reflexive, but also the particular verb that the preposition combines with.

One possible explanation of such differences is based on the intuitive idea underlying our Binding Theory: that reflexives and their antecedents are always arguments of the same predicate. It seems plausible to claim that English prepositions have two distinct semantic functions. In some uses, they function much like verbs, introducing new predications in which they assign argument roles to the nouns they combine with. In other uses, they are simply functioning as argument markers – that is, they indicate what role their object plays in the situation denoted by the verb of the clause they appear in. The clearest examples of this argument-marking use of prepositions are sentences like (4a), *Susan<sub>i</sub> told a story to herself<sub>i</sub>*, in which *to* is used to mark what traditional grammarians called the indirect object. In these cases, the preposition can actually be omitted if the order of the complements is reversed: *Susan told herself a story*.

In (27a), the preposition arguably functions as a separate predicate (making the sentence mean roughly, 'The house had a fence, and the fence was around the house'), whereas in (27b), the preposition simply marks one of the arguments of the verb *wind*. Notice that nothing in the meaning of the verb *had* leads one to expect that anything is or goes around its subject. In contrast, the verb *wind* indicates that something is going around something else, so the preposition is introducing an expected participant in the situation. These remarks are intended to provide intuitive motivation for the formal distinction we make between the two types of prepositions, but the real reason we need the distinction is to account for the distribution of reflexive and nonreflexive pronouns. Cases like (27c), then, will be treated as having prepositions that are ambiguous between being independent predicates and argument markers.<sup>8</sup>

Let us now formalize this intuition. For the purposes of Binding Theory, nothing new needs to be said about the prepositions that function as independent predicates. If the object of such a preposition is [MODE ana], then Principle A will require it to be coindexed with something that outranks it on the preposition's ARG-ST list. This is not the case in (27a).<sup>9</sup> If the prepositional object is [MODE ref], it must not be coindexed with anything that outranks it on the preposition's ARG-ST list. Since the subject of the sentence in (27a) does not appear on the ARG-ST list of *around*, Principle B permits a nonreflexive pronoun *it* coindexed with *the house* to appear as the object of *around*.

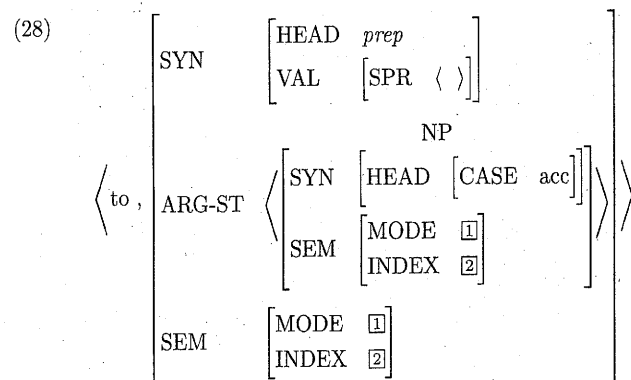
For prepositions that function as argument markers, however, we need to provide some way by which they can transmit information about their object NP up to the PP that they project. In particular, in order for the binding principles to make the right predictions with respect to objects of argument-marking prepositions, we need to be able

<sup>8</sup>This leads in certain cases to prepositions like *around* being unintuitively treated as not directly contributing to the semantics of the sentence. A full analysis of these facts is beyond the scope of this book.

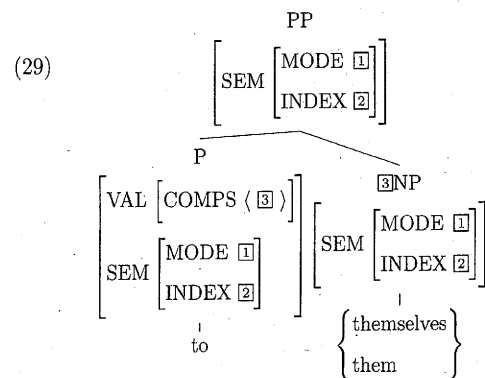
<sup>9</sup>We leave open for now the question of how many ARG-ST members such predicational prepositions have. If *around* in (27a) has two arguments (as seems intuitive from its relational meaning), then the first argument should be identified with a *fence*; hence, *itself* could still not be coindexed with *the house*. In Chapter 12, we will investigate mechanisms by which different ARG-ST lists can have elements with the same index.

to determine at the level of the PP both whether the object NP is a reflexive pronoun (that is, whether it is [MODE ana]) and also what its INDEX value is. If the object's MODE and INDEX values can be transmitted up to the PP, then the higher verb that takes the PP as its complement will have the MODE and INDEX information from the object NP in its ARG-ST, within the PP's SEM value. Note that without some method for transmitting this information up to the PP, the information about the preposition's object is invisible to the higher verb selecting the PP as its complement. The COMPS list of the PP, for example, is empty.

