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Predication Theory: A Case Study For Indexing Theory

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1 *Predicates and theta-role assignment*

In this chapter I offer a definition of predicate and a theory of theta-role assignment, and I distinguish arguments of a lexical item from role players of a predicate. What follows is an informal discussion that will lay the necessary foundation for chapter 2 and the rest of this book. It will be easy for the reader to find formal approaches to these issues in the linguistic literature. The reason for an informal discussion will become apparent as the relevant issues are examined.

This chapter will establish three major points:

- (A) Predicates are semantic entities that need not have any particular syntactic characteristics;
- (B) The relationship of a predicate to its role players is distinct from, although highly coincidental with, theta role assignment from a lexical item to its arguments. I modify a term from Marantz (1984) and say that predicates assign Semantic Roles to their role players. The schema I will defend is the following:

where the arrow represents the direction of assignment of the Semantic Role or Theta Role;

- (C) Typically the lexical heads N (noun), A (adjective), and V (verb) head a predicate, although there are uses in which P (preposition) may also head a predicate.

1 An event-structure approach to predicates

A clause typically corresponds to the semantic notion of proposition, in which we have some state or action expressed and a group (which may consist of one or more) of participants or role players in that state or action. (For a discussion of what a **STATE** word and an **ACTION** word are, see Jackendoff 1983.) I lump together states and actions under the term “event”. In (1–1), for example, the event is the action of lending and the role players are a lender, an object lent, and someone who has received the object lent.

(1–1) Jean **lent** Mary books.

In this book I analyze a sentence such as (1–1) as containing the predicate *lent* (marked in boldface in (1–1)) and the three role players for that predicate: *Jean*, *Mary*, and *books* (and see Halliday 1970 and Matthews 1981, among many others, for a similar event structure analysis of propositional structure). Immediately, then, we can see a first formulation of an informal definition of predicate: an event word which takes one or more role players, where the term “event” covers both states and actions. (In sec. 1.5 below I discuss the necessity for at least one role player per predicate.)

Certainly there are other ways to analyze (1–1), still thinking of it in terms of an event and role players. For example, we could view the event as being one of lending books. With that idea in mind, the predicate would be the discontinuous string *lent . . . books* and there would be only two role players: *Jean* and *Mary*. (That predicates can be discontinuous strings is shown below in sec. 1.2.) We could as easily view the event as being one of Jean lending to Mary, in which case the predicate would be the string *Jean lent Mary* and the role player would be *books*. Or we could view *lent Mary* as an event and see *Jean* and *books* as the role players. And so on. That is, we could view *lent* alone or in combination with any one or more nominal in (1–1) as a predicate, so long as there is at least one role player.

So far as I can see, there is no *a priori* basis upon which to choose between these possibilities. (We will see ample evidence against the claim that a predicate must be a maximal projection below in secs. 2.5 and 2.6 and in ch. 2, secs. 3 and 4.) Thus we must look to how language treats the syntactic entities that participate in the make-up of a semantic proposition when determining which entities correspond to a predicate and

8 *Theta assignment*

which entities correspond to role players. That is, we must base our analysis on the syntactic and semantic behavior of these entities.

In this chapter I argue that an event lexical item is the “head” (as I will define the term below) of a predicate and that the event lexical item assigns a thematic (theta) role to the role players. Theta assignment will be seen to treat all role players equally (see, in particular, sec. 2.5, where I argue against the claim that VP assigns a theta role to the item in syntactic subject position). It is primarily upon the basis of theta-role assignment behavior that I have decided to analyze a sentence like (1–1) as having only *lent* be the predicate, with all the nominals being role players (but we will see in sec. 3 below that items other than nominals may be role players).

There is at least one instance, however, in which I believe it makes sense (from an empirical point of view – since, as I said above, from a theoretical point of view a wide range of analyses of (1–1) can be argued to be valid) to analyze strings like *Jean lent Mary* or *Jean lent . . . book* or *lent Mary books* as a predicate. And that is when there is a variable present in the clause in the “missing” role-player slot. The item that binds that variable could be considered the single role player, and the clause with the variable could be considered a predicate clause. I will call such clauses “open,” and I will return to a brief discussion of them in section 2.6 below and in chapter 5, section 5.

We will here proceed, then (laying aside until later the discussion of open-clause predicates), with this very simple first formulation of the notion of predicate as an event word which takes one or more role players. With this formulation we can rule out closed clauses (clauses without variables) from the class of potential predicates: closed clauses are not just events, but events plus all their role players. Thus closed clauses correspond to propositions. With this formulation we can also rule out anything but the phrasal level as a level for role players that are nominal (but we will see in sec. 1.4 below and in ch. 2, sec. 14 that we may have to allow nonphrasal role players that are non-nominal). This is because if a role player is referential, the entire reference (not just the sense) of an item tells us who or what the role player is. But *N*'' is the referential level. For example, in an *N*'' like *the dangerous dog*, the head *N* tells us only the sense of the nominal, but all the elements (*the*, *dangerous*, and *dog*) contribute to helping us pick out the referent. Thus *N*'' is the referential level of nominals. Therefore *N*'' can be a role player, but *N* or *N*' cannot.

In (1–1) the boldface predicate is an action; in (1–2) it is a state.

(1–2) The man who marries young is **happy**.

In (1–2) *happy* alone, not *is happy*, is the predicate. I follow Emonds (1985) in calling the copula here a grammatical word. *Is* is present in (1–2) purely to satisfy needs of the syntax and does not contribute to the semantic interpretation of the sentence in the same way semantically full lexical items do. (One of the functions of *is* in (1–2) is to carry the tense of the sentence, for example.) Notice that the same semantic relationship of predication holds between *the man who marries young* and *happy* in (1–3), without any copula, as in (1–2) above, with the copula. (Examples of the first type in (1–3) were pointed out to me in this regard by Andrew Radford (personal communication).)

(1–3) **Happy** the man who marries young!
I consider **happy** the man who marries young.

The fact that the predication between *the man who marries young* and *happy* in (1–2) and (1–3) is the same is evidence that the copula in (1–2) is not part of the predicate, but a grammatical word only.

Predicates, whether of the action or state type, can take as few as one role player, as in (1–2) above for states and (1–4) below for actions:

(1–4) Jean **ran**.

And predicates can take more than one role player, as in (1–1) above for actions and (1–5) below for states:

(1–5) Jean is **talented** at the piano.

In (1–5) the role players are *Jean* and *the piano*. The predicate is *talented*, which lexically selects the preposition *at* to introduce one of its role players (see sec. 2.1 below for discussion).

The preceding first glance at predicates is quite distinct from most linguistic definitions today, in which typically the subject role player is singled out and the rest of the material is the predicate. I will argue in section 2.6 below against any analysis of predication in terms of VP (verb phrase) versus the syntactic subject. But the argumentation will depend upon an understanding of lexical argument structure; thus it must be postponed until after the relevant discussion. I will return to this issue from another perspective in chapter 2, section 3.

One immediate advantage of the event-structure definition of predicate developed in this chapter is that such a definition can carry over to

10 *Theta assignment*

languages which lack a VP (the so-called nonconfigurational languages, such as Tagalog – as argued in Miller (1988)).

1.1 **Modifiers and specifiers as part of the predicate**

The sentences used to exemplify predication above, with the exception of that in (1–3), consist of a single clause with predicates that consist of a single word, all the remaining words of the sentence being phrases that function as role players in the event. The sentences of natural language, however, do not always lend themselves to such a neat analysis.

(1–6) Jean **almost lent** Mary books.

(1–7) Jean **lent** Mary books **frequently**.

In (1–6) and (1–7) the words *almost* and *frequently* call for analysis. They are not role players in any event. We might, then, ask if they are themselves events, i.e. predicates. That is, are (1–6) and (1–7) best analyzed as representations of a proposition in which there is a predicate roughly paraphrased as “almost happened” and “frequently happened” with a propositional role player roughly paraphrased as “Jean lent Mary books”?

Certainly scholars have argued that adverbials are predicates (see Davidson 1975, Rothstein 1983, Abney 1986, among others), where I use the term “adverbial” to cover the functional notion of modifier of a non-nominal. Thus the analysis of adverbials as predicates is not a strawman, and such an analysis has significant effects on the semantic representation of sentences. For example, (1–8) would be analyzed as having three predicates (each in boldface here):

(1–8) Jean **almost lent** Mary books **frequently**.

And the different readings of whether it was a frequent occurrence that Jean almost lent Mary books or (the more bizarre reading) that it was almost the case that Jean frequently lent Mary books could be represented by having either *frequently* or *almost* as the highest (i.e., least embedded) predicate. That is, at LF (Logical Form) the arrangement of predicates would encode scope relations.

An analysis with adverbials as predicates, however, would meet resistance in a theory that requires role players to be phrasal. For example, in (1–6) the putative predicate *almost* would take a single role player (the whole sentence minus *almost*) that does not form even a constituent, much less a phrasal level of one. Most theories of predication

that I know of require role players to be phrasal – thus one might balk at giving up this requirement on role players easily. Still, the requirement that role players be phrasal is as stipulative as any other claim about role players, at least so far as non-nominal role players are concerned. (Recall that it was argued above that nominal role players must be N", since N" is the referential projection.) And we will see in various places in this book (including ch. 2, sec. 14) that non-nominal role players may well not be phrasal. We must therefore consider this objection in that light. And if this were the only objection to a predicate analysis of adverbials, and if such an analysis seemed otherwise to be the most nearly adequate one, I would be led to propose that these adverbials offer one more piece of evidence against the requirement that all role players be phrasal. However, this is not, in my opinion, the most nearly adequate analysis of adverbials.

There are alternative analyses of (1–6) and (1–7) that lead to simpler semantic representations of sentences like (1–8). One is the analysis linguists traditionally have given such sentences, in which *almost* and *frequently* are taken to modify other parts of the sentence rather than to predicate of them. This analysis, of course, assumes a distinction between “modification” and “predication,” a distinction that I return to and defend in section 1.4 below. With this kind of analysis the varying interpretations of (1–8) would be handled as scope phenomena.

An alternative midway between the two above is to call an adverb like *frequently* a predicate but an adverb like *almost* a modifier (where the term “adverb” is a category label, although these adverbs are adverbial in function, as well). The relevant distinction here would be that (1–6) does not entail (1–1), but (1–7) does. (See Davidson 1970, Clark 1970, Thomson 1977 for a discussion of the entailment of sentences like (1–1) from sentences like (1–7).)

None of these analyses seems quite right to me, although the last one discussed above seems less obviously incorrect than the others. Consider *almost* in (1–6). Rather than being an event in itself in any obvious way, it acts as a degree word, telling us that some independent event (independent of the concept of “almost”) did not occur but came very close to occurring. As a degree word it is similar in function to the italicized words in:

(1–9) Sally is *very* tall.

(1–10) Sally is *so* smart.

12 *Theta assignment*

(1-11) That is *quite* a possibility.

(1-12) She's *a little bit* nice.

And like these degree words, *almost* modulates an event by placing it somewhere on the scale from negative to positive with respect to the occurrence or extent of the event; *almost* is an intrinsic part of which event actually occurs. I therefore analyze the predicate in (1-6) as consisting of the two words (which do not form a syntactic constituent) *almost lent*. In other words, I take *almost* to be a modifier which combines with an event word to form a new event, and, thus, a new predicate.

Let me point out that if I were to accept *almost* as a predicate, I can see no clear reason for not also analyzing the italicized words in (1-9) through (1-12) as predicates. But then the notion of predicate would get ever more distant from the event structure notion I develop in this section (in which predicate is an event word or words that takes at least one role player). Thus, while a more abstract approach to the concept of predicate might well allow an analysis of *almost* as a predicate, I will here stick to a limited sense of predicate that excludes degree words from qualifying for predicate status.

Given that I am analyzing some adverbials (the degree adverbials) as parts of predicates, I will generalize and analyze all adverbials that are not themselves role players (and see McConnell-Ginet 1980, who argues that some manner adverbials are role players (in our terms) with certain predicates, as well as secs. 1.6, 2.4, and 3 below) as parts of predicates. That is, my predication theory will not distinguish between types of adverbials unless such distinctions are required for explanatory or theoretical adequacy. And, so far as I can see, such distinctions are not required. Therefore, even adverbials such as *frequently* in (1-7) will be analyzed here as parts of predicates. In sum, modifiers of an event word are parts of the predicate that the event word is part of.

Let me point out that my adopted position that manner adverbials like *frequently* are part of the predicate, rather than predicates themselves, is not a strong one. It is quite possible that adverbials do, in fact, split into two groups, where some form part of the predicate and others are separate predicates which predicate of the predicate (or, perhaps, of the entire proposition minus the adverbial). That is, I recognize that *frequently* might best be analyzed as an event unto itself. In fact, as I point out below with respect to (1-34), there are uses in which even degree adverbs seem much more open to an analysis as predicates than *almost*

does in (1–6). Still, throughout this study I will continue to analyze adverbials that are not role players as part of the predicate they co-occur with for ease of exposition. The theory to be developed here, however, does not hang on this choice of analysis. In fact, no claim in this book is based solely on the analysis of adverbials as parts of predicates. Thus, if one were to analyze adverbials as predicates themselves, the theory of predication given in this work would hold unchanged.

Like adverbial modifiers, I contend, are the auxiliaries. That is, the auxiliaries, by giving the information of aspect, modality, and voice, are an intrinsic part of the event and should be analyzed as part of the predicate (and see Napoli 1981 for a discussion of the semantic contribution of an auxiliary to the predicate).

One important result of the analysis of adverbial modifiers and auxiliaries as part of the predicate is that we will not be able to recognize predicates in the lexicon. (But, as mentioned above, this result will follow also from other data. These data are given in secs. 1.2 and 2.4 below.) Instead, we need to see which words go together in a sentence before we can pick out the predicate. This fact means that we must make a distinction between lexical items and predicates and between the semantic relationship between a lexical item and its arguments as opposed to the semantic relationship between a predicate and its role players. We will turn to this distinction in section 1.6 below.

At this point, we can alter our working definition of predicate to be an event word plus or minus modifiers and auxiliaries, taking one or more role players.

Finally, up to this point in this subsection the predicates whose auxiliaries and modifiers we have discussed have been verbs. We will see repeatedly in this chapter (particularly in sec. 2 below) that we can have predicates that do not contain verbs (and we already have seen an example of one in (1–3) above). I propose to generalize the findings of this subsection to all categories that can be predicates. Thus not only auxiliaries, which are specifiers of *V'*, but specifiers of any category can be part of a predicate (though they need not be – as in the case where a specifier of *N'* is a role player of a predicative *N* – see sec. 2.3 below). And not only adverbials (which I have defined as modifiers of non-nominals), but modifiers of any category can be part of a predicate. In the examples below, the predicates are in bold face.

(1–13) I am **very fond** of Sue.

14 *Theta assignment*

(1–14) She is **a terrific scholar** of Dante.

(1–15) She's **absolutely into** Greek art.

In section 1.6 I argue that all role players of a predicate are arguments of a theta assigner that is (part of) the predicate. The theta assigner turns out to be the event lexical item of the predicate. For the moment let us assume this. We can now define the concept “head of a predicate,” which will be useful to us in later discussion:

(1–16) *Head of a predicate*: The lexical item which assigns a theta role to the role players of a predicate containing that lexical item is the head of that predicate.

To see what this definition means, consider:

(1–17) Jean **lent** Mary the books **in great haste**.