The method we use to transmit this information is straightforward: argument-marking prepositions, such as (some uses of) *to*, *about*, and *of*, share the MODE and INDEX values of their objects. This is illustrated in the lexical entry in (28):



The MODE and INDEX values are projected up from the preposition to the PP by the Semantic Inheritance Principle, as shown in (29):



A PP like this can be selected by a verb like *tell* or *wind*. Hence, the PP on its ARG-ST list will contain the object NP's MODE and INDEX values within it. Put another way, the information about the object of the preposition that we need in order to apply the binding principles is available in the verb's ARG-ST list.

To get the right binding results for the objects of argument-marking prepositions, we now need to make a slight modification to our definition of 'outranks'. In particular, we need to say that an argument-marking PP and its object NP are 'of equal rank', by which we mean that they outrank exactly the same elements and are outranked by exactly the same elements. More precisely:

- (30) (i) If a node is coindexed with its daughter, their feature structures are of equal rank.  
 (ii) If there is an ARG-ST list on which *A* precedes *B*, then *A* has a higher rank than (i.e. outranks) *B*.

Part (ii) of this definition is just the definition we gave earlier. Part (i) is needed to account for the binding facts in argument-marking PPs. Consider, for example, the case where the object of such a PP is a reflexive pronoun (e.g. *The children fended for themselves*). The reflexive's INDEX is shared by the preposition *for*, as is the [MODE ana] specification, as required by the lexical entry for the argument-marking *for*. These values are also shared by the whole PP, *for themselves*, as required by the Semantic Inheritance Principle. So the PP and the reflexive pronoun it contains are coindexed; hence, by part (i) of the definition above, the PP and the reflexive pronoun are of the same rank. In the ARG-ST of *fended*, the feature structure of *the children* outranks that of *for themselves*. Consequently, the feature structure of *the children* outranks that of *themselves*. Thus, if *the children* and *themselves* are coindexed, Principle A of the Binding Theory is satisfied. Without part (i) of the definition, the reflexive pronoun would not satisfy Principle A.<sup>10</sup> We will go through a similar example, as well as one with a nonreflexive pronoun, below.

The formal machinery we have just developed is designed to capture the fact that objects of prepositions in English exhibit different binding properties in different environments. It involves positing two kinds of lexical entries for prepositions: one contributes its own MODE and INDEX values; the other adopts those of its object, thereby serving as a conduit for that information to be passed on to the dominating PP. We attempted to motivate this distinction through an intuition that the two kinds of prepositions serve different semantic functions. But such intuitions vary considerably from speaker to speaker, so it would be dangerous to put too much weight on them. Our analysis provides a more reliable means of classifying prepositions as argument marking or predicational, namely, exploring their binding properties. Prepositions that are transparent for purposes of binding should be analyzed as argument markers; those whose objects cannot be bound by a preceding NP in the clause should be analyzed as predicational.

## 7.5 Examples

So far, this chapter has motivated several technical innovations in our theory (ARG-ST, the concept of 'outranking', and the distinction between the two types of prepositions). In this subsection, we present two examples to illustrate the formal machinery we have been discussing.

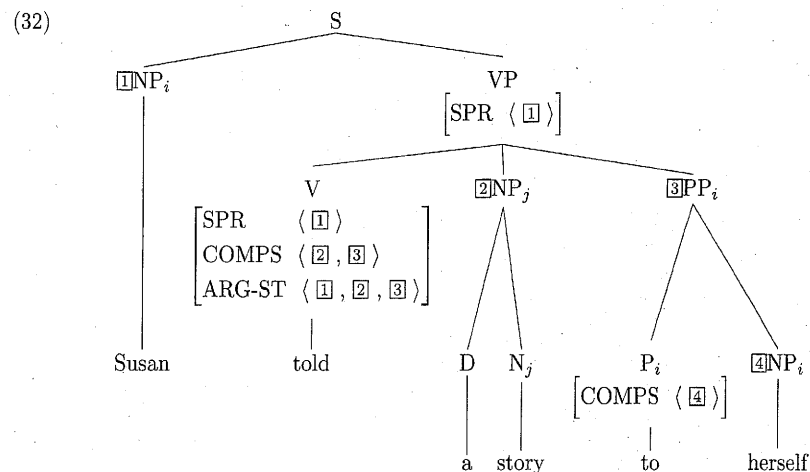
<sup>10</sup>As a consequence of the way we've formalized our analysis, the P *for* is also [MODE ana] and therefore subject to Principle A. It satisfies Principle A in the same way the object NP does: by part (i) of (30), its rank is equal to that of the PP and thus it is outranked by *the children*.



Consider first (4a), repeated here for convenience as (31):

(31) Susan<sub>i</sub> told a story to herself<sub>i</sub>.