In (1–17) the predicate consists of the discontinuous string *lent . . . in great haste* (that is, an event word plus an adverbial). There are two lexical heads which are parts of this predicate: *lent* and *haste*. But of them only *lent* assigns a theta role to the role players of the predicate, so *lent* is the head of the predicate.

In (1–16) “containing” is not to be read as properly containing. Thus the word *lent* in (1–1), for example, is a part of the predicate and is, in fact, the entire predicate. Here *lent* heads the predicate that it is (part of).

1.2 **Nonconstituent predicates**

In (1–6) the continuous string *almost lent* is a predicate, although it does not form a syntactic constituent. Thus analyzing modifiers and specifiers as part of the predicate requires that I admit predicates which do not form syntactic constituents. We would hope that other factors besides the analysis of modifiers and specifiers would lead us to the conclusion that predicates do not have to form syntactic constituents, for, if not, our analysis of modifiers and specifiers as potentially being part of the predicate could be seen as too expensive to the grammar.

In fact, there is strong evidence independent of the analysis of modifiers and specifiers that predicates need not form syntactic constituents. Consider predicates consisting of fixed or idiomatic sayings. Such sayings need not form syntactic constituents, as in:

(1–18) Mary **took** the students **to task**.
Mary **took** the students **on an outing**.

Both *took . . . to task* and *took . . . on an outing* are predicates and neither forms syntactic constituents or even continuous strings (and see Emonds 1976 and Larson 1987 for more such examples). There are many such idiomatic predicates, a great number of which involve a verb plus a preposition, as in *look after* in the sense of “take care of.” The approach to predication developed here can analyze these strings as predicates without calling for any kind of syntactic restructuring of a V plus a P into a new constituent (compare Hornstein and Weinberg 1981, for example, and see the refutation of this kind of syntactic restructuring in ch. 2, sec. 3).

Of course, a predicate certainly can be a syntactic constituent, as with an idiomatic P(repositional) P(hrase) (hereafter PP) and V(erb) P(hrase) (hereafter VP):

- (1–19)a. Bill is **out of his mind**.
- b. Bill **lost his cool**.

Here the entire PP *out of his mind* and the entire VP *lost his cool* are the predicates. (And see Maling (1982) for discussion of idiomatic PPs).

Example (1–19) can be used to point out another important fact: not all predicates need have a head that is a single word, in the sense of (1–16) above. In (1–19)a, for example, both *out* and *mind* are lexical heads that are part of the predicate, but neither of them is an event word in this usage, thus neither of them is a theta assigner here. This predicate, then, is a phrasal lexical item. I will argue in section 1.6 that the whole phrase is a theta assigner. Therefore the whole phrase is the head of the predicate (as well as filling the entire predicate).

At this point one of the most important results of this chapter is apparent: predicates are semantic primitives which are not definable either as lexical units (and see sec. 1.1 above) or as syntactic units. Thus the concept of predicate, which is best defined by considering the semantic concepts of events and role players, must be admitted into the grammar of natural language.

1.3 Predication versus unanalyzable idioms, identification, and nonpredicative verbs

So far we have examined single-clause sentences in which it is clear that a single event occurs and that event has at least one role player. Here I ask the question of whether every clause must have a predicate.

The answer is clearly no. Several types of clauses do not involve

predication. The sentences in (1–20), for example, cannot be analyzed as consisting of an event plus role players in that event.

- (1–20) Mum's the word.
The jig's up.

These are semantically unanalyzable idioms (in the sense of Napoli 1987a), and the entire clause forms a single semantic unit that cannot be broken down into semantic subparts (although, of course, these sentences are syntactically analyzable).

In fact, it has been claimed in the literature that many types of clauses do not involve predicates in the sense I am developing here, such as sentences expressing weather and time. That is, some claim that these expressions involve actions or states, but fail to have role players. In Napoli 1987a I argue that weather and time expressions in English (although this is not so in many other languages) are, after all, examples of predication structures, and do, in fact, involve role players. For example, weather *it* can control PRO, as in *It got cold enough [PRO to snow]*, where event control (as in Lasnik 1984 and Williams 1985) is not possible: the event of getting cold does not snow. Thus if only arguments can control PRO (as in Chomsky 1981), then weather *it* is an argument and “weather words” are predicates. (See Napoli 1987a for further arguments for the thematic status of weather and time *it*.)

There are other kinds of clauses which have been argued not to involve predication, such as purely identificational sentences of the type seen in (1–21). (See Williams 1983b, among others, where the linguistic tradition is quite distinct from that found in the more philosophical literature.)

- (1–21) My aunt is Miss Prothero.

Actually, the determination of whether a sentence like (1–21) is an identificational sentence or a predication sentence is highly dependent upon context. With a sentence of the form NP₁–copula–NP₂ (where NP = Noun Phrase) the likelihood of NP₂'s being understood as a predicate correlates inversely with the likelihood of NP₂'s being understood as a totally referential NP. Thus if we are offering two different names for the same person, (1–21) is an equational or identificational sentence and has no predicate and no role player. In that situation, the sentence should be symmetrical. That is, if we reversed the order of the NPs, we still would be giving the same information. But in another context NP₂ could be understood to be assigning a semantic role to NP₁; it can be telling us that NP₁ has the property described by NP₂. Such a context is found in:

- (1–22) We all know that a woman named Miss Prothero asked the firemen if they wanted anything to read. But what you haven't figured out yet is that my own aunt, our dear friend, is Miss Prothero.

Here *Miss Prothero* is a predicate taking *my own aunt* as its role player.

While English does not morphologically signal the difference in semantic function between the NP *Miss Prothero* in (1–21) and in (1–22), other languages may. John Myhill (personal communication) has pointed out to me that (1–21) would be rendered differently from (1–22) in Indonesian, where the predicative status of the relevant NP in (1–22) would be clearly marked. The linguist studying predication in English is nowhere near so lucky, however, and must rely primarily on context for recognizing instances of predication in copular sentences.

Still, there are other clues that help us distinguish between predication and identification. As Rothstein (1983, p. 104) points out, in general the more evaluative material there is in the NP to the right of the copula, the more likely we are to interpret that NP as predicative. (See also Strawson 1950, Wiggins 1970, Donnellan 1966, Geach 1950, 1968, Halliday 1967a and b, Fodor 1970, Hawkins 1978, Higgins 1979, Williams 1980, Woisetschlaeger 1983, and Safir 1985 (pp. 169–70) for a discussion of definite NPs as predicates.) Many have noted that superlative NPs can be predicates, whereas usually a definite specifier closes an NP so that it cannot be a predicate – see Higginbotham 1985. (For other ways in which superlatives behave like indefinite NPs, see Rando and Napoli 1978 and the references given there.)

Higgins (1979) offers tests for predicate nominals, such as whether or not they can be questioned with *what* (the operator binding a predicate NP position) rather than *who* (the operator binding a referential [+human] NP position). (See also Williams 1983b, who makes use of this question test.) By that test the NP to the right of the copula in (1–21) is not a predicate. Thus (1–21) is not an appropriate response to (1–23):

- (1–23) What is your aunt?

But the NP to the right of the copula in (1–24) is a predicate, as we can see by the fact that (1–24) can be an appropriate response to (1–23):

- (1–24) My aunt is a doctor.

Nominals that function as identifications also have a distinct distribution from nominal predicates, as noted by Stuurman (1985, p. 242) and Napoli (1987a). (But see Jackendoff 1983, who argues that identification

and predication are essentially the same in conceptual structure – and see my remarks on coindexing in identificational sentences in ch. 2, sec. 2, as well as the NPs analyzed in ch. 5, sec. 1.)

Still another candidate for a clause that does not contain a predicate is a clause with the main verbs *seem*, *happen*, *begin*, *continue*, and other so-called aspectual verbs (see Newmeyer 1975, and Napoli and Rando 1979, ch. 1), as in:

(1–25) It happens now and then that cats can't meow.

(1–26) Jack began [t to cry].

When these verbs take an infinitival complement, I analyze them in the standard GB way as involving NP movement. The “t” in (1–26), then, is the trace of the moved NP *Jack*. The question is whether these verbs head predicates.

Given the semantic definition of predicate developed thus far, we are led to conclude that these verbs are not predicates. Instead, like *almost* (see sec. 1.1 above) and the auxiliaries, these verbs give information in such a way that they are intrinsic parts of some event but do not denote events in themselves. Thus *happens* in (1–25) forms a predicate with the discontinuous string *now and then . . . can't meow*. And *began* in (1–26) forms a predicate with *to cry*. Likewise, the modal verbs and aspectual verbs of Italian (which are main verbs syntactically; see Napoli 1974b) would not be predicates in themselves, but parts of predicates (as in Napoli 1981, who draws syntactic as well as semantic parallels between these verbs and the auxiliaries *avere* ‘have’) and *essere* ‘be’) in Italian).

One might object to this analysis on two different grounds. First, these verbs can impose semantic restrictions on their clausal sisters, as we can see by the conflict in time frames in (1–27):

(1–27) *The water continued [t to spill in an instant].

A clausal complement of *continue* must be a durative proposition. If only predicates could impose semantic restrictions on other items they co-occur with, then (1–27) could be taken as evidence that *continue* is a predicate.

My response has two parts. For one thing, I know of no arguments that only predicates can impose semantic restrictions on the items they co-occur with. In fact, I will argue in section 2.4 that role players can select each other for pragmatic and semantic appropriateness (see the discus-

sion of (1–85)); thus items other than predicates can impose semantic restrictions on their linguistic companions.

For another thing, if *continue* is part of the predicate in (1–27) we have an immediate explanation for the failure of (1–27): the predicate *continue . . . to spill in an instant* is self-contradictory (containing both a durative and a point-time requirement) and, thus, anomalous. Therefore, the analysis with *continue* as part of the predicate accounts for the failure of (1–27) in at least as adequate a way as an analysis with *continue* as a predicate.

The other major objection that one might bring against my claim that all these verbs are not predicates themselves is based on the behavior of *seem*. *Seem* can take a referential nominal in a *to* phrase in addition to a clause, similarly to predicates such as *ridiculous*:

- (1–28) Jack seems to me [t to understand French pretty well].
That he would even think of firing you is ridiculous to me.

One might claim that the NP in the *to* phrase is a role player of *seem* in the first sentence of (1–28). However, the referent of this NP is not a participant in any event of seeming alone. Instead, the entire event of seeming to understand is viewed from the perspective of the referent of this NP. That is, the judgment that Jack has the property of seeming to understand is anchored on this NP. Thus this NP is attracted into the sphere of role players of the entire predicate. (I will return to a discussion of what this means for the Projection Principle in sec. 4 below.)

I maintain, then, that *seem*, *appear*, *happen*, and the aspectual verbs are all parts of predicates but not predicates themselves. This analysis of *seem* is counter to that of most linguists, who claim *seem* is a predicate (a notable exception being Rothstein (1983), who analyzes *seem* as a copula and not as either a predicate or part of a predicate).

I conclude that not every clause need contain a predicate, unanalyzable idioms, identificational clauses, and clauses with verbs such as *seem* and *continue* supplying clear cases of clauses without predicates.

1.4 Multiple predication in a single clause

In all the examples we have seen thus far, the predicate we have singled out has been the only predicate in the sentence and the sentence has consisted of only one clause. It is a highly debated matter as to whether it is possible to have more than one predicate in a single clause. In chapter 2, section 1 I lay out some of the theoretical consequences of allowing

multiple predicates in a single clause, and I compare Chomsky 1981 to Williams 1980, among others. In this book, however, I will not debate this issue. In Napoli 1987a I come down firmly on the side of Williams: there may be multiple predicates in a single clause. And let me point out that even Chomsky (1986b) has abandoned his original position. I therefore here merely assume that there may be multiple predicates in a single clause.

Along with this assumption goes the desire to adhere strictly to the principle that only syntactic data are valid evidence for syntactic structure. (See also the introduction to this book.) Thus the fact that we have the sense of a proposition does not in any way offer evidence that we have the syntactic structure of a clause. The sentence in (1–29), then, is analyzed as consisting of only a single clause, but has two predicates: *painted* and *red*. (That is, I reject a small clause analysis of such sentences; see Williams 1983a.)

(1–29) We **painted** the barn **red**.

An interesting question arises here: whether there is a distinction to be made between predication and modification. Certainly (1–29) above contrasts with (1–30) below, in which *red* is typically called a modifier of the head N *barn*.

(1–30) We painted the red barn.

In (1–29) we are painting the barn and the result is that it turns out red. Thus the barn is a role player (the only role player) with respect to the state described by *red*. In other words, *red* predicates of *the barn*. However, in (1–30) (to be read without contrastive stress on *red*) we are picking out a particular barn by calling it red. Yet after painting it might be another color, as in:

(1–31) We painted the red barn blue for a change.

And before painting it might not have been red, but perhaps we painted it red so it now is. We can even read (1–30) with *the red barn* as the name of the barn (in which case, perhaps we should capitalize: The Red Barn), to indicate the barn that used to be red or that for some reason or other we refer to as “the red barn.” But even if the barn is a red barn before we begin and even if we wind up repainting the barn red again, the *red* in (1–30) does not tell us that the barn was painted red. Instead, the *red* in (1–30) assigns the property to the barn of being that barn that we call red, regardless of our reason for calling it red. We are not asserting in (1–30) that the barn has the property of redness, unlike in (1–29).

In both (1–29) and (1–30) *red* assigns a property to the barn, then, and thus is a theta assigner (and see sec. 4 below). The distinction is whether the redness is being asserted of or being used as a characterization of the barn. One might be led then to propose that in both uses *red* is a predicate, where modification would be a type of predication.

However, there are at least two related reasons for distinguishing the property assignment called modification above from the property assignment called predication. One is that if *red* in (1–30) were a predicate, then its role player would be *barn*, which is an N and not an NP, whereas nominal role players should be phrasal, as already has been argued at the opening of this chapter. That is, NP is the referring level. Thus it makes no sense to speak of an N as being a role player with the notion of role player and predicate that I am developing in this chapter.

Second, the modifier *red* in (1–30) falls within the maximal projection (that is, within the N[″]) of the N it modifies, so that it is an intrinsic part of defining the reference of the entire NP. In contrast, the reference of the NP predicated of by *red* in (1–29) is independent of the property of redness. This is a major distinction between modification and predication, and one the theory must recognize.

I therefore will treat modification as a separate phenomenon from predication. And I will account for the fact that *red* in (1–30) assigns a property to *barn* by saying that *red* here assigns (or discharges) a theta role to *barn* by way of Theta Identification (see Higginbotham 1985). (I return briefly to the issue of theta identification in sec. 4 below.)

In sum, while the difference between (1–29) and (1–30) is one of difference between what is asserted and what is not asserted, it is also a difference between what is predicated and what is not predicated. My argument that modification should not be identified with predication is in no way dependent upon the fact that redness is asserted of the barn in (1–29) but not in (1–30). In fact, as John Myhill (personal communication) has pointed out to me, if we put the stress peak of the sentence on *red* in (1–30), we can read redness as being asserted of the barn. Thus there is no definitive correlation between nonassertiveness and modification.

Still, the fact that *red* is asserted in (1–29) is worthy of note, since in general asserted information is significant new information, so it can be the focus of a clause and can be understood as a predicate. (See Myhill 1984 for an overview of notions such as assertion, focus, transitivity, semantic complexity, and foregrounding, as well as Chomsky 1972, Erteschik 1973 (who discusses the notion of communicative dynamism of

22 *Theta assignment*

Firbás 1962), Hopper 1979, and Hopper and Thompson 1980, among others.) In fact, Myhill (1985) demonstrates that in many languages focussed or new information is grammatically marked, sometimes with what could be called the predicate marker. And in English some have argued that the intonation peak marks the focus (see Akmajian 1970, Chomsky 1972, and Higgins 1979, among others). For example, consider sentences such as those below, suggested to me by John Myhill (personal communication).

(1–32) BILL left town.

(1–33) Some IDIOT must have suggested that to you.

(The capitals indicate that the stress peak falls on this word.) We can analyze (1–32) with *Bill* as a predicate, assigning the property of being Bill to the one who left town. We can analyze (1–33) with *idiot* (perhaps plus the auxiliary *must*) as a predicate, assigning the property of (obligatory) idiocy to the one who suggested that to you. In fact, we might even allow degree words to be analyzed as predicates when they receive the stress peak (*contra* the discussion in sec. 1.1 above):

(1–34) I know SOME Spanish.

Here *some* would be a predicate, assigning the property of smallness to the amount of Spanish I know. (And see Bolinger 1972 (pp. 75ff.) for a discussion of predicate degree nouns.)

Of course, if the indicated words above are, indeed, predicates, then we have evidence that non-nominal role players need not be phrasal. And from here on in this book I will assume that non-nominal role players need not be phrasal (see also ch. 6, sec. 7).

If the discussion immediately above of (1–32)–(1–34) is on the right track, we can see that approaches to predication based on syntactic restrictions between the locations of predicates and certain of their role players are hopelessly inadequate. One of my goals in this book is to show precisely that. And while I will be primarily concerned with less controversial instances of predication, the ones discussed here are telling and offer a serious challenge to syntactically based theories of predication.

Let me repeat that one of the most important consequences of my nonsyntactic definition of predicate is that we must allow a grammar in which semantic units do not have to be represented by syntactic units and syntactic units do not have to be mapped into semantic units. This is precisely the point defended on different grounds in Keenan and Faltz

1978. That is, there is no isomorphism between syntax and semantics. (See also Williams 1982.)

1.5 Role players are necessary

Many event words, particularly nominals, can be used without any explicit role players present, as in:

(1–35) I'm saddened by **destruction** of any kind.

Here *destruction* is an event word, and in other sentences it can take explicit role players:

(1–36) I'm saddened by the Venetians' **destruction** of their own city.

The question posed here is whether an event word must have a role player in order to be (the head of) a predicate.

Certainly our discussion of the notion of predicate thus far has repeated continually that a predicate takes one or more role players. And notice that both formal linguistic and philosophical approaches to predication take the stance that a predicate must be an open function which assigns a theta role to (or saturates) some role player (see Higginbotham 1985 and Davidson 1975, among others). Therefore, let us not abandon the idea that a predicate requires a role player unless we are forced to do so.

The problem now is how to analyze *destruction* in (1–35). If *destruction* indeed has no role players in (1–35), then it cannot be a predicate, and we must analyze it as a second nonpredicative use of an event lexical item (where modification is the first we have seen). While the concept of event lexical items having a variety of separate functions does not seem to me to be wrong in any *a priori* sense, it does seem wrong to analyze *destruction* in (1–35) drastically differently from *destruction* in (1–36), given the very strong semantic similarity between the two sentences. Fortunately, we may be able to analyze *destruction* as a predicate in both sentences. There is evidence that while *destruction* in (1–35) has no explicit role player, it does have an implicit one. That is, an implicit role player would be one that appears in the argument structure of an event lexical item in the lexicon, but is not realized as any syntactic entity (although it may be realized as a morpheme – see Roeper 1987). (The significance of implicit arguments for the Projection Principle will be discussed in sec. 4 below.) Thus in (1–37) the infinitival rationale clause requires an agentive controller (see Roeper 1987), which is the implicit role player of *destruction*.

24 *Theta assignment*

(1-37) The **destruction** of the city [PRO to prove a point] was deplorable.

One cannot argue that a PRO in specifier of NP is the controller here, since adverbial NPs also can fill this specifier:

(1-38) Yesterday's **destruction** of the city [PRO to prove a point] was deplorable.

I conclude that an implicit agentive role player of *destruction* is present in (1-35) and it is this implicit role player that controls the PRO of the rationale clause in (1-37) and (1-38). (See Manzini 1983, Williams 1985, and Roeper 1987 for relevant discussion; see also Torrego 1986, who reports on an MIT talk in 1986 by Alessandra Giorgi and Giuseppe Longobardi, in which they give Italian sentences parallel to (1-37).)

Once more we have an instance of predication for which any syntactically based theory of predication is inadequate. The agentive role player of *destruction* in (1-35) not only does not stand in any specified syntactic location with respect to that predicate, it is not even a syntactic entity (although it is a thematic entity).

A similar case is that of impersonal passives (passives of intransitive verbs) in languages such as German, where there is evidence that an implicit agent is present (perhaps even in the passive morpheme on the verb, as proposed in Roeper 1987 for personal passives). The most common types of evidence involve adverbials or AdjP's that can appear in these impersonal passives and that can be licensed only by an agent (see also Hale and Keyser 1986 and 1987, Belletti 1986, and Safir 1987a).

There is at least one other type of serious challenge to the definition of predicate as requiring a role player, and that is nonreferential uses of NPs. For example, consider:

(1-39) A career girl, which is something my fiancée doesn't happen to be, attracts me most.

(Example (1-39) is from Higgins 1979, p. 253.) Here the NP *a career girl* has a "genus" sense (see Givón 1978, p. 293) rather than a referential sense. Example (1-39) minus the relative clause could be roughly paraphrased as, "The type of female that attracts me most is a career girl." In other words, the semantic representation of a nonreferential NP like *a career girl* should be something like "someone who is a career girl" (or that *x*, such that CAREER GIRL(*x*)). With this kind of semantic representation, the nonreferential NP is a predicate and has a role player: that referent which the NP picks out by virtue of its being used predi-

catively. But now we are talking about nonlinguistic entities that have no linguistic counterparts, and if we were to require our theory of predication to handle the analysis of these NPs, we might have to develop a theory that goes beyond linguistics proper. (And see Chierchia 1985 for a discussion of a range of other difficult problems in this area.)

I will not use NPs like *a career girl* in (1–39) as examples of a predication in any of the rest of this book, since their analysis raises questions I am unable to answer (and some I am unable to even formulate). Let me just point out that no theory of predication that I will be arguing against in chapter 2 can deal any better with this use of an NP than mine.

I will, therefore, set this type of NP aside, and assume that it does not pose a threat to my claim that every predicate requires at least one role player, a claim common to all theories of predication so far as I know, as I said above.

I conclude that in all instances of predication a predicate must find at least one role player.

1.6 Semantic roles and thematic roles

It is a commonplace in the linguistic literature that some lexical items have “argument” structures and assign “thematic” or “theta” roles to their arguments. That is, linguists of various recent theories seem to agree that some lexical items involve the notion of event and call for a range of participants or role players (which are typically dubbed “arguments”) in that event. (Exactly at what point in the grammar theta assignment takes place and exactly how argument structure is best represented are much discussed matters. See Stowell 1981, Williams 1984b, and Culicover and Wilkins 1986.) Actually, there is evidence that arguments of an event lexical item can be introduced when that event lexical item appears in a syntactic structure by way of nonlexical principles which allow adjuncts of a lexical head to be interpreted as arguments of that lexical head (see in particular Jackendoff 1987a and b). We will discuss such cases in secs. 2.4 and 4 below.

In this book I do not justify the existence of or investigate deeply the event structure of particular lexical items (although I do discuss nominals and prepositions in secs. 2.3 and 2.4 below in this regard). Much interesting work on this topic is found in Gruber (1965), Jackendoff (1972, 1983, and 1987b), Stowell (1981), Anderson (1983), Pustejovsky (1985), Beth Levin (1985), Croft (1986), Guerssel *et al.* (1986), Talmy (1986), Roeper (1987), and various works issuing from the Lexicon

Project at MIT (including Guerssel 1986, Hale and Keyser 1986 and 1987, Rappaport, Levin, and Laughren 1987), among others. What is essential to my present work is that some lexical items do have event structures, and those that do have arguments (the counterparts to role players for predicates).

Let me point out that in spite of the fact that for the most part event structure is dependent upon meaning, to some extent the particular event structure a lexical item may have is lexically idiosyncratic. That is, words which are close synonyms may have different event structures and subcategorization frames. *Try*, for example, need not take a theme argument, but *attempt* must (*She tries hard* vs. **She attempts hard*).

Some have argued that all obligatorily subcategorized sisters to a lexical head at DS are arguments of that lexical head. (By “DS” I mean to indicate the first syntactic tree in the derivation.) McGonnell-Ginet (1982), in fact, proposes that all VP internal adverbs are arguments. On the other hand, Dowty (1980) has argued that all “oblique” terms (beneficiaries, locatives, instrumentals, etc.) are not arguments of V. In section 1.1 above I argued that some adverbials and specifiers are not role players of a predicate but, rather, parts of the predicate (although I pointed out that an analysis of certain adverbials as predicates themselves might be justifiable, and we will see in sec. 2.3 below that specifiers of NP can be arguments of the N). For much the same reasons as outlined there, I would argue that these same adverbials are not arguments of a lexical head (*contra* McConnell-Ginet). On the other hand, since beneficiaries of the type found in Indirect Object position are role players in an event, I would argue that they are arguments of a lexical head (*contra* Dowty). And I argue in section 2.4 below that certain instrumental and locative phrases are arguments of a lexical head (see also sec. 3 below). Therefore, at least some adverbials can be arguments with certain lexical items.

As I said above, the traditional approach is to say that lexical heads assign theta roles to their arguments. For example, Vs can take an agent argument and/or a theme argument and/or an experiencer argument and/or a beneficiary argument, etc. Exactly how many and which theta roles exist is something to be established by argumentation based on examination of the data from individual languages. The crucial point for us here and throughout this book is that theta roles exist – not which theta roles exist.

Lexical items which have argument structures, then, are potential heads of predicates. However, a predicate can consist of more than just a

lexical item that is an event word (see secs. 1.1 and 1.2 above for predicates that consist of more than one word), and a predicate need not contain any isolable event word at all, but instead may be a phrasal event (as in the case of metaphorical or idiomatic PP and VP predicates, such as in (1–19) above). Still, regardless of a predicate’s lexical and syntactic make-up, all predicates take role players and assign properties to those role players.

In this subsection I want to compare the concepts of assignment of a property to role players by a predicate and assignment of theta roles to arguments by lexical heads, for, certainly, there is much in common between the two.

Marantz (1984) uses the term “semantic role” to describe the role a lexical head assigns to its arguments and the role a VP assigns to its syntactic subject when the syntactic subject is an argument of the V. (In sec. 2.6 below I argue against VP as a theta assigner, *contra* Marantz and others.) He points out that semantic roles in his sense are numerous and idiosyncratic, varying according to the lexical item, whereas theta roles are simply features of the more varied semantic roles. Thus, for example, both *eat* and *assassinate* take an agentive argument, but they assign quite different semantic roles to that agentive argument. (The agent of *assassinate* acts maliciously, with aforethought, and with purpose (see Chomsky 1972). The agent of *eat* merely initiates the action, but may even do so unintentionally (as in the situation in which a two-year-old boy eats his chewing gum by accident).)

I here modify Marantz’s term of semantic role and apply it to predication: I say that a predicate assigns a semantic role to its role players.

Notice first that the semantic roles a predicate assigns to its role players depend on the entire predicate and not just on the head of the predicate. (Recall that the head of the predicate is the theta assigner for the role players, as in (1–16) above, while the entire predicate includes certain specifiers and modifiers of the head as well.)

(1–40) Jack **barely passed** the test.

(1–41) Jack **almost passed** the test.

In (1–40), where the predicate is *barely passed*, Jack passed the test; in (1–41), where the predicate is *almost passed*, he did not. *Jack*, therefore, is assigned a different property by the different predicates (the property of barely passing in (1–40); the property of almost passing in (1–41)). Hence

the presence of *barely* and *almost* affects the semantic role assigned to the role players of the predicates in these sentences.

On the other hand, in both (1–40) and (1–41) *Jack* is agentive. That is, the theta role of *Jack* is affected only by the lexical head that *Jack* is an argument of (which is the verb *passed* in both sentences), not by the full predicate that *Jack* is a role player of.

One might object to my claim that adverbials do not affect theta roles, by pointing out much-discussed pairs such as:

(1–42) Sharon **broke** the window **accidentally** (**when she fell through it**).

(1–43) Sharon **broke** the window **on purpose**.

In (1–43) *Sharon* is agentive. But in (1–42) *Sharon* is not agentive (but perhaps experiencer or instrument, according to the situation). We consider the adverbials *accidentally* and *on purpose* when figuring out what theta role *Sharon* has in these sentences. However, this does not mean that the adverbials are DETERMINING or assigning the theta role. Instead, the sentence without any adverbials is vague with respect to the theta role of *Sharon*:

(1–44) Sharon **broke** the window.

Broke is an appropriate word to use to describe a range of events, both intentional and unintentional, from the point of view of the person who initiates the action. Part of the lexical structure of this verb is the information that it can be used in such a range of events. We therefore must use context (sometimes linguistic context, sometimes pragmatic context) to figure out which theta role the relevant argument of the verb has in a given utterance (and see Hale and Keyser's 1986 discussion of "constructional" theta roles).

Many lexical heads have a fairly wide range of events that they can be used to describe and are thus vague out of context with respect to the theta role of some of their arguments. Other lexical heads are highly restrictive as to what kinds of events they can be used to describe. Thus *assassinate*, for example, must take an agentive argument in its active form; but *kill* need not (as in *The poison killed John*, where *the poison* is an instrumental, not an agent).

The above discussion points out a flaw in any theta theory that insists that a given lexical item has a fixed set of theta roles to assign to its arguments (and see Jackendoff 1987a for other problems with such a theory). However, the above discussion does not require us to make theta

assignment be dependent on context. Instead, we can assume that theta-role assignment applies at DS without regard to context. Then at LF we will check theta-role assignment against context to test for appropriateness. In this way we will be adopting an evaluation procedure similar to that proposed in Farmer (1984) for Japanese particles.

I conclude that theta roles are determined by lexical items and not by predicates. If we consider headed predicates, this amounts to saying that theta roles are determined by the heads of predicates rather than by the full predicates. In this way theta roles contrast sharply with semantic roles, which are determined by predicates (including the head and all the other parts).

If we take a strict and narrow definition of theta role as that role assigned by a lexical head to its arguments, we will reach the conclusion that in a sentence like,

(1–45) That comment is **off the wall**.

the NP *that comment* has no theta role since it is not an argument of any lexical head, although it does receive a semantic role from the PP predicate *off the wall*. I believe such an approach would miss the generalisation that metaphorical PPs like *off the wall* can take role players which appear to have the same kinds of theta roles that role players of nonphrasal predicates have. I therefore propose that individual words with event structures take arguments, and, furthermore, that any phrasal lexical item that has an event structure takes arguments. The PP *off the wall* is a phrase in the lexicon (that is, it appears in the lexicon as a single lexical item in its nonliteral sense) and it has an event structure. Thus it will take an argument and assign a theta role to that argument (probably the same theta role the adjective *crazy* assigns to its argument).

We can now see that there is a correlation between arguments of lexical items (including phrases as well as single words) and role players of predicates. I sum up this correlation in the following principle:

(1–46) *Principle of Coincidence*: The arguments of a lexical item are the role players of the predicate headed by that lexical item.