The structure licensed by our grammar is the following (omitting irrelevant details):



The geometry of this tree is given by our phrase structure rules in ways that are by now familiar. The aspect of the tree we are concerned with here is the coindexing of the nodes, indicated by the subscripted *i* and the resulting argument structure of the verb *told*, which is displayed in (33):

(33)  $\left[ \text{ARG-ST} \left\langle \left[ \text{MODE ref} \right]_{NP_i}, \left[ \text{MODE ref} \right]_{NP_j}, \left[ \text{MODE ana} \right]_{PP_i} \right\rangle \right]$

This ARG-ST conforms to the Binding Theory: the [MODE ana] PP is outranked by a coindexed NP, namely the first NP on the list. Similarly, the NP tagged 4 in (32), which is also [MODE ana], is of equal rank with the PP dominating it (by the definition of rank), so it is outranked by the first NP in the list. Again, Principle A is satisfied. Notice that Principle A requires coindexing between the prepositional object and one of the other arguments, in this case, the subject. The ARG-ST list of *told* plays a crucial role in enforcing this coindexing, even though the verb is one level below the subject and one level above the prepositional object in the tree.

Principle A would also be satisfied if the anaphor were coindexed with the direct object NP:

(34)  $\left[ \text{ARG-ST} \left\langle \left[ \text{MODE ref} \right]_{NP_j}, \left[ \text{MODE ref} \right]_{NP_i}, \left[ \text{MODE ana} \right]_{PP_i} \right\rangle \right]$

Although this is implausible with *told* (because of the nonlinguistic fact that people are not the kind of thing that gets told to others), it is much easier to contextualize grammatically analogous sentences with the verb *compared*:

- (35) a. We compared him<sub>i</sub> [to himself<sub>i</sub>] (at an earlier age).  
b. We compared them<sub>i</sub> [to each other<sub>i</sub>].

Thus in both (33) and (34), the PP – and hence its NP object as well – is outranked by some coindexed element. It seems correct to say that as far as grammar is concerned, both the ARG-ST configurations in (33) and (34) are acceptable, although there are independent factors of plausibility that interact to diminish the acceptability of many grammatical examples.

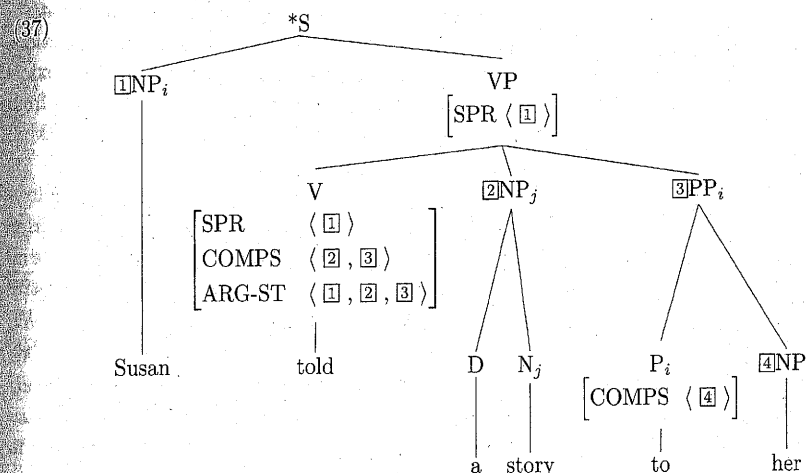
## Exercise 2: The Distribution of ARG-ST

Which nodes in (32) have the feature ARG-ST?

Now consider (4b), repeated here for convenience as (36):

(36) \*Susan<sub>i</sub> told a story to her<sub>i</sub>.

The tree structure that our grammar must rule out is the following:



The lexical entry for *her* specifies that it is [MODE ref] – that is, that it is not a reflexive (or reciprocal) pronoun. As in the case of the previous example, the lexical entry for *to* and the Semantic Inheritance Principle pass information to the P and the PP. The verb's ARG-ST list then looks like (38):

(38) \* $\left[ \text{ARG-ST} \left\langle \left[ \text{MODE ref} \right]_{NP_i}, \left[ \text{MODE ref} \right]_{NP_j}, \left[ \text{MODE ref} \right]_{PP_i} \right\rangle \right]$

The PP in (38) violates Principle B: it is a [MODE ref] element that is coindexed with another element that outranks it – namely, the first NP on the list. Consequently, the coindexing indicated is not permitted.

## 7.6 Imperatives and Binding

In Chapter 1 we noted that the behavior of reflexive and nonreflexive pronouns in sentences like (39) is what one would expect if they had second-person subjects:

- (39) a. Protect yourself!  
 b. \*Protect  $\left\{ \begin{array}{l} \text{myself} \\ \text{himself} \end{array} \right\}$ !  
 c. \*Protect you!  
 d. Protect  $\left\{ \begin{array}{l} \text{me} \\ \text{him} \end{array} \right\}$ !

Sentences like these are known as IMPERATIVE sentences. Their characteristic properties are that they lack an overt subject, employ an uninflected form of the verb, and are used to express directives. Such sentences are sometimes said to have 'understood' second-person subjects. The distribution of reflexives illustrated in (39) shows that imperatives do indeed behave in at least one way as if they had second-person subjects.

Our theory provides a straightforward way of capturing the intuition that imperatives have understood subjects. First we need to allow for verb forms that lack the inflections of the verb forms we have been considering thus far. These forms, produced by a lexical rule discussed in the next chapter, have no inflectional endings and are distinguished from other kinds of verbal forms in terms of differing values for the HEAD feature FORM.<sup>11</sup> This basic form of a verb has the FORM value 'base'.