In sum, lexical items – whether single words or phrases – that have event structures take arguments and assign theta roles to their arguments. If such lexical items are single words, they can be the heads of predicates. If such lexical items are strings of words but are not phrasal in the lexicon (such as *take . . . to task*), their syntactic head (that is, the X that heads the

minimal XP that contains the entire lexical item – so in *take . . . to task* the syntactic head is the verb *take*, since the VP is the minimal XP that contains *take . . . to task*) can be the head of a predicate. If such lexical items are phrasal (such as *off her rocker*), they are headed predicates (since the whole phrase is the theta assigner). (Notice that all through here we are talking about the potential to head a predicate, since we have seen that event words need not head predicates in the sense developed here, as when they are used as modifiers.)

Theta roles are limited in number and are merely gross semantic features indicating the general nature of the participation of an argument in an event.

Predicates (consisting of a head and perhaps other parts), on the other hand, assign semantic roles to their role players. These semantic roles are unlimited in number and are finely detailed semantic properties, indicating the specific nature of the participation of a role player in the event.

We can sum up the findings of this section in the following chart:

LEXICAL STRUCTURE	PREDICATE STRUCTURE
<i>lexical item</i> = single word, strings of words, or phrase	<i>predicate</i> = an event lexical item (the head of the predicate) plus certain specifiers and modifiers of the head
Lexical items take arguments.	Predicates take role players. (All arguments of the head of the predicate are its role players.)
Arguments receive theta roles (which are a few gross semantic features like agent, patient, theme . . .).	Role players receive semantic roles (which are unlimited, detailed semantic properties).

2 Categories that can be predicates

A(djectives), V(erbs), and N(ouns) all can serve as the heads of predicates. I will demonstrate this fact below rather briefly, since much of the material to be covered is not controversial in any way. An exception is the very controversial question of whether N can take a role player in specifier position – to which I answer yes. From that, it follows that an N such as *destruction* can head a predicate.

In the discussion that follows I will call an item an “argument” or a “role player” interchangeably, since arguments of the heads of predicates are always role players of the predicate (see the Principle of Coincidence in (1–46) above). This does not mean that the distinction pointed out between the two in section 1.6 is no longer recognized, but only that that distinction is not relevant to the following discussion.

P(repositions) also can serve as the heads of predicates, but I will argue that in many instances P is not a predicate, but a relational word of a different sort from event lexical items. In particular, in most uses Ps are not the sole theta assigners of other items.

Finally, I will argue that all phrasal categories other than projections of C(omplementizer) can be predicates, but only if they are fixed or idiomatic phrases or if they are headed predicates which just happen to fill the entire maximal projection of the head of the predicate. I argue specifically against the proposal of many that VP (including DO (direct object) and IO (indirect object) arguments) rather than V plus adverbials and auxiliaries is a predicate. Regarding projections of C, I argue in section 2.6 that closed clauses cannot be predicates (where the only open clause is one that contains a variable).

2.1 The lexical head A(djective)

An adjective is always an event word. That is because adjectives denote states (whether stative or active). Accordingly, adjectives always discharge (or assign) theta roles and very often head predicates (see section 1.4 above, where I argue that modification is distinct from predication).

The role players for a predicate headed by A can appear inside the A(djective) P(hrase) or outside the AP. Examples of role players which are inside the AP are given in (1–47), where the relevant role player is italicized and the predicate is in boldface:

- (1–47)a. Bill is [_{AP} **fond** of *Jan*].
 b. This fraction is [_{AP} **equal** to *.875*].
 c. Ken is [_{AP} **generous** to *the less talented of us*].

Notice that I have italicized NPs without italicizing the P that introduces each italicized NP in (1–47). In English A does not take NP sisters (see Maling 1982 for relevant discussion). Instead, NP arguments of the lexical head A which appear inside the AP are introduced by prepositions. Those prepositions are either the so-called null preposition *of* (and see M. Anderson 1979, Bouchard 1982, and Chomsky 1986b), as in

(1–47)a; or some preposition lexically chosen by the head A, like the *to* in (1–47)b (something must be “equal to” something else and never “equal at” or “equal on”, etc.); or the typical preposition which introduces IOs, like the *to* in (1–47)c (which is also lexically chosen by the head *to* to the extent of the choice between *to* and *for*: *a gift for NP*, but *a remark to NP*; *give NP to NP*, but *bake NP for NP*; etc.). (Notice that while a lexical head chooses *to* or *for* to introduce its beneficiary argument, this does not mean that these Ps are contentless. To the contrary, they carry distinct meaning; see Larson 1987.) Sometimes the head A allows a small range of Ps rather than just one. For example, *generous* can introduce a beneficiary argument either with the IO preposition *to* or with *toward* or *with* (as in *generous {toward/with} the less talented of us* but not **generous {of/on} the less talented of us*).

While the italicized arguments in (1–47) are not syntactic sisters to the head A, they appear in PP sisters to the head A, where the P is chosen by the head A (either lexically selected, or merely chosen by the category A – as in the case of the null preposition *of*). In a sense, then, they are “prepositional sisters” to the head A, and I will lump them together with real syntactic sisters, ignoring the configurational effect of the P introducing these arguments.

Of course, not all sisters to A are role players of the A. In (1–48) I have italicized sisters to A that are adverbial, here functioning to tell the extent or degree of the quality denoted by the A.

- (1–48) Debbie was upset *beyond belief*.
Joan is beautiful *to the extreme*.

In accordance with the discussion in section 1.1 above, I analyze these modifying phrases as parts of the predicate. Thus the predicates in (1–48) are *upset beyond belief* and *beautiful to the extreme*. When a PP sister to an A is part of the predicate rather than a phrase containing a role player of the predicate, we find that the P can range lexically, without being chosen by the head A (*upset beyond belief*, *upset to a small degree*, *upset in ridiculous ways*). Likewise in a phrase like *generous {for/around} the less talented of us* we do not have an argument of the head A, but, rather, an adverbial PP which is part of the whole predicate (in contrast to (1–47)c).

Another position inside AP where we might expect to find arguments of the lexical head A is specifier position. However, A does not allow arguments in specifier position. Thus if an NP occurs in specifier of A, it is a measure or degree phrase and should be analyzed as part of

the predicate (see sec. 1.1 above). In (1–49) the italicized NPs are in specifier position to the A and form part of the predicate headed by that A.

- (1–49) Your remark was *several hours* too late to help.
Margene's *a little bit* happy now.

Every A takes precisely one argument outside the AP, whether the A heads a predicate or a modifier. (We will return to the significance of this fact in sec. 4 below.) Examples of role players which are outside the AP include NPs in GF subject position (such as *Bill*, *this fraction*, and *Ken* in (1–47) above), as well as NPs in other syntactic relationships to the AP (as discussed in ch. 2), such as the italicized NPs below (where the relevant predicate is in boldface). (By “GF” I mean “grammatical function” as defined in Chomsky 1981.)

- (1–50) I consider *Sally* [_{AP} **fond** of Jan].
With *Sally* [_{AP} **fond** of Jan], you might as well forget about a fair vote in the class treasurer election.

2.2 The lexical head V(erb)

V, unlike A, need not be an event word. We already saw in (1–2) above that the copula *be* can be used as a grammatical word and not as a part of a predicate (although, as we will see in (1–105) of sec. 2.6 below, the copula can head a predicate in some uses). And I argued in section 1.3 above that so-called aspectual verbs like *seem* and *continue* form parts of predicates but are not predicates themselves. Thus not all Vs head predicates. However, V usually heads a predicate.

V, like A, can take sister arguments, typically introduced without a P, but sometimes with the null preposition *of*, sometimes with a P lexically chosen by the V, and sometimes with the IO prepositions *to* and *for*. (As with A, I have lumped together prepositional sister arguments of V with real syntactic sister arguments of V for ease of exposition.)

- (1–51)a. The girl [_{VP} **read** her cousin a book].
b. The girl [_{VP} **thought** of *nothing in particular*].
c. The girl [_{VP} **depended** on *her cousin*].
d. The girl [_{VP} **read** to *her cousin*].

(*Thought*, as in (1–51)b, takes only a PP or clausal argument in most uses, although in casual speech we hear phrases of limited productivity like *She thinks computers day in and day out*.)

V, like A, can take sisters that are not arguments, but that are instead

34 *Theta assignment*

part of the predicate the V heads (that is, V can take sisters that are modifiers):

- (1–52) She's laughing *now*.
Artisans sleep *in that park*.

And V, like A, cannot take an argument in specifier position (where I am adopting an X-bar theory that is a restrictive version of that in Chomsky 1986a – thus the GF subject slot is not the specifier of V and S (the node I have been calling I) is not a projection of V – see the introduction to this book). In fact, V does not allow any kind of NP in specifier position.

Finally, V, like A, must take precisely one argument which appears outside the VP that the V heads. In (1–51) that argument is *the girl*. Again, the importance of this fact is discussed in section 4 below.

2.3 The lexical head N(oun)

Many nouns are not event words and do not have argument structures; thus they cannot head a predicate. Mona Anderson (1983), in fact, argues that no concrete nouns have argument structures. I differ with her, as will be seen below, but I agree that most concrete nouns in most contexts do not denote events and do not have argument structures. For example, the noun *wallet* can take an NP in specifier position as well as an NP sister, but in both instances that NP is not a role player with respect to the head N:

- (1–53)a. I prefer yesterday's wallet.
b. Sue bought a wallet of leather.
c. A wallet of true beauty lay on the bureau.

In fact, Mona Anderson (1983, p. 17) calls the *of* in (1–53)b & c the “attributive of” and says that its object modifies the head N. Thus the *of* phrase here is part of the object. And I would analyze the NP in specifier position in (1–53)a as part of the object, as well.

Abstract nouns, however, are often event words and, like A and V, they can take NP sisters (with the null P *of*, or prepositions lexically chosen by the head N, or the IO prepositions *to* and *for*) as arguments. Thus these Ns can head predicates. Below only the head of the predicate is in boldface:

- (1–54)a. the **death** of *John*
the **destruction** of *the city*
the **bounce** of *the ball*

- b. an unhealthy **dependence** on *celery juice*
the **story** about *the firewoman*
- c. a passing **remark** to *the professor*
the **gift** for *the landlady*

And, as with A and V, the sisters of N need not be arguments of the N, even if the N is an event word. Instead, they can modify the N – and would then be part of the predicate that the N heads:

- (1–55) destruction of *incredible magnitude*
a remark *beyond the bounds of decency*
a look of *anxiety*

Thus far in this section, the items I have identified as arguments of the head A, V, or N are generally accepted in the literature to be precisely that. Now I turn to the much more controversial question of whether NPs in specifier position of N are arguments.

Of course, the question arises seriously only for Ns which have an event structure. Thus in (1–56) *Sharon* is not an argument of the head N, since this N in this context takes no arguments.

- (1–56) Sharon's wallet is embossed with pink letters.

In fact, the relationship of Sharon to the wallet is underdetermined: she could own it, have made it, want to buy it, like it very much, have lost it, drew it, etc. That is, the wallet in (1–56) is characterized by having a relationship to Sharon, but the sentence does not tell us the nature of this relationship. Instead, our ability to imagine contexts is the only clue we have to this relationship when the sentence is used out of context (see Williams 1982 and Higginbotham 1985, among others).

Notice that the situation here is quite distinct from the situation discussed in section 1.6 above regarding (1–42)–(1–44), where I discussed lexical items which can be used to describe a small range of types of events and thus can assign a correspondingly small range of theta roles to their arguments. So while *Sharon* in (1–56) may have an enormous range of possible appropriate relationships to *wallet* out of context, *Sharon* in (1–44), repeated here:

- (1–44) Sharon broke the window.

may not have an enormous range of possible appropriate relationships to *broke*, but, rather, only a few. That is, *Sharon* does receive a theta role in (1–44), from the lexical head *broke*, but out of context we will not be able to determine precisely which of the small set of possible theta roles this

NP might have it actually does have. But *Sharon* does not receive a theta role at all in (1–56).

However, when the head N takes arguments, the question of whether an NP in specifier position can be an argument of the head N arises seriously, as in:

(1–57) The Huns' destruction of the city upset us.

Chomsky (1970) analyzed the NP *the Huns'* in specifier position of *destruction* in (1–57) as the subject of this head N, and he has maintained that position ever since (as in Chomsky 1986a). And Cinque (1980) has argued for Italian that possessive adjectives, which appear in specifier position of NP, are subjects of NP (but see Ruwet 1972, who points out for French that possessive adjectives have the favored interpretation of possessor over all other possible interpretations, including agent).

Williams (1982), on the other hand, argues that no NP in specifier position of an N is an argument of the N. His reasons are multiple and I will not counter them here. Instead, whenever an argument I am making is relevant to one of Williams' arguments, I will point that out. (See in particular the discussions of (1–58) and of (1–72) through (1–76) below and several points in ch. 2, particularly secs. 3 and 10.) Here let me address just one of his positions. Williams claims that the semantic relationship of the genitive NP to the head N in an NP like that in (1–57) is underdetermined. But Mona Anderson (1983) shows that this relationship is, instead, narrowly defined, in contrast to the relationship between a genitive NP in specifier position and a concrete head N. And Hornstein and Lightfoot (1987) show a variety of ways in which Williams' account of the semantic interpretation of determiners in NPs like that in (1–57) is inadequate.

Notice that this issue is crucial to a theory of predication. For those who require that a predicate take an argument external to the maximal projection of the head of the predicate (as Williams does), *destruction* in (1–57) does not head a predicate. But with my definition of predicate, there is nothing to prevent our analyzing *destruction* in (1–57) as a predicate.

I here follow Chomsky in allowing an NP in specifier position of an event N to be an argument of that head N. In chapter 6, section 2, I argue that anaphors in both Italian and English require that their antecedents bear a theta role. Assuming for the moment that I am correct on this point, let me add here that specifiers of N can bind an anaphor in both Italian and English.

- (1–58) la sua_i finta lettera a se stesso_i
 ‘his fake letter to himself’
 il suo_i libro su se stesso_i
 ‘his book about himself’

(The Italian examples in (1–58) are from Giorgi 1987.) Thus from (1–58) we are led to the conclusion that specifiers of NP can be arguments of the head N.

Before proceeding to a discussion of specifiers of NP, I would like to address Higginbotham’s (1985) argument against analyzing specifiers as arguments, an objection based on examples such as (1–59)a.

- (1–59)a. John’s dog
 b. John is a dog.

Higginbotham asks, if *John* can bear a theta role, why cannot we understand the NP in (1–59)a to mean that John is a dog, parallel to (1–59)b? Higginbotham concludes that NPs in specifier position do not enter into the subject–predicate relationship.

I do not have an answer to Higginbotham’s question. However, I would like to argue against a commonly proposed explanation of the lack of a predicational reading in (1–59)a. Some have used the *i*-within-*i* constraint to block the missing predicational reading of (1–59)a (see Williams 1982, Hornstein 1984, among others). The *i*-within-*i* constraint blocks a phrasal node from being coindexed with another phrasal node that properly contains it. I argue in chapter 2, section 10, that this constraint is incoherent. However, here it is necessary only to show that the *i*-within-*i* constraint cannot help us to rule out the missing predicational reading of (1–59)a.

To see this, let us add indices to (1–59)a. The noun *dog* will be coindexed with the overall NP, since heads and maximal projections are coindexed (see Williams 1981b). Then, under a predicational reading, the noun *dog* and the NP *John* would be coindexed by predication coindexing (which will be the topic of chapter 2, and see Williams 1980). The result is:

The fact that both NPs in (1–60) have the same index would constitute a violation of the i-within-i constraint.