We introduce a new grammar rule to analyze imperative sentences. This rule allows a sentence to consist of a single daughter: a VP specified as [FORM base]. In requiring that the daughter be so specified, we ensure that the lexical head of that phrase will be an uninflected verbal form, such as *be*, *get*, *run*, or *look*. The new rule we need for imperative sentences is a nonheaded rule that says a sentence may consist of a [FORM base] VP that behaves as though it had a second-person subject and is interpreted as a directive:

(40) Imperative Rule

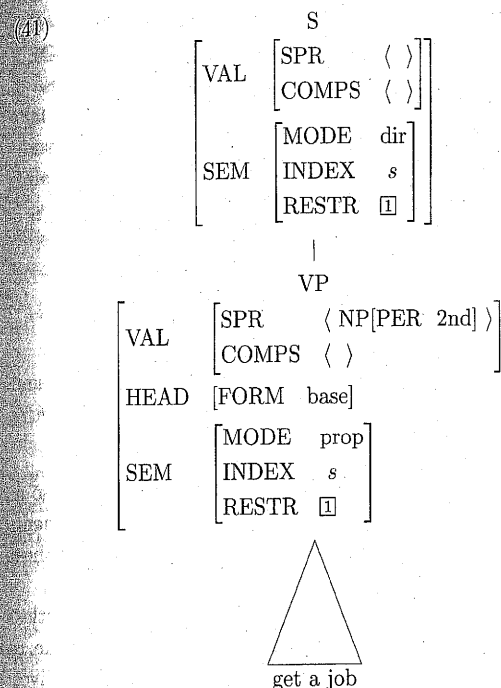
$$\left[ \begin{array}{l} \text{phrase} \\ \text{HEAD} \text{ verb} \\ \text{VAL} \left[ \begin{array}{l} \text{SPR} \langle \rangle \end{array} \right] \\ \text{SEM} \left[ \begin{array}{l} \text{MODE} \text{ dir} \\ \text{INDEX} s \end{array} \right] \end{array} \right] \rightarrow \left[ \begin{array}{l} \text{HEAD} \left[ \begin{array}{l} \text{verb} \\ \text{FORM} \text{ base} \end{array} \right] \\ \text{VAL} \left[ \begin{array}{l} \text{SPR} \langle \text{NP}[\text{PER} \text{ 2nd}] \rangle \\ \text{COMPS} \langle \rangle \end{array} \right] \\ \text{SEM} \left[ \begin{array}{l} \text{INDEX} s \end{array} \right] \end{array} \right]$$

Recall that imperative sentences require their subject to be second-person, a fact that is captured by the constraint on the SPR of the daughter in (40). And though all verbs are lexically specified as [MODE prop] (which is in turn passed up to the [FORM base] VP that enters into the imperative construction), (40) ensures that any phrase it sanctions is

<sup>11</sup>We will have more to say about the feature FORM in Chapter 8.

specified as [MODE dir] – that is, that it has a meaning appropriate for an imperative.<sup>12</sup>

The Imperative Rule sanctions structures like the one depicted in (41):



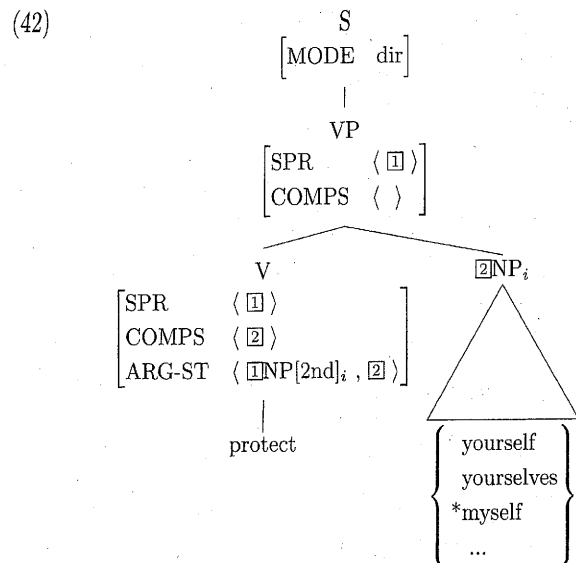
Note that, because the Imperative Rule is not a headed rule, the Head Feature Principle, the Valence Principle, and the Semantic Inheritance Principle are not relevant to licensing the S node in (41) (though the Semantic Compositionality Principle identifies the RESTR value of the mother in (41) with the RESTR value of the daughter). Instead, the values of the features on the S node are dictated by the rule itself and/or the initial symbol.<sup>13</sup>

The last thing to understand about the rule in (40) is that it explains the observations we have made about anaphor binding in imperative sentences. By requiring the specifier of an imperative VP to be second-person, we constrain the first argument of the VP's lexical head (i.e. the verb) to be second-person as well, thanks to the ARP. This, in turn, entails that in a structure like the following, Principle A will require a reflexive object to be coindexed with (and hence, by the AAP, to agree with) the second person subject:

<sup>12</sup>This analysis of imperatives is incomplete. In a larger grammar, it would need to be scaled up to include a semantic representation for the understood subject, as well as a constraint restricting imperatives to be stand-alone sentences. For more on imperatives and English clauses in general, see Ginzburg and Sag 2000.