One problem with this explanation of the lack of a predicational reading for (1–59)a is that the same indexing configuration is found in (1–61), where we understand *John* to have the same semantic role as in (1–62).

(1–61) John's nastiness

(1–62) John is nasty.

A proponent of the i-within-i constraint explanation for the failure of a predicational reading in (1–59)a might point out that the NP *John's dog* in (1–60) would have the same referent as the NP *John* under the (ungrammatical) predicational reading, but the NP *John's nastiness* in (1–61) would not have the same referent as the NP *John*. Thus if we were to construe the i-within-i constraint as pertaining only to referential indices (that is, if the i-within-i constraint is a constraint against semantic incoherence, as Williams 1982 presents it to be), then (1–60) would be a violation of the i-within-i constraint but (1–61) would not.

However, there are at least two problems with this account. First, given this account, we would expect both (1–63)a and (1–63)b to be bad on the reading indicated by the indices. But, instead, the second sentence is good, as is the third (suggested to me by Andrew Radford (personal communication)).

- (1–63)a. *John_i is [his_i boss]_i.
 b. John_i is [his own_i boss]_i.
 c. Anyone can see that John_i is [his_i father's son]_i.

Hornstein (1984) discusses sentences like (1–63)a as examples of the i-within-i constraint. And he says sentences like (1–63)b and (1–63)c show that the constraint is not a semantic one.

Second, there is empirical evidence that the i-within-i constraint explanation for (1–59)a is wrong. In Italian we find NPs like (1–64)a, which has the structure in (1–64)b (see ch. 3, sec. 2 for justification of this syntactic structure):

- (1–64)a. quel matto di Giorgio
 that madman of Giorgio
 ‘that madman Giorgio’

I argue in chapter 3 that the head N *matto* is a predicate here, taking *Giorgio* as its sole argument. The indices for (1–64)b reflect this analysis. Here whether or not we consider predication indices, we have a violation of the i-within-i constraint. That is, the two NPs with identical indices should constitute a violation of the i-within-i constraint just as much as the coindexed NPs in (1–60) are said to. Yet (1–64) is perfectly grammatical with the reading indicated. Thus the i-within-i constraint does not block (1–64) and should not be assumed to block (1–60), either. (In ch. 4 I analyze English NPs which have a similar syntactic and semantic analysis to the Italian one in (1–64). And I point out in chapter three that a variety of languages have such NPs. Thus (1–64) cannot be considered some aberration of Italian alone.)

I conclude that the failure of (1–59)a to have a reading similar to that of (1–59)b is irrelevant to the question of whether an NP in specifier position can bear a theta role. And I leave open the question of why (1–59)a lacks a predicational reading.

From this point on I will proceed with the assumption that NPs in the specifier position of Ns that have argument structures can be arguments of those Ns. This is a major difference between N and both A and V. And this difference correlates with another major difference, which is that N does not require any arguments to be external to the NP (as in (1–57) and (1–64)), whereas both A and V require precisely one external argument. I will return to these contrasts in section 4 below. Notice that in allowing an argument to appear in specifier position, N is parallel to Chomsky's (1986a) nonlexical category I(nflection).

However, as with NP sisters to N, NPs in specifier position of a head N need not be arguments of that N even when the N is one that does have an argument structure or when the N clearly is being used predicatively.

- (1–65)a. yesterday's announcement
 b. Leila is Elena's doctor.

In (1–65)a *yesterday* is not an argument of *announcement*; in (1–65)b, *Elena* is not an argument of *doctor* (in fact, Elena's relationship to the doctor is as underdetermined as the relationship of the specifier to the head N in other concrete NPs, such as *Sharon's wallet*).

There are at least two more interesting facts about event nouns that relate to their argument structure. First, sometimes theme or patient arguments (the so-called objective arguments) that occur as sister arguments to head Ns can also occur in the specifier position:

- (1–66) the city's destruction (cf. the destruction of the city)

Chomsky (1970) proposes that such arguments are generated in sister position and moved to specifier position. I follow Chomsky here (and, in doing so, I am joined by many, including Mona Anderson 1983, Kayne 1984, Aoun *et al.* 1987, Roeper 1987, and Hornstein and Lightfoot 1987; but against this position see Williams 1982, Higginbotham 1983, Rappaport 1983, Grimshaw 1986, Zubizarreta 1986, and Safir 1987a).

The movement rule operative in (1–66) is not limited to just arguments, but can apply to certain adverbial NPs, as Emonds (1976) points out and as we saw above in (1–65)a, which is derived as in (1–67):

- (1–67) the announcement yesterday → yesterday's announcement

The application of NP movement in (1–67) is of special interest in light of the claim commonly found in the literature that arguments and non-arguments of a lexical head bear different syntactic relationships to that head. In particular, some claim that there is a syntactic difference between arguments and non-arguments to the effect of placing arguments of a lexical head H as sisters to the head and non-arguments as sisters to H' (or, sometimes, even H''). We can see this approach in Jackendoff (1977, 1983), Emonds (1985), and its history is recounted by Speas (1986), who also adopts it (but inconsistently, I believe – see p. 81 versus p. 120). Chomsky (1981, 1982, 1986a, 1986b), however, has never adopted this approach.

As I stated in the introduction to this book, I consider only syntactic data (and not semantic data) as valid evidence for syntactic structure. I know of no convincing syntactic evidence that our X-bar theory need be any more complicated than that first proposed by Chomsky in 1970 and revised in 1986a. Thus for the lexical categories of N, V, A, and P, I take

X'' to expand to specifier and X'; and I take X' to expand to X and its phrasal sisters (see more detailed discussion of this in the introduction to this book). Therefore in this chapter (and throughout this work) I have consistently analyzed as sisters to the head all phrases to the right of a lexical head within the phrase. In my analysis, then, the NP movement in (1–67) is the same NP movement that applies in (1–66): movement from sister position of N to specifier position of N. Indeed, the fact that NP movement applies equally to arguments and non-arguments suggests these two semantic functions are indistinguishable syntactically – just as my analysis would demand they be.

The second very interesting fact about the argument structure of event nouns is that arguments of the head N which are not objective are not limited to specifier position, but can also occur as sisters to the head N, always introduced by the null preposition *of*. (For arguments that the object of passive *by* is not the agentive argument, see ch. 2, sec. 8).

- (1–68)a. John's {lecture/story} amazed me.
- b. That {lecture/story} of John's amazed me.
- (1–69)a. John's {death/arrival} shocked me.
- b. The {death/arrival} of John shocked me.

There is an interesting variation in (1–68)–(1–69) above: some of the sister NPs to the head N have a genitive marker (as in (1–68)b) and some do not (as in (1–69)b). We find that when an N has only one argument in its lexical structure, that argument has no genitive marker in sister position (*the death of John*, *the happiness of your little sister*). But when an N allows two or more arguments, if one of these arguments is nonprepositional and nonobjective, it appears with a genitive marker. (And see Aoun *et al.* 1987 for an explanation of why the objective reading cannot emerge with the genitive, based on a violation of the E(mpty) C(ategory) P(rinciple) of Chomsky 1981 in logical form.) This is true whether or not any other arguments are syntactically realized (*the lecture of John's (on birth control)*, *the belief of Sam's (in intergalactic communication)*). But if all the arguments are prepositional or objective, none of them is in the genitive (*the betrothal of Judith to Pete*). We can see that if the N takes more than one argument, then the argument typically singled out as the subject in G(overnment) and B(inding) literature is marked with a genitive when it appears as the sister to the head N. (We return to this fact in sec. 4 below.)

Notice that *John('s)* in the (b) examples of (1–68)–(1–69) is the

so-called subject argument of the NP; I am taking *John('s)* to be a sister to the head N in these instances. Even linguists who allow a less restrictive version of X-bar theory than the one I adopt in this book should agree that *John('s)* is attached at the sister level in (1–68)b and (1–69)b. This is because, as Speas (1986) has shown, if we trace the method of argumentation often used to advance an X-bar theory in which the X' level can have sisters (other than conjuncts or the specifier) and in which perhaps even the X'' level can have sisters (other than conjuncts), we find that an overriding principle is that if a theta relationship holds between X and Y, then X and Y are sisters (see Speas 1986, especially p. 81). Thus *John('s)* should be a sister to the head N in (1–68)b and (1–69)b even in theories which allow sisters to N' and N''.

Cinque (1980) argues that so-called subject arguments of N in Italian are not sisters to N but to N'. However, his argument is based on the claim that the clitic *ne*, when it corresponds to an argument of an N, corresponds only to the subject argument of N. This claim is not accurate, as I show in chapter 3 (see the discussion following (3–97)). Therefore, I maintain that the proper analysis of (1–68)b and (1–69)b has *John('s)* in sister position to the head N. (In chs. 3 and 4 I will give several tests for constituency within NP. By all of these tests *John('s)* is a sister to the head N in (1–68)b and (1–69)b, as the reader can easily confirm.)

In light of the fact that there are good arguments for an NP movement rule that takes a sister of N and places it in specifier position of N (the rule operative in (1–66) and (1–67)), I propose that that same rule is operative in (1–68) and (1–69) and derives the (a) sentences from the (b) sentences. That is, I propose that all arguments of N within NP are sisters of N at DS and that a movement rule can place an argument of N in specifier position of N.

Notice that if we generated all arguments of N that appear within NP as sisters (introduced by *of*) of the head N, the fact that the theta role interpretations of the genitive NPs in specifier position (1–68)a and (1–69)a is the same as that of the genitive NPs that are sisters to the head N in (1–68)b and (1–69)b is accounted for.

Also, we will see in chapter 6, sections 4 and 5.3, that the specifier of NP behaves in the same way sister arguments of N behave with respect to the binding of anaphors. (That is, specifiers behave as though they are within the theta domain of the head N – where the notion of theta domain is defined in ch. 2, sec. 5.) The behavior of specifiers examined in chapter 6, then, would be accounted for with the analysis which generates these

specifiers as sisters to N and optionally moves them into specifier position.

Furthermore, as long as we see the advantage of relating the two positions by a movement rule, we should prefer movement from sister position into specifier position rather than vice versa so that the trace will be properly bound.

There is at least one more reason for generating all arguments of N that appear within NP as sisters to N in DS. And that is that if we do so, theta assignment by Ns in Italian observes the same principles that we find for theta assignment by Ns in English (assuming that the subjects of N studied in Cinque 1980 are really sisters to N – see ch. 3). Since this whole book presents a theory of predication that holds for both Italian and English (and that I offer for all configurational languages), and since that theory of predication depends upon theta theory in important ways (as we will see in ch. 2), we should opt for a version of theta theory that will suffice for both languages.

I will hereafter assume the derivation of NPs in specifier position of N as originating in sister position.

If the above analysis of (1–68)a and (1–69)a as coming from (1–68)b and (1–69)b is correct, we would expect this rule to operate on NP sisters of any N, not just on sisters of Ns that have event structures. In fact, it appears that the rule does operate inside all NPs, regardless of whether or not the head N has an event structure:

- (1–70) John's car
 that car of John's
 yesterday's menu
 the menu (of) yesterday

(But see Torrego 1986, who argues that possessives that follow the head N are sisters to N".) There are, however, restrictions on this movement rule, since not all NP sisters can undergo it (*an idea of great merit*, but not **a great merit's idea*). Those restrictions, however, while puzzling, are tangential to our study, and I will not go into them here.

Let us turn now to a question raised at the opening of section 2 which I said that I would not delve into deeply: how do we know whether a lexical item has an event structure? The question is not acute for A (which always has an event structure), nor for V (which almost always does), but it is critical for N.

At the opening of section 2 I gave a list of references the reader can consult which deal extensively with this very question. Here I want to

focus only on one particular related question: whether or not concrete Ns can serve as heads of predicates.

I believe that there is at least one usage in which any N, whether concrete or not, can head a predicate. That context is seen here in (1–71), and we have already come across it in (1–65)b above:

(1–71) This ratty piece of leather is **a wallet**.

No one could consider this ratty piece of leather **a wallet**.

In both sentences of (1–71) the concrete N *wallet* is used in its predicative rather than referential sense (and see secs. 1.3 and 1.5 above for a discussion of nonreferential uses of NPs). Thus the property of being a wallet is assigned by the phrase *a wallet* to the NP *this ratty piece of leather*. In fact, it is by virtue of appearing in a predicative position that the N *wallet* must head a predicate and take a role player.

There is at least one other instance in which I would analyze a concrete N as a predicate. Certain concrete Ns appear to have argument structures. Consider

(1–72) Mary's photograph

Photograph is a concrete N and (1–72) can be used in a wide range of situations, including those in which Mary took or liked or bought or did any other number of actions with respect to the photograph, as well as those in which Mary was in the photograph. In other words, the relationship of *Mary* to *photograph* at first appears to be underdetermined, just as the relationship of a genitive NP to other concrete Ns is (as in (1–56) above).

However, if *Mary's* appears in sister position, the theme sense is unavailable:

(1–73) that photograph of Mary's

And *photograph* can take a nongenitive NP sister that it bears a specific semantic relationship toward:

(1–74) that photograph of Sue

In (1–74) Sue must be in the photograph, thus *Sue* is a theme argument of *photograph*.

Not all concrete Ns can take theme arguments. The fact that the concrete N *photograph* can stems from the fact that a photograph is always of something – it is inherently transitive. Like *photograph* are *portrait* (*a portrait of our family*), *record* (*a record of the war*), *story* (*a*

story of love), and many other concrete Ns (including the so-called “picture” nouns, as in Gruber 1967).

When a concrete N has a theme argument present, it will assign the agentive role to a genitive argument. Thus in (1–75) *Mary* can be understood only as performing some action with respect to *photograph* and not as being in the photograph.

- (1–75) Mary’s photograph of Sue
that photograph of Mary’s of Sue

Notice that *Mary* does not have the same semantic role in (1–75) as it has in the corresponding clause with the verb *photograph*:

- (1–76) Mary photographed Sue.

In (1–76) *Mary* was the photographer, but in (1–75) *Mary* may have performed a range of actions with respect to the photograph. That is, the event denoted by the verb *photograph* is specific in terms of the particular semantic roles assigned to the role players in that event; but we see no such specificity of the agentive role player with the noun *photograph*. It seems that concrete Ns like *photograph* do not really denote events, but, instead, evoke events – and the range of events they can evoke is limited by the referent they denote. Since a photograph can be taken, or bought, or enjoyed, etc., the genitive in (1–75) could bear any of these semantic roles.

Given the remarks above, I conclude that concrete Ns like *photograph* evoke events and have argument structures. As such, they can head predicates.

Looking back at the interpretations of (1–72), then, I would analyze the thematic sense of *Mary’s* as being the result of NP movement from sister position of N of a theme argument (as in (1–66)) and the agentive sense of *Mary’s* as being the result of NP movement from sister position of N of an agentive argument (as in (1–68) and (1–69) above).

In sum, N may or may not head a predicate, unlike nonmodification uses of A and unlike most uses of most verbs. And N need not have an argument which appears outside the NP that the N heads, unlike both A and V. We will return to the importance of this last fact in section 4.

2.4 The lexical head P(reposition)

Most have claimed that all lexical heads are theta assigners (following Chomsky 1981), and paid little attention to Ps in particular. Some have considered the potential to be a theta-role assigner to be identical to valency, so that all inherently relational words (words with valency greater than zero) will be theta assigners (as in Croft 1986). Since Ps are generally relational, with a valency approach to theta assignment, we would expect Ps to assign theta roles.