<sup>13</sup>There are further constraints on what can be a 'stand alone' clause. In Chapter 9 we will require that the 'initial symbol' of our grammar must include the specification [FORM fin], which will distinguish past and present tense verbs (e.g. *went*, *loves*) from all others. FORM values for verbs are discussed in Chapter 8. Like the specification [COMPS  $\langle \rangle$ ], this information will be supplied to the mother node of imperatives by the initial symbol.





In this way, our treatment of imperatives interacts with our treatment of ARG-ST so as to provide an account of 'understood' arguments. The ARG-ST may include elements that are not overtly expressed, that is, which correspond to no overt phrase, and these can play a role in binding relations.

Note that we can use Binding Theory to confirm whether or not a given subjectless clause should involve an understood subject. For example, it would be a mistake to analyze exclamations of the form *Damn* NP along the lines just employed for imperatives. If we posited an understood subject NP in the ARG-ST of *damn*, it would license a reflexive pronoun (of the appropriate person, number, and gender) in the position after *damn*. But this is not possible:

- (43)
- |       |  |
|-------|--|
| *Damn | <div style="display: inline-block; vertical-align: middle;"> <div style="display: inline-block; vertical-align: middle;"> myself<br/>yourself<br/>herself<br/>himself<br/>itself<br/>themselves </div> <div style="font-size: 3em; vertical-align: middle;">}</div> </div> |
|-------|--|

Hence, *damn* in this use will have to be analyzed as being truly subjectless, in the sense that it has only one element in argument structure (and an empty SPR list). Examples like (43) are then ruled out because the reflexive element in the ARG-ST is not outranked by any coindexed element.

We have given a preview here of the analysis of verb forms that will be developed in the next chapter. There we will address the question of how the forms are differentiated formally, and how to manage the proliferation of entries for different forms of the same word.

## 7.7 The Argument Realization Principle Revisited

ARG-ST lists in general, and the ARP in particular, will play an increasingly important role in the chapters to come. We will place various constraints on the ARG-ST values of particular kinds of words, yet these would be vacuous without the ARP, which relates ARG-ST values to the values of the valence features SPR and COMPS. This connection is central, if the constraints we place on lexical heads are to interact with the elements that heads syntactically combine with. The Binding Theory presented in this chapter illustrates the importance of both ARG-ST and the ARP in our theory. Note that the order of arguments on the ARG-ST list also determines their linear order, given the way our grammar works. That is, subjects precede objects and other arguments, direct objects precede other arguments except the subject, and so forth. The ordering in (44) predicts the linear order that arguments occur in reasonably well:

- (44) Subject > Direct Object > 2nd Object > Other Complement

ARG-ST also has other uses that we cannot examine in detail here. Many grammarians have sought to explain various regularities exhibited by subjects, objects, and other syntactic dependents of the verb by making reference to the hierarchy in (44). For example, attempts to account for regularities about the semantic roles assigned to syntactic arguments (e.g. a more 'agent-like' argument of a verb will be linked to its subject argument) have led linguists to assume an ordering of the verb's arguments like the ARG-ST ordering. Such theories (which we regrettably cannot do justice to here) are often called **BINDING THEORIES**.

Various other phenomena have moved linguists to posit an ARG-ST hierarchy. One has to do with what is called 'relativization' i.e. using a clause to modify a noun. In these relative clauses, there is usually a 'gap' – that is, a missing NP that is understood as coreferential with the NP containing the relative clause. For example, in the following sentences, the bracketed portion is the relative clause, and the underlining indicates the location of the gap<sup>14</sup>:

- (45) a. I met the person [who    left].  
 b. I met the person [who they visited   ].

It turns out that there are languages where only subjects can be 'relativized', i.e. where the analog of (45a) is grammatical, but the analog of (45b) is not. But there are apparently no human languages where the facts are the other way around, i.e. where (45b) is grammatical, but (45a) is not. These observations also extend to examples like (46):

- (46) I met the person [to whom they handed a present.   ].

If a language allows (46), it will also allow both (45a) and (45b). The cross-linguistic generalization then is:

- (47) If a language can relativize X, then it can relativize any element that outranks X.

In addition, there are languages where a verb agrees not only with its subject, but also with its direct object or with some other argument. An examination of the agreement systems of many of the world's languages, however, will reveal the following generalization to be true:

<sup>14</sup>We return to the analysis of such gaps in Chapter 14.

- (48) If a language has words that show agreement with X, then it also has words that show agreement with the elements that outrank X.

Thus the ARG-ST hierarchy appears to have considerable motivation beyond the binding facts that we have used it to explain, some of it cross-linguistic in nature.

The ARP is simply a constraint on the type *word* and may be formulated as follows:

$$(49) \quad \text{word} : \left[ \begin{array}{l} \text{SYN} \quad \left[ \text{VAL} \quad \left[ \begin{array}{l} \text{SPR} \quad \boxed{A} \\ \text{COMPS} \quad \boxed{B} \end{array} \right] \right] \\ \text{ARG-ST} \quad \boxed{A} \oplus \boxed{B} \end{array} \right]$$

This constraint interacts with other constraints in our grammar to give appropriate values to SPR and COMPS. For example, suppose we had a lexical entry for *loves* that specified nothing about SPR and COMPS, as in (50):<sup>15</sup>

$$(50) \quad \left\langle \text{loves}, \left[ \begin{array}{l} \text{word} \\ \text{SYN} \quad \left[ \text{HEAD} \quad \text{verb} \right] \\ \text{ARG-ST} \quad \left\langle \begin{array}{l} \text{NP}_i \\ [\text{AGR} \quad 3\text{sing}] \end{array}, \text{NP}_j \right\rangle \\ \text{SEM} \quad \left[ \begin{array}{l} \text{MODE} \quad \text{prop} \\ \text{INDEX} \quad s \\ \text{RESTR} \quad \left\langle \begin{array}{l} \text{RELN} \quad \text{love} \\ \text{SIT} \quad s \\ \text{LOVER} \quad i \\ \text{LOVED} \quad j \end{array} \right\rangle \end{array} \right] \right] \right\rangle$$

The effect of the ARP is to ensure that any word structure that (50) gives rise to will also satisfy further identity conditions, for example those indicated by the tags in (51):

$$(51) \quad \left\langle \text{loves}, \left[ \begin{array}{l} \text{word} \\ \text{SYN} \quad \left[ \begin{array}{l} \text{HEAD} \quad \text{verb} \\ \text{VAL} \quad \left[ \begin{array}{l} \text{SPR} \quad \langle \boxed{1} \rangle \\ \text{COMPS} \quad \langle \boxed{2} \rangle \end{array} \right] \end{array} \right] \\ \text{ARG-ST} \quad \left\langle \begin{array}{l} \boxed{1}\text{NP}_i \\ [\text{AGR} \quad 3\text{sing}] \end{array}, \boxed{2}\text{NP}_j \right\rangle \\ \text{SEM} \quad \left[ \begin{array}{l} \text{MODE} \quad \text{prop} \\ \text{INDEX} \quad s \\ \text{RESTR} \quad \left\langle \begin{array}{l} \text{RELN} \quad \text{love} \\ \text{SIT} \quad s \\ \text{LOVER} \quad i \\ \text{LOVED} \quad j \end{array} \right\rangle \end{array} \right] \right] \right\rangle$$

<sup>15</sup>In fact, as explained in the next chapter, lists like (50), consisting of a phonological form *loves* and a feature structure of type *word*, are to be derived by an inflectional rule.

However, given what we have said so far, (51) is not the only way for both of the elements of the argument structure list in (50) to be identified with complements. The ARP would also be satisfied if both  $\boxed{1}$  and  $\boxed{2}$  appeared on the COMPS list (with the SPR list empty). Similarly, both  $\boxed{1}$  and  $\boxed{2}$  could appear on the SPR list (with the COMPS list empty). Such possibilities will need to be ruled out. In the next chapter, we introduce a constraint requiring verbs to have exactly one element on their SPR lists. This will ensure that all words and word structures that satisfy (50) will in fact also satisfy (51).

## 7.8 Summary

This chapter has developed an account of anaphoric binding – that is, the association of pronouns with antecedents – within our grammatical framework. We motivated two binding principles, one licensing elements like reflexives and reciprocals and the other restricting the possible coindexing of other NPs. Formalizing this led to a number of innovations, including the feature ARG-ST, the Argument Realization Principle, and the relation ‘outrank’. We saw that prepositional phrases exhibit different binding patterns, depending on whether the prepositions serve simply as argument markers or introduce their own predications. Finally, we introduced a new grammar rule for imperative sentences.

## 7.9 Changes to the Grammar

Most of the changes to our grammar in the remainder of the book will be additions, rather than amendments of rules, principles, or other mechanisms we have already introduced. Hence, it would be redundant and somewhat tedious to have a full grammar summary at the end of each chapter. Instead, we end this chapter and most subsequent ones with a summary of what changes to the grammar we have introduced in the chapter. We will provide two more full grammar summaries: one in Chapter 9, and one in Appendix A.

In this chapter, we added a new value of the MODE feature (‘ana’). The type constraint on *sem-cat* now looks like this:

$$\text{sem-cat} : \left[ \begin{array}{l} \text{MODE} \quad \{ \text{prop, ques, dir, ref, ana, none} \} \\ \text{INDEX} \quad \text{index} \\ \text{RESTR} \quad \text{list}(\text{predication}) \end{array} \right]$$

We also added a feature ARG-ST (appropriate for feature structures of type *word*) and the Argument Realization Principle (a constraint on the type *word*) which constrains the value of ARG-ST. The value of ARG-ST is a (possibly empty) list of *expressions*. The type constraint on *word* now looks like this:

$$\text{word} : \left[ \begin{array}{l} \text{SYN} \quad \left[ \text{VAL} \quad \left[ \begin{array}{l} \text{SPR} \quad \boxed{A} \\ \text{COMPS} \quad \boxed{B} \end{array} \right] \right] \\ \text{ARG-ST} \quad \boxed{A} \oplus \boxed{B} \end{array} \right]$$

The Binding Theory itself consists of the definition of ‘outrank’ and two principles:

The definition of 'outrank':

- (i) If a node is coindexed with its daughter, their feature structures are of equal rank.
- (ii) If there is an ARG-ST list on which *A* precedes *B*, then *A* has a higher rank than (i.e. outranks) *B*.