Both of these approaches are inadequate for Ps. I argue here that in some uses P is a theta assigner, but in many others it is not. Thus only in those uses in which P is a theta assigner can P head a predicate.

In this section I discuss only a handful of Ps. My discussion is meant to be representative of the kinds of questions that arise when looking at the semantic structure of strings involving Ps and of the types of analyses I would offer. (The reader interested in discussions of a wide range of Ps might consult Jackendoff 1983, 1987a, 1987b.)

The lexical head P can be an event word and can take arguments. Thus P can head a predicate in examples such as those in (1–77). (This type of example was pointed out to me by Barry Miller (personal communication).)

- (1–77) Pina is into Greek pottery.
 Her sister is after my husband.
 Those children are on drugs.
 I'm onto you.

The sentences in (1–77) are decidedly conversational in style. It is possible that some of these uses of Ps originated as ellipses from longer phrases such as *chase after*, *dependent on*, *catch on*, where the V or A head got lost. In fact, these PPs, like certain fixed-phrase PPs, such as *at ease*, and metaphorical PPs, such as *off his rocker*, can undergo AP movement, whereas regular PPs cannot.

- (1–78) { Happy
 Into art } though he says he is, he isn't really.
 but: { *In bed }

Thus the syntactic behavior of these PPs is like that of APs in some respects.

There are also many uses of P in which P is clearly not an event word and does not assign a theta role to any arguments. We have seen many of

these above, such as uses of the null preposition *of*, or Ps lexically selected by some other lexical head, or the IO prepositions *to* and *for*:

- (1-79) I'm fond *of* pasta.
 You shouldn't rely *on* translations.
 Jim baked the carrot cake *for* Sally.

Here *pasta* is an argument of *fond*, not *of*; *translations* is an argument of *rely*, not *on*; *Sally* is an argument of *baked*, not *for*. We can say that the prepositions in (1-79) transmit the theta role from the actual theta assigner to the argument.

The distinction between the usage of the Ps in (1-77) and those in (1-79) is easy to see, and I expect no reader to balk at my analysis of the Ps in (1-77) as heading predicates, but the Ps in (1-79) as not heading predicates. However, in many other instances the functional status of Ps is not so uncontroversial.

There are instances in which a P interacts with a V to affect which event a sentence describes. In (1-80)–(1-81) we find a much-studied pair (see Jespersen 1924, Fillmore 1968, S. Anderson 1971 & 1977, B. Levin and Rappaport 1986, and Jackendoff 1987b).

- (1-80) Jack sprayed the wall with paint.

- (1-81) Jack sprayed paint on the wall.

In (1-80) we understand the wall to have been painted by way of being sprayed. *Paint* here is the theme which covers the patient, *the wall*. But in (1-81) we understand Jack to be doing something to the paint and we understand the wall to be only the locus of the event. The question now is how the object of *with* receives the theme role in (1-80).

Let me first point out that *sprayed with* is not a theta assigner, for, if it were, it would be a lexical item in (1-80). But then we would be missing a generalization, since *with* can appear with a theme sense for its object with a variety of other verbs (as in *We loaded the wagon with hay* and other such examples). Furthermore, another close semantic use of *with* has an instrumental sense for its object, and again this occurs with a variety of other verbs:

- (1-82)a. Mary broke the piggy bank with a hammer.
 b. Mary opened the door with a key.
 c. Mary paid for the necklace with my dime.

Thus it seems to be either *with* alone or *sprayed* alone that is responsible for the instrumental sense of the object of the P.

The question now is exactly what the semantic status of *with* is in (1–80) and (1–82). One might posit that *with* is a predicate, taking its object and the entire proposition of the clause minus the *with* phrase as its role players, or, alternatively, its object and the predicate of the clause it appears in as its role players. There is at least one good reason to reject this analysis. Notice that the presence of the *with* phrase affects the appropriateness of the role players of the predicate of the clause. Consider an example with instrumental *with*:

- (1–83)a. People/ants/amoebas eat honey.
 b. People eat honey with a spoon.
 c. #Ants/amoebas eat honey with a spoon.

(The symbol # in (1–83)c means semantically or pragmatically ill-formed.) Here the addition of *with a spoon* limits the appropriate agentive role players for the predicate *eat*. However, typically a predicate selects its own role players but does not select the role players inside its own role players. That is, some principle of integrity forces each predicate to treat its role players as semantically unanalyzable wholes, at least with respect to certain kinds of semantic information. If *with* (or even *with a spoon*) were a predicate in (1–83), it could select its own role players, but it should not look down inside those role players; thus it should not participate in the selection of the role players of *eat*. The semantic selection that goes on between the syntactic subject of the sentence in (1–83)b and c, then, and the adverbial *with a spoon*, is evidence that *with a spoon* is a role player in the same event that the syntactic subject is a role player in: the event of eating. That is, the presence of one role player often affects the appropriateness of the choice of other role players of the same predicate:

- (1–84) Mary resembles Pete.
 Certain kinds of anemia resemble diabetes.
 (1–85) #Mary resembles diabetes.

In some respects *with* is a marker (or perhaps a reflex) of the fact that its object is used as a theme or instrument in the event denoted by the predicate of the clause *with* occurs in. It is, then, parallel to the use of special Cases in other languages to mark instrumentals (such as ablative in Latin). I therefore analyze the entire *with* phrase as an argument (an unsubcategory-for argument) of the verb in (1–80) and (1–82).

Let me point out that Hale and Keyser (1987) argue that *with* is inherently instrumental. They also develop the ideas of central event and

central participant. In (1–82)a, for example, the central event is breaking and the central participant is the piggy bank. Mary is less central in that she causes the central event and the hammer is less central in that it is the tool Mary uses to cause the central event. It appears that unsubcategorized-for arguments except subjects of intransitives are noncentral.

Thematic and instrumental *with*, then, are not themselves theta assigners. Instead, their object, with the *with* as a marker on that object, is the argument of some other lexical item, and it bears a theta role assigned by that other lexical item (and see Baker 1987a for this same conclusion regarding instrumentals in PPs in Chichewa). I would analyze other themes and instrumentals introduced by other Ps in the same way (as in pairs such as *Bill cleared the dishes from the table* and *Bill cleared the table of the dishes* where a theme is involved – see Jackendoff 1987b – and idiomatic instrumentals such as *on foot*, *by hand*, *in a taxi*, etc.).

Jackendoff (1987b) argues that we interpret the object of theme *with* as an argument of some other lexical item by way of a nonlexical rule that operates once we throw the words together in a syntactic structure. His analysis is consonant with mine here. An immediate question, then, is whether argument structure can be adequately represented in the lexicon. After all, if a nonlexical rule can add an argument, then lexical structure may well not reflect all the argument possibilities of a lexical item. The reverberations of this question affect the Projection Principle, discussed in section 4 below, which requires lexical properties of a lexical item to be reflected at all the syntactic levels. This principle was formulated with the assumption that one of the lexical properties was argument structure. But we are now questioning whether all information about argument structure is truly present in the lexicon, and, depending on our answer, the Projection Principle may well be affected. I think, however, that Jackendoff's nonlexical rule does not necessarily threaten the Projection Principle. All we need do is stipulate that certain lexical items are subject to certain nonlexical rules. This stipulation is part of the lexical information of a lexical item. Thus, the fact that *spray*, for example, can take a theme that appears in a *with* phrase would be encoded in the lexicon by way of the fact that *spray* can undergo the nonlexical rule.

Other Ps which are essentially locative in nature have a strong similarity to thematic and instrumental *with* when they co-occur with a head of a predicate. When these Ps appear in an utterance with a head of a predicate, the P is not lexically selected by the head of the predicate, but

rather chosen because of the sense of the proposition the utterance describes (in contrast to the Ps in (1–79) above). The object of a P in a locative PP in such sentences is not an argument of the P itself. Instead, the object of the P is an argument of the head of the predicate of the clause. And the P functions to relate its syntactic object to the head of the predicate. In Rothstein's terms (1983, p. 35), the P indicates the type of thematic relation its object will have to the head of the predicate. For example, consider:

- (1–86)a. Mary went inside.
b. Mary went inside the house.

In (1–86) the P is a locative giving direction or position to the action. It extends one action (*went*) into a new action (*went inside*). As such, the P is part of the predicate (see sec. 1.1 above). The presence of an object of the preposition in (1–86)b but not in (1–86)a specifies the goal of the direction or position of the (newly formed) action, and, thus, introduces another role player, *the house*, onto the scene. That is, in (1–86) the predicate is *went inside*, but in (1–86)a it has only one role player, whereas in (1–86)b it has two. However, in both sentences the theta assigner is *went*, where in (1–86)a it takes one argument, but in (1–86)b it takes two.

In Jackendoff's (1983) sense, we can view these Ps as functions converting things into places. That is, in the lexicon, a verb such as *went* in (1–86) takes an optional place argument, not a thing argument. So in order for a nominal object of a P to be an appropriate argument of such a lexical item, it must be converted into a place via the P. The object of the P, then, is not a location in isolation of context, but becomes a location by virtue of being related to the verb via the locative P. And the exact kind of location the NP becomes is affected by both the P and the V (the head of the predicate). Below we see a variety of contexts and, thus, locative functions of objects of Ps. We find the entirely parallel situation for temporal PPs, where the temporal P converts a thing into a time. And the creativity with which English approaches these PPs is reflected here in some of the more metaphorical examples.

- (1–87) *on*:
Sue found the jacket on the table.
I saw my shoes on Mary.
Jill tapped on Sally's window.
Mary arrived on time.
I bought the diamond on Sue's reassurance of a raise.
I swear it on everything I hold dear.

over:

Peter drove his car over the manhole.
 Dorothy went over the rainbow.
 Santa drove the reindeers over the rooftops.
 I leaned over Mikey's shoulder.
 You went over his head by talking to the dean.
 He's working over the weekend.
 He'll run for president over my dead body.

Again we have an instance in which the object of a P receives a theta role, but not from the P. Let me stress, however, that unlike with instrumental *with*, the P itself does add more information than just the function of locative. Thus locative *in* adds different information from locative *on*, which adds different information from locative *under*, etc. Therefore, it is not reasonable to analyze the P as being merely a reflex of the thematic role of its object (in contrast to instrumental and theme *with*). Instead, the head of the predicate and the P work together to tell us precisely how the object of the P plays a role in the event. Thus we must analyze the head of the predicate and the P together as a predicate. For example, I analyze *drive . . . over* as a predicate in a sentence such as *Peter drove his car over the manhole* (in (1–87) above).

We see here an important distinction between theta role and semantic role. The verb *went* in (1–86)b, for example, assigns the theta role of locative to the NP *the house*. But the predicate *went inside* in (1–86)b assigns the semantic role to that NP, letting us know that this (now) locative NP is a space that contains, rather than a space that is above or below, etc. (That is, *inside* contributes to the semantic role of its object NP.)

One advantage of analyzing the objects of the Ps in (1–86)–(1–87) above as bearing theta roles and as being role players to the predicate of the clause is that we can capture the similarity in function of NPs which are objects of Ps in locative PPs to NPs which are objects of Vs where the V incorporates a locative sense. And we can capture the same similarity regarding the temporal sense. Thus, as Ken Hale (personal communication) has pointed out to me, the NP object of the V and the NP object of the P have a similar function in each of the pairs below; my analysis captures that fact.

- (1–88)a. Our family occupied the house for seven years.
 Our family lived in the house for seven years.
 Heathfern approached the house.
 Heathfern went toward the house.

- The panda entered the house.
 The panda went into the house.
 b. The letter A precedes the letter B.
 The letter A comes before the letter B.
 The letter B follows the letter A.
 The letter B comes after the letter A.

(I am not suggesting that the pairs in (1–88) are synonymous, only that the theta roles of the relevant NPs are identical in each pair. The semantic roles of these NPs, however, vary as the predicates vary.)

In (1–86)–(1–88) the locative and temporal PPs co-occur with a separate head of a predicate. But they certainly need not. I delay the discussion of locative and temporal PPs in the absence of a separate head of a predicate until later in this section.

In all the instances thus far, I have argued that the object of the P in question receives a theta role, but not always from the P. Thus in (1–77) the P is a theta assigner; in (1–79) the P transmits, but does not assign, the theta role from the V to the P's object; in (1–80) the P is merely a reflex of the theme theta role, but the object of the P receives its theta role from the V; and in (1–86)b the object of the P receives its theta role from the head of the predicate of its clause (but it receives its semantic role from the entire predicate, which includes the P). (In this last case the P converts its object into an appropriate argument for the lexical head – that is, from a thing into a place.)

Let me now turn to some instances in which I argue that the object of the P bears no theta role whatsoever.

To begin, consider sentences such as (1–89), where one might be tempted to claim that *Betty* has a theta role.

(1–89) Beth will eat after Betty.

The most immediate reading we have for (1–89) out of context is that Beth will eat after Betty eats. Thus *Betty* in (1–89) should get the same theta role *Beth* gets – that is, whatever theta role *eat* assigns to this argument.

I contend, however, that despite our first reading of (1–89) out of context, *Betty* in (1–89) is not an argument of any event lexical item and does not receive a theta role. To see this, let us put a sentence like (1–89) in a context. *Betty* is auditioning for a dancing part in a musical. *Beth* is the auditioner.

(1–90) –Hey, Beth! Come on, let's eat.

–Hold on. One more audition. I'll eat after Betty. See, she's on stage already. 5 minutes max.

Here it looks as if *Betty* should get the theta role appropriate for an argument of *dances* (that is, we read (1–90) to mean, “I'll eat after Betty dances”). One might say that since both *eat* and *dance* have an agent-subject argument, there is no difference between the theta assignments for the object of *after* in (1–89) and (1–90), and that thus we have no evidence against allowing *after* to assign the theta role of agent to its object. However, the object of *after* need not be understood as an agent.

- (1–91)a. I ate salad after the steak.
 b. I ate a small snack after my bath.
 c. I eat peas only after 4 o'clock.

In (1–91)a our most immediate reading would have *the steak* getting the theta role of theme since it is an appropriate theme argument of the verb *ate*. In (1–91)b we might try to say that *my bath* gets the theta role of theme since it is an appropriate theme argument of some unexpressed verb such as *took*. In (1–91)c we have to admit that the object of *after* is simply a modifying time expression and is not an argument of any lexical head, thus it cannot have a theta role.

The above discussion shows that were we to maintain an analysis of sentences such as (1–89) through (1–91) in which the object of *after* gets a theta role, we would have to allow some abstract verbs at the level relevant for theta-role assignment which assign the appropriate theta roles in order to account for the differences just noted between the roles of the objects of *after* in (1–89) and (1–91)a&b. That is, *after* could not by itself randomly assign agent or theme or no theta roles to its object. Instead, we would need an as yet undefined process of constructing abstract verbs and precisely the right abstract verbs to give the theta role to the object of *after* that is appropriate in the particular sentence in a given situation, or, alternatively and equally as magical and undefined, some process of deleting abstract verbs before the sentences reach phonological form. Furthermore, we still would be in a quandary over (1–91)c, where no theta role is assigned to the object of *after*.

The theoretical and empirical problems raised by this approach are reminiscent of the types of problems that came up with the proposals for deletion rules of Comparative Ellipsis and Conjunction Reduction in the 1960s. And for much the same reasons that we have abandoned the bogus

deletion rules of Comparative Ellipsis and Conjunction Reduction (see Napoli 1983), we here abandon this approach to *after* phrases.

We see, then, that (1–89) through (1–91) have objects of *after* which receive no theta role. This is a welcome conclusion, since there is nothing in the conceptual structure of *eat* which would suggest that it takes a temporally sequential argument. That is, we have a very different situation here from that in (1–86). Verbs of motion, like *went* in (1–86), entail a location as part of their conceptual structure – the very idea of space is encoded in the lexical items. Thus it is conceptually appropriate for *went* to take a locative argument. The location is, in an admittedly abstract but no less conceptually real way, a participant or role player in the event. But a verb like *eat* does not encode the very idea of sequential time any more than, say, *cough* or *breathe*. And, accordingly, a phrase like *after NP* (as in (1–91)) can appear in a clause with (almost) any verb.

After in (1–89)–(1–91) relates its object sequentially in time to the proposition expressed by the words preceding *after*. The semantics are skeletal: *after* indicates only temporal sequence. But the context of the utterance allows us to fill out a reasonable interpretation of the utterance, sometimes to the point of letting us imagine a sequence of propositions (as in (1–90) and (1–91)a&b). Prepositional phrases of this sort are strikingly similar in their semantics to so-called comparative ellipsis phrases and are another example of the “efficiency” of language (where I mean the term as developed by Barwise and Perry 1983). The point for us is that we can account for the semantics of sentences like those in (1–89) through (1–91) without claiming that the object of *after* has a theta role; we would have problems of both an empirical and a theoretical nature if we took the opposite stance, that the object of *after* did receive a theta role from *after*.

The above discussion used only one preposition: *after*. One might argue that *after* is unique in not being a theta assigner. However, similar discussions could be made based on other prepositions, such as the concomitant sense of *with* (in contrast to the theme *with* of (1–81) discussed above). I offer the examples in (1–92) and leave the reader to construct the discussion. (Caveat: *With* can also introduce an absolute that can be a clause (with the Accusative-*Ing* construction studied in Reuland 1983: *With Mary crying, how can we just walk out?*) or a simple NP plus sister predicate (as in van Riemsdijk 1978: *With the buses on strike, let's walk*). See Napoli (1987a) for a full discussion. As you test out (1–92) below, be sure not to use the absolute constructions.)

- (1–92) She left with Barbara.
 She ate peas with cream.
 She left with no regrets.
 She answered with aplomb.
 She danced with the music.
 She danced with a cheerful smile.

In general, all prepositions which are open to relating an entire proposition to some other point, such as temporal sequence (e.g. *after*), temporal consequence (e.g. *with*), and temporal precedence (e.g. *before*), as well as causal sequence (e.g. *because (of)*) exhibit behavior similar to that discussed above for the *after* sentences. And I argue that in all such uses, the object of the P receives no theta role.

A question unanswered thus far is precisely what semantic function the PPs in (1–89)–(1–91) have. I argued in section 1.1 that adverbials which are not themselves role players are parts of the predicate. Thus these PPs would be part of the predicate: they are modifiers. (With a more abstract approach to predication than mine, of course, the familiar alternative that these PPs are themselves predicates, taking the entire proposition minus the PP as their role player, arises. See the discussion in sec. 1.1.)

In sum, Ps are relational words that connect some other entity to their object. Ps such as *inside*, *in*, *over*, etc. in sentences like those in (1–86)–(1–88) are part of the predicate and relate the head of the predicate to their object by indicating the specific nature of the locative role their object plays in the event. On the other hand, Ps such as *after*, concomitant *with*, *before*, etc. in sentences like those in (1–89)–(1–91) relate the entire proposition of the clause they appear in minus the PP to some point outside that proposition, which is denoted by the object of the P. In the first instance the object of the P receives a theta role from the head of the predicate; in the second instance, it receives no theta role.

Before I leave this subsection, let me point out that I take the object of *by* in a passive sentence not to bear a theta role. Justification of this position is found in chapter 2, section 8.

Let us now turn to propositions in which a PP does not co-occur with a separate head of a predicate. Consider first the locative Ps.

- (1–93) Mary is inside the house.

Here the property of being inside is attributed to Mary. We, as speakers of such a sentence, do not present the concept of inside as being a location or direction which extends some other action or position into a new event.

That is, we do not present *inside* as an extension of some other item, in contrast to how we present it in:

(1–94) Mary ran inside the house.

Rather, we present the concept of inside in (1–93) as a coherent whole: we view *inside* as denoting an event in itself. Thus *inside* is a predicate in (1–93). And it takes two role players: *Mary* and *the house*. In (1–94), instead, *ran inside* is the predicate, again taking two role players.

We can now see that whether or not a lexical item has an event structure cannot be determined in isolation of context. All Ps have the potential to be viewed as events and to have argument structures. But the crucial question for the analysis of any given utterance is how we view the P in that utterance.

One might object to this contextual approach to the event structure of lexical items and try to get around it by analyzing the copula in (1–93) as the head of the predicate rather than as merely a grammatical word (and see Jackendoff 1983). Then in both (1–93) and (1–94) the P would be part of the predicate but it would not head the predicate. Such an alternative cannot work, however, since the copula plays no semantic role in (1–93) – witness (1–95), where no copula is present but the same semantic relationship holds between *Mary* and *inside* as in (1–93) (and see the discussion of (1–3) at the opening of this chapter).

(1–95) I want Mary inside this house by midnight!

Any analysis which treats *is* in (1–93) as the head of the predicate would have to posit some abstract BE function in a sentence like (1–95). (The BE here represents an abstract function that need not have any lexical realization.) Our very nonabstract approach to predication does not allow for such an abstract BE.

Temporal Ps can also occur in such copular sentences, as can many other kinds of Ps:

(1–96) Mary is before Bill.

Here *before* is viewed as denoting a coherent event, the state of temporally preceding. The predicate, then, is *before*, and it takes two role players: *Mary* and *Bill*.

Thus in both (1–93) and (1–96) the object of the P receives a theta role from the P itself, in contrast to (1–94), where the object of the P receives a theta role from the V, and sentences like (1–89), where the object of the P receives no theta role at all.

We see from everything in this subsection so far that the object of P may or may not receive a theta role, and, if it does, that theta role may or may not be assigned by the P alone. In fact, only in examples like those in (1–77), (1–93), (1–95), and (1–96) is the P alone a theta assigner. Thus, in most uses, P is not a theta assigner.

This conclusion is interesting in several ways. First, others have argued on independent grounds that P is not a theta assigner (Gunnarson 1986, p. 32, Giorgi 1984, among others).

Second, P is a defective lexical category in ways other than just theta assignment. Frequently it has been claimed that P is not a proper governor for binding theory, in contrast to N, A, and V (Kayne 1981b; Chomsky 1981, sec. 5.1; Safir 1985, pp. 51, 88; Aoun 1985, p.68, among others). P is also the only lexical category that is closed (Emonds 1985); for example, there are a limited number of Ps (as opposed to other lexical categories), and new ones are not likely to be coined. And objects of P, unlike objects of V, are not subject to the Definiteness Effect (Safir 1985).

Third, while we cannot call P a grammatical rather than lexical category (since grammatical categories in the sense of Emonds 1985 have no purely semantic feature, whereas Ps generally do, except for the null preposition *of*), monosyllabic Ps are minor categories in prosodic trees, while all other lexical categories are major categories (see Nespor and Vogel 1982). And many Ps have special phonological properties, behaving in ways like syntactic dependents and clitics (see Chomsky and Halle 1968, Kean 1981, among others). Furthermore, Ps have some of the characteristics of functional elements in Abney's (1986) sense.

We would hope that the defectiveness of P in all the above ways would be explained by a single account. Unfortunately, I do not have one to offer, nor do I expect that any such account will be rapidly forthcoming. For example, Ps are theta assigners in certain contexts and in those same contexts Ps behave like proper governors. So we might connect those two facts by claiming that only theta assigners can be proper governors. On the other hand, all Ps are Case assigners, so unless the notion of proper government can be shown to be different for binding theory from that for Case theory, this explanation looks unpromising. (And such fracturization of the notion of proper government would threaten the explanatory value of the notion – thus I hope it would be avoided in any case.) Furthermore, the fact that polysyllabic Ps behave differently phonologically from monosyllabic Ps seems to be an unrelated fact, so far as I can see.

Let me end with an important fact: if it is a theta assigner, P – like A and V but unlike N – must take one argument which appears outside the PP that the P heads.

2.5 Phrasal predicates

As has already been pointed out, there are instances in which whole phrases can be predicates. For example, phrases which form lexical items, such as metaphorical PPs and fixed-phrase VPs, can be predicates. Here the predicate is in boldface:

(1–97) That analysis **is off the wall**.

(1–98) John **flew into a rage**.

And, frequently, a predicate just happens to comprise an entire phrase. Thus intransitive VPs are often predicates:

(1–99) John **ran inside quickly**.

But they need not be:

(1–100) John **ran inside** the house **quickly**.

Phrases can be predicates in at least two instances, then: either the phrase is a lexical item which denotes an event (as in (1–97)–(1–98)); or the phrase just happens to contain no material other than the predicate (as in (1–99)).

Naturally, if a whole phrase is a predicate, then it must have at least one role player (which is also an argument – see the discussion of (1–45) above in sec. 1.6) which, *per force*, appears outside that phrase, since every predicate must have a role player (see sec. 1.5). Furthermore, phrasal predicates are limited to precisely one role player (see Emonds 1985). This follows from the fact that every category X that we have examined above which can head a predicate can take at most one argument external to XP.

Let us now turn to a closer look at the issue of VP predicates and at whether entire clauses can be predicates.

2.6 Concerning VP and CP as predicates

Many linguists have assumed or argued that all predicates are phrasal (Stowell 1981, Chomsky 1981, Aoun and Sportiche 1983, Marantz 1984, among many others). In particular, Stowell (1981) has argued that VP rather than V is a predicate, and most works within GB follow Stowell on this point.

In this chapter we have seen that predicates can be single words, continuous strings of words that do not form a syntactic constituent, discontinuous strings of words that do not form a syntactic constituent, as well as entire phrases. It is important, then, that I counter the arguments of Marantz for the analysis of VP as a predicate.

Marantz argues that VP is the theta assigner for an argument in G(rammatical) F(unction) subject position, rather than V – thus for us that would mean that the entire VP is the predicate. Marantz's proposal is based partially on an inaccurate claim about the data (and partially on a discussion of idioms, to which Rothstein 1983 responds in a way consistent with my approach). He says that keeping a verb fixed and varying the DO can affect the theta role of an argument in GF subject position, as in (1–101), where I use my own examples rather than his. But no such variability is found in the theta role of the argument found in DO position.

- (1–101)a. Mary threw the ball.
 b. Mary threw a party.
 c. Mary threw a fit.
 d. Mary threw up.

In (1–101)a&b *Mary* is agentive; in (1–101)c it is debatable whether *Mary* is agentive or experiencer; in (1–101)d *Mary* is experiencer. Marantz would conclude from (1–101) that it is not the verb *threw* that is assigning a theta role to *Mary* in each of these sentences but the whole VP. However, exactly the same kind of variability is found in the theta role of the argument in DO position if we hold the verb fixed and vary the argument in GF subject position. (The examples in (1–102) were suggested to me by my intermediate syntax class, winter term 1986, University of Michigan.)

- (1–102)a. The ball struck Mary.
 b. The idea struck Mary.
 c. Multiple sclerosis (suddenly) struck Mary.

Here *Mary* is a patient in (1–102)a, perhaps a theme in (1–102)b, and an experiencer in (1–102)c.

If we were to conclude from (1–101) that the V plus its DO is a theta-role assigner, we would be led to conclude from (1–102) that the V plus its GF subject is a theta-role assigner, a regrettable conclusion for anyone's theory.

One might argue that sentences like (1–102)b&c are metaphorical, and

thus extensions of the “real” use of *struck*, seen in (1–102)a, where the DO gets a patient role. But the same objection would then hold for the sentences of (1–101), where the (b) and (c) examples can be seen as metaphorical. The important point is that (1–101) and (1–102) present entirely parallel questions and problems regarding theta-role assignment. Thus there is no asymmetry between DO and GF subject position with respect to theta-role assignment by a V. Accordingly, Marantz’s argument that VP is a predicate, which is based on such a proposed asymmetry, is vitiated.

Notice, of course, that it is also debatable whether there is a single verb *threw* in (1–101) and a single verb *struck* in (1–102), as Bill Croft (personal communication) has pointed out to me. But I will ignore that debate here in the interest of showing that Marantz’s argument is inconsistent internally, even if only a single verb is involved in these examples.

In sum, I reject Marantz’s position that VP is a theta-role assigner and reiterate that only lexical items can assign theta roles. Other arguments for rejecting VP as a theta assigner are found in Rothstein (1983).

Given that only lexical items assign theta roles, we will say that in (1–101) the lexical head *threw* takes *Mary* as an argument and assigns a theta role to that argument. Likewise in (1–102) the lexical head *struck* takes *Mary* as an argument and assigns a theta role to that argument. However, the theta role that is assigned with these verbs may vary. This is a common situation, as we saw above in section 1.6 with the discussion of (1–42)–(1–44).

A distinct instance of the common claim that VP is a predicate regards the analysis of sentences involving NP movement:

(1–103) *Mary* [_{VP} appears [t to have understood]].

Here Williams (1980) argues that the matrix VP is a predicate by virtue of the presence of the trace, which makes the VP an open function, according to him. I have adopted an event-structure approach to the definition of predicate, which has little to do with the notion of an open function except for the fact that predicates require at least one role player. Thus a phrase would be an open function only if one of the role players of the predicate were missing from the phrase. I would therefore not analyze the VP in (1–103) as a single predicate. Instead, the predicate here is the discontinuous string *appears . . . to have understood*, and the trace, being a trace of NP movement, is an anaphor. As an anaphor, this trace is a legitimate role player of the predicate, thus the VP is not an

open function in any way relevant to predication: there are no role players missing from this phrase. In chapter 6 I will argue that the principles of coindexing a predicate and its subject role player (which I present in ch. 2, but see sec. 4 below for a definition of subject role player) can be extended to cover the coindexing of an anaphor and its antecedent. Thus my analysis will capture the similarities between the coindexing of trace and *Mary* in (1–103) and the coindexing between a predicate and its subject role player while still maintaining an event-structure notion of predicate.

Williams (1980) is also responsible for the claim that *S'* (or, in our terms, CP) can be a predicate. (By *S'* Williams intends the phrase consisting of a clause plus its introductory complementizer node. By CP I mean the phrase headed by the complementizer node.) Let me consider that analysis of his which has gained the most following: that instances of obligatory control are predicates. Thus Williams would analyze the embedded clauses here as predicates:

(1–104) *Mary* wanted [PRO to leave].

(1–105) *Mary* is [PRO to leave by 5].

According to Williams, these clauses can be predicates because they are open by virtue of the presence of PRO. However, while the clauses here have a phonetic hole, so to speak, they are not open in the sense relevant to predication. The PRO in obligatory control clauses is an anaphor (see Hornstein and Lightfoot 1987) – thus these clauses, like the VP in (1–103) above, are closed. These clauses therefore cannot be predicates. However, since the coindexing principles for anaphors and predicates are the same (see ch. 6), the similarities between such sentences and instances of predication are not only unproblematic, but expected (see also ch. 2, sec. 9).