The principles of the Binding Theory:

Principle A: A [MODE ana] element must be outranked by a coindexed element.

Principle B: A [MODE ref] element must not be outranked by a coindexed element.

To account for the agreement between pronouns and their antecedents, we introduced a further principle:

The Anaphoric Agreement Principle (AAP): Coindexed NPs agree.

We also introduced a distinction between predication and argument-marking prepositions, and an analysis of argument-marking prepositions by means of lexical entries with the following specifications:

$$\left[ \begin{array}{l} \text{ARG-ST} \left\langle \left[ \begin{array}{l} \text{SEM} \left[ \begin{array}{l} \text{MODE} \text{ [1]} \\ \text{INDEX} \text{ [2]} \end{array} \right] \right] \right\rangle \\ \text{SEM} \left[ \begin{array}{l} \text{MODE} \text{ [1]} \\ \text{INDEX} \text{ [2]} \\ \text{RESTR} \langle \rangle \end{array} \right] \end{array} \right]$$

Finally, we introduced a new grammar rule, the Imperative Rule:

$$\left[ \begin{array}{l} \text{phrase} \\ \text{HEAD} \text{ verb} \\ \text{VAL} \left[ \begin{array}{l} \text{SPR} \langle \rangle \end{array} \right] \\ \text{SEM} \left[ \begin{array}{l} \text{MODE} \text{ dir} \\ \text{INDEX} \text{ s} \end{array} \right] \end{array} \right] \rightarrow \left[ \begin{array}{l} \text{HEAD} \left[ \begin{array}{l} \text{verb} \\ \text{FORM} \text{ base} \end{array} \right] \\ \text{VAL} \left[ \begin{array}{l} \text{SPR} \left\langle \text{NP} \left[ \begin{array}{l} \text{PER} \text{ 2nd} \end{array} \right] \right\rangle \\ \text{COMPS} \langle \rangle \end{array} \right] \\ \text{SEM} \left[ \begin{array}{l} \text{INDEX} \text{ s} \end{array} \right] \end{array} \right]$$

## 7.10 Further Reading

The binding of anaphors has been the topic of an extensive literature since the late 1960s. A seminal and very readable paper is Lasnik 1976. To our knowledge, the first proposal to treat reflexive binding in terms of a hierarchy of the verb's arguments was made by Johnson (1977). The Binding Theory of Chomsky (1981) distilled many of the insights of the research of the preceding decade into three principles; this theory was developed further in a number of works within the Government and Binding Theory of grammar.

A detailed account of binding within Lexical Functional Grammar is presented by Dalrymple (1993). The theory of binding presented in this chapter is based on Pollard and Sag 1992, 1994 with terminological revision ('(out)ranking') due to Bresnan (1995). One of the most detailed attempts to date at formulating a linking theory compatible with the approach presented here is by Davis (2001), whose theory of the alignment of semantics and argument structure allows a further streamlining of all our lexical descriptions. The Argument Structure hierarchy (44) is often referred to as the 'Keenan-Comrie' Hierarchy, because of the pioneering work on this topic reported in Keenan and Comrie 1977.

## 7.11 Problems

### Problem 1: Classifying Prepositions

We have divided prepositions into two sorts: those functioning as predicates and those functioning as argument-markers. For each of the following sentences,

- (a) classify the italicized preposition into one of these two sorts (or as being ambiguously both); and
  - (b) justify your classification by showing (with acceptable and/or unacceptable sentences) what reflexive and nonreflexive coreferential pronouns can or cannot appear as the preposition's object.
- (i) The dealer dealt an ace *to* Bo.
  - (ii) The chemist held the sample away *from* the flame.
  - (iii) Alex kept a loaded gun *beside* the bed.
  - (iv) We bought flowers *for* you.
  - (v) The car has a scratch *on* the fender.

### Problem 2: Imperative 'Subjects'

There are imperative sentences that contain an NP that looks like it is the subject of the [FORM base] VP:

- (i) You get out of here!
- (ii) Everybody take out a sheet of paper!

But the initial NPs in these examples don't seem to participate in the normal agreement pattern with respect to reflexive pronouns. For example, we know that an NP like *everybody* is third person because of its behavior in (iii):<sup>16</sup>

- (iii) Everybody found  $\left\{ \begin{array}{l} ?\text{himself} \\ *?\text{yourself} \\ ?\text{themselves} \\ *?\text{myself} \end{array} \right\}$  a seat.

<sup>16</sup>Following standard practice of generative grammarians, we use designations '?', '??', and '?\*' to indicate different levels of naturalness between full acceptability and complete unacceptability.

Yet in imperative sentences, we still find the second-person reflexive pattern illustrated in (iv):

- (iv) Everybody find  $\left\{ \begin{array}{l} ??\text{himself} \\ \text{yourself} \\ ??\text{themselves} \\ *myself \end{array} \right\}$  a seat!

Assuming that we do not want to license examples marked '??', what minimal modification of the Imperative Rule would account for the indicated data? Make sure that your proposal still accounts for all relevant facts illustrated above for imperative sentences with no initial NP. For the purposes of this problem, don't worry about the semantics: concentrate on providing a syntactic analysis that will get the binding facts right.

### Problem 3: Principle A Revisited

Picking up on an idea from Problem 2 of Chapter 1, we hinted at a couple of places in this chapter that the English reciprocal form *each other* might be [MODE ana] – that is, that it might obey Principle A of the Binding Theory. One immediate obstacle to this suggestion is raised by examples like (i):

- (i) They acknowledged each other's contributions.

A. Explain why our current formulation of Principle A together with the assumption that *each other* is [MODE ana] makes the wrong prediction about (i).

At first glance, (i) might be taken to show that reciprocals are not subject to Principle A, but another possibility is that Principle A isn't formulated quite right. It turns out that there are also cases involving reflexives that do not obey Principle A:

- (ii) Clinton is writing a book about himself.  
 (iii) We heard that embarrassing pictures of ourselves had been posted on the internet.  
 (iv) Pat asked Chris where they had filed the descriptions of themselves.  
 (v) Pat told Chris to send reminders about the meeting to everyone on the distribution list, with the exception of themselves.

Such data suggest that our formulation of Principle A is in need of revision. We could try to expand the coverage of Principle A, so that it covers such examples. But that approach does not look very promising, particularly for examples (iv) and (v). In those sentences, there is no single NP that serves as the antecedent of the reflexive. Rather, the reflexives in those examples refer to a set consisting of Pat and Chris. This indicates that determining the reference of the reflexive pronouns in these cases is not purely a matter of grammar, but involves some pragmatic inference. Consequently, it seems that the best way to deal with these counterexamples to our current Principle A is to restrict its applicability – that is, to make examples like (ii)–(v) EXEMPT from Principle A.

In doing so, however, we must be careful not to exempt too many anaphors. For example, we want Principle A to continue to account for the distinction in well-formedness between (vi) and (vii):

- (vi) They read Mary's story about herself.  
 (vii) \*They read Mary's story about themselves.

B. Reformulate Principle A so that it does not rule out (ii)–(vi), but does rule out (vii). Your formulation should likewise not rule out (i) on the assumption that *each other* is [MODE ana]. [Hint: Look at what kinds of elements (if any) outrank the [MODE ana] elements in (i)–(v), and restrict the applicability of Principle A to cases that have suitable potential antecedents. Note that the objective is simply to remove examples like (i)–(v) from the coverage of Principle A; we are assuming that the generalization that determines how such 'exempt' reflexives and reciprocals are interpreted is outside the domain of grammar.]

If Principle A is reformulated so as not to block (i), then it will also fail to block examples like (viii).

- (viii) \*You acknowledged yourself's contribution.

Let us assume the analysis of the English possessive introduced in Chapter 6, Problem 4 – that is, that 's is a determiner that takes an obligatory NP specifier. Notice that not all kinds of NPs can serve as specifiers for 's; in particular, the forms \*I's, \*me's, \*you's, \*he's, \*him's, \*she's, \*her's, \*we's, \*us's, \*they's, and \*them's are all ill-formed possessive determiner phrases.

C. Formulate a generalization about the possible specifiers of 's that will rule out (viii), independent of any facts about binding. How would this be stated formally? [Hint: You will need to posit a new feature (call it 'PRO') that distinguishes the kinds of NPs that cannot be specifiers of 's and those that can. The formal statement will involve the SPR value of 's.]

Your reformulation of Principle A probably also exempted examples like (ix) and (x) from its domain. (If it didn't, you should double-check to make sure that its predictions are consistent with (i)–(viii); if so, then you may have discovered a new analysis).

- (ix) \*Himself is to blame.

- (x) \*They believe that themselves will win.

D. Suggest a generalization about reflexive pronouns that will rule out (vii) and (viii) (again, without relying on binding). [Hint: Notice that the forms are *himself* and *themselves*, not \**heself* or \**theyself*.] How would this generalization be stated formally?

Finally, the reformulation of Principle A to exempt reflexives like those in (ii)–(v) creates problems for the analysis we gave of predication prepositions. In particular, Principle A will no longer rule out examples like (xi) (repeated from (27a)):

- (xi) \*The house had a fence around itself.

E. Explain why the reflexive in (xi) is no longer ruled out.

Later in the book, we will introduce formal machinery that will allow us to bring examples like (xi) back within the purview of Principle A.