Example (1–105) is important to take a closer look at, however. In all the examples of copular sentences that we have seen thus far, *be* is a grammatical word. However, in (1–105) if *be* were a grammatical word, the GF subject *Mary* would not be licensed in the sense of Chomsky (1986b) (given that I do not analyze the embedded clause as a predicate). Therefore, this use of *be* must not be as a grammatical word. And, in fact, it is not. The *be* here expresses obligation or intention and is not simply a word that carries the tense (see also Safir 1985 and Williams 1983a, who argue that there are two senses of *be*).

There are still at least two other types of open clauses which are

candidates for being analyzed as predicates: restrictive relative clauses and appositive relative clauses. But restrictive relative clauses are sisters to the head N they describe (see ch. 3, sec. 2), and thus fall within the NP of the N they describe. This collocation is that of modifiers, not predicates, as was argued in section 1.4 above.

Appositive relative clauses, however, will be argued in chapter 5, section 5 to be outside the NP they are related to at SS – and, in fact, to predicate of that NP. (By SS I intend the level of structure at the output of the syntactic component of the grammar.)

In sum, VPs are predicates only when they consist of phrasal lexical items or when a predicate just happens to comprise an entire VP (as in (1–99) versus (1–100) in sec. 2.5 above). But CPs can be predicates only when they are open (that is, when they contain a variable) and when they are not modifiers. At least one such case arises: the appositive relative clause.

3 Categories that can be role players

Any phrase that can be an argument can be a role player (by virtue of the Principle of Coincidence in (1–46)). Thus far the role players we have looked at are NPs. However, clauses can be arguments.

- (1–106) Jane insisted that we come back.
 I'm hopeful that he'll come back.
 Jane's insistence that we come back surprised me.

And, as was mentioned earlier, some have argued that all subcategorized-for elements are role players. If this were so, subcategorized-for locative phrases would be role players:

- (1–107) The doctor put notes on Sally's chart.

I have argued (sec. 2.4 above) that, instead of the entire locative PP being a role player, the object of the P is a role player and the P is part of the predicate. Thus the predicate in (1–107) would be *put . . . on*.

We will find in chapter 2 that the principles of coindexing between a subject role player and a predicate are unchanged whether we analyze the object of the P or the whole PP as a role player in (1–107), so long as in either analysis the object of the P receives a theta role (in the analysis with the whole PP as a role player this might be by way of inheritance from the PP to its object NP).

There is another analysis of sentences like (1–107) that I have not yet discussed – that of Simpson (1983b). (I do not have access to this work,

but it is referred to in Hale and Keyser 1986. I present here my understanding of the work and I apologize for any unintentional misrepresentation.) Simpson argues that the verb *put* takes the entire locative PP as its argument, but that locative PP is itself a predicate. Simpson uses the term “translative small clause” to describe the type of relationship that holds between the sister arguments of *put* in (1–107) (that is, between *notes* and *on Sally’s chart*). I am unsure whether or not in this analysis the NP *Sally’s chart* would receive a theta role or not, and, if it did, which item would be its theta assigner. It is quite possible that Simpson would allow *Sally’s chart* to be a role player of the predicate even while analyzing the entire PP as the predicate (just as Williams 1980 and Marantz 1984 allow the DO to be a role player even though they analyze the VP that contains the DO as the predicate).

I will maintain my original analysis of sentences like (1–107), in which the NP and not the PP is a role player of the predicate, and I leave open the question of whether or not the alternative analyses I have discussed here would be consistent with my coindexing principles given in chapter 2.

Some theta assigners definitely do take arguments that are themselves predicates, however (and see Chierchia 1985):

- (1–108)a. The medication rendered John helpless.
- b. The confirmation of Sarah as a Catholic freaked out Arnie.

In (1–108)a the AP *helpless* is an argument of *rendered* and at the same time it is a predicate (taking *John* as its role player). To see this, notice that *helpless* licenses *John* (**We rendered John*), whereas adjunct (that is, nonargument) predicates must be licensed by their subject role player (and see Emonds 1985, p. 83). Other predicates of other categories can be arguments of *rendered* (*The medication rendered John out of control/a bumbling idiot*). In (1–108)b the PP *as a Catholic* is an argument of the head N *rendered*, where here *a Catholic* is a predicate taking *Sarah* as its role player.

It appears that NP, AP, PP, and clauses can all be arguments of lexical items. So all phrasal nodes can be role players of predicates.

4 Theta assignment

All arguments of an event lexical item receive a theta role. In this chapter we have seen that arguments of a lexical item can appear inside the

maximal projection of the syntactic head of the lexical item or outside that maximal projection. (Recall that I allow strings like *take . . . to task* in (1–18) to be a lexical item. Thus it makes sense to talk of the syntactic head of a lexical item, where the X that heads the minimal XP that contains the entire lexical item is the syntactic head of the lexical item.)

When arguments appear inside the relevant maximal projection, they are either (a) sisters to the syntactic head of the lexical item, or (b) objects of a P where the P is part of the lexical item (as in *look after*), or (c) objects of a P where the PP is a sister to the lexical item (as in *depend on*). (Recall that I analyze arguments of N which appear in specifier position as originating in sister position in DS. Thus either these arguments or their trace will be sisters to N at the point of theta assignment.) I will call the (a) case “sister arguments.” I will call both the (b) and (c) cases “prepositional arguments.”

Two very common principles of theta assignment will account for theta assignment to sister and prepositional arguments.

(1–109) *Direct Theta Assignment*: A lexical item assigns a theta role to its sister arguments.

(1–110) *Compositional Theta Assignment*: A lexical item assigns a theta role to its prepositional arguments.

These principles are similar to those commonly assumed in GB (as in Chomsky 1981), as well as in other theories (such as Lexical Functional Grammar, as in Bresnan 1982a&b). Notice that the term “compositional” in (1–110) is, actually, a misnomer, since I am not claiming that the P need have any part in the assignment of the theta role (it might, as in sentences with *look after*; and it might not, as in sentences with *think of*). I adopt this rubric despite the fact that it is a misnomer, since the cases of theta assignment meant to be covered by (1–110) are the same as those meant to be covered by the principle called Compositional Theta Assignment in Chomsky (1981).

There are two very important distinctions, however, between the principles as stated here and those commonly assumed in the literature.

First, theta assignment as stated here applies only to arguments. And arguments are not syntactically identifiable (see sec. 2 above, where I argue that sisters to a lexical head need not be arguments of that head). Thus these principles are semantic in nature. The reference to syntactic structure (to sisters and to prepositional sisters) is needed in order to account for the data we have seen in this chapter, all of which come from

English. The same kinds of data precisely would lead us to the same principles if we had looked at Italian, instead. And I believe that the same kinds of data exist in all configurational languages (in the sense of Chomsky 1981 – that is, languages which exhibit a VP). Thus these principles are syntactic only insofar as the languages they apply to are configurational. That is, the nature of theta assignment is NOT configurational itself – it is semantic, applying to arguments wherever they happen to be located. But in configurational languages the arguments internal to the maximal projection of the head of the lexical item theta assigner will be sisters or prepositional sisters.

Second, Compositional Theta Assignment as stated here is not to be interpreted as a form of syntactic reanalysis. That is, I am not claiming that a lexical head and a P be syntactically restructured into a new constituent (*contra* both the restructuring rule of GB and the verb–preposition incorporation rule of Lexical Functional Grammar (hereafter LFG)). To the contrary, I argue at length against such restructuring in chapter 2, section 3.

Examples of arguments which receive theta roles by Direct Theta Assignment are the italicized items here, where the theta assigners are in boldface:

- (1–111) Jack **kicked** *the ball*.
Your book is **worth** *two cents*.

(See Maling 1982 for the analysis of *worth* as a P.) Direct Theta Assignment may apply to more than one argument of a given lexical item, as in the double object construction (*contra* Emonds 1985, p. 62):

- (1–112) I'll **bake** *[you] [a cake]*.

Examples of arguments which receive theta roles by Compositional Theta Assignment are the italicized items here, where the theta assigner is again in boldface:

- (1–113) That **announcement** of *Jack's* shocked everyone.
I'm **counting** *on you*.
He isn't **inclined** toward *leniency*.
Look after *him* for me, won't you?
Drop the trash into *that can*, please.

Notice that IOs when introduced with a P also receive their theta role by way of Compositional Theta Assignment:

- (1–114) I'll **bake** a cake for *you*.

And, like Direct Theta Assignment, Compositional Theta Assignment may apply to more than one argument of a given lexical item:

(1–115) **The lecture** of *Bill's on birth control* was an anticlimax, so to speak.

It is commonly claimed that principles of theta assignment hold at DS. However, so long as movement leaves a trace (as in GB) and theta assignment can be to traces, there is no need to specify the level at which these principles hold. I take these principles, then, to account for theta assignment to the italicized arguments here:

(1–116) *Jack's announcement* [t] wrecked havoc.

What can the children eat [t]?

What can he be thinking of [t]?

That is, the lexical item assigns a theta role to the trace and, by virtue of being in a chain with that trace, the italicized items in (1–116) are understood to bear a theta role.

Arguments of a lexical item that appear outside the maximal projection of the syntactic head of that lexical item also receive theta roles, but not by the principles in (1–109)–(1–110). As Emonds (1985) has noted, at most one argument may appear outside the relevant maximal projection. I propose the following principle to handle theta assignment to such arguments.

(1–117) *External Theta Assignment*: A lexical item may assign a theta role to at most one argument that is external to the maximal projection of (the head of) the lexical item.

(Again, recall that I allow lexical items which are strings of words – thus it makes sense to talk about “the head” of a lexical item.)

This principle differs drastically from the generally accepted third principle of theta assignment in GB, which is called Indirect Theta Assignment. With Indirect Theta Assignment a theta role is transmitted from a V via a VP to the GF subject of the clause. Instead, (1–117) makes no mention of anything indirect about this theta assignment: it is directly from the theta assigner to the argument. Furthermore, (1–117) makes no mention of where the external argument may be, only that it must be, in fact, external (that is, outside the phrase).

Let us recapitulate for a moment. In (1–118) all the boldface words are predicates in the sense developed in section 1.

(1–118) Jack **discussed** Bill's **refusal** [PRO **to consider** the best lawyer's **resignation** from the firm].

(That *to* in *to consider* is part of the predicate follows from the fact that *to* is an auxiliary. See Pullum 1982 and Napoli 1985.) Predicates can, of course, consist of more than just an event lexical item, as when a specifier or a modifier is part of the predicate (see sec. 1.1 above). But all the arguments of the lexical item that heads the predicate will be role players of the predicate, even if the predicate consists of more than just its head (that is, even if the predicate consists of more than just the event lexical item). We know this from the Principle of Coincidence in (1–46).

We can see, then, that the question of where the external argument covered by principle (1–117) can be is the same question as where the external role player of a predicate can be. This is true even though external role players of a predicate may have originated as internal arguments of the head of the predicate in DS. For example, the GF subject of a passive sentence (derived via movement in GB) is an external role player for its predicate, but it originated as an internal argument (a sister argument).

In section 2 above we saw that A, V, and P, when they are used with an argument structure, must take an external argument. Furthermore, when whole phrases are lexical items that have an argument structure (as in the idiomatic PPs and VPs of sec. 2.5 above), they *per force* take an external argument. If we couple this with the fact that every predicate must have at least one role player, we can see that the external argument is a special argument. Only N does not require an external argument: N can take an external argument (and optional internal ones, as well); or it can take only internal arguments:

(1–119) [*Jack*] is [_{NP} a **failure** (at *tennis*)].

(1–120) [_{NP} *Jack's* **argument** about *Bill*] convinced me.

In (1–119) the N *failure* assigns a theta role to *Jack*, which is external, and to *tennis*, which is internal. In (1–120) the N *argument* assigns a theta role to the genitive NP and to the object of the P, both of which are internal to the NP.

We can now see that predicates headed by N must be singled out from all other predicates, since all other predicates must have an external role player, but predicates headed by N need not. Let me now define one more term:

(1–121) *Subject Role Player*: The external argument of a lexical item at SS is the subject role player of a predicate headed by that lexical item.

(I choose SS as the level of interest in (1–121), since the notion of subject role player relates to the GB notion of subject – as we will see in ch. 2 – and Chomsky (1986b) has argued that his Extended Projection Principle, which requires that V have a subject, holds at SS. In ch. 2, sec. 2 I discuss this further.)

We need a special definition for subject role players of N, however, in precisely those cases where N does not have an external argument at SS. Recall that if N has multiple arguments where all are internal and where one is nonprepositional and nonobjective, then one of its arguments will be a genitive in English, whether it occurs in specifier or in sister position (thus we get *the death of John*, but *that lecture of John's on birth control* – see sec. 2.3 above). And N never has more than one genitive argument (**John's picture of Bill's*). I can now offer the following definition:

(1–122) *Subject Role Player of N*: If an N takes only one argument in the lexicon, that argument is the subject role player of the predicate headed by the N.

If an N has no external argument at SS but does have a genitive argument, the genitive argument is the subject role player of the predicate headed by the N.

Condition: (1–122) holds only if (1–121) does not apply.

Of course, the definition in (1–122) holds only for English and not for Italian, since Italian does not have genitive NPs.

(1–123) *il libro di Moravia sulla guerra*
'the book of Moravia's on the war'

We might be able to modify (1–122) to accommodate Italian by talking about which P can introduce the subject role player of an N (where the P *di* is the most likely counterpart to the English genitive Case). However, there is another serious problem with (1–122): the definition in (1–122) will not help us determine which argument is the subject role player if an N has no external argument and no genitive argument, as in the case of an N with an implicit argument in a sentence such as (1–37), repeated here:

(1–37) The **destruction** of the city [PRO to prove a point] was deplorable.

Is *the city* or the implicit argument (the argument that controls PRO) the subject role player of *destruction* in (1–37)? Both are arguably internal, so (1–121) does not help us. And neither is observably genitive, so (1–122) does not help us.

There is one thing in common about all subject role players of N which are identified by (1–122) that one might try to use in determining the

subject role player of sentences like (1–123) and (1–37). Notice that the internal argument of N that is identified as the subject role player in (1–122) is the argument that would be the external argument of the predicate with a V or A head that most closely corresponds to the sense of the N, if such a V or A exists:

- (1–124)a. The death of Jack . . .
Jack died.
- b. Jack's argument that we should leave . . .
Jack argued that we should leave.
- (1–125) Jack's happiness at the news . . .
Jack was happy at the news.

One might propose that some comparison of NPs with clauses would help us to determine which argument of an N is its subject role player. However, this approach is fraught with problems. For one, many NPs with head Ns that I have argued do have argument structures do not easily map into any corresponding clause.

- (1–126) Jack's book about the war . . .

As we noted in section 2.3 regarding examples like (1–75), repeated here,

- (1–75) Mary's photograph of Sue . . .

the genitive NP in such NPs can be understood to have performed a range of activities with respect to the theme argument. Thus there is no one clause to map such NPs into. Furthermore, many Ns that do have morphologically corresponding As do not always have the same relationship to their arguments as the corresponding As do to their arguments.

- (1–127) Jack's guilt about the divorce . . .

- (1–128) Jack is guilty.

Jack in (1–127) feels guilt, which is a quite different relationship to the concept of guilt from that of *Jack* in (1–128), where Jack actually is guilty.

I believe the above tack raises more problems than it solves and shows that we need an analysis of conceptual structure in order to get at the proper definition of subject role player. This book, however, is not an investigation of conceptual structure – and cannot become one. Thus the best we can hope for here is a definition that is descriptively adequate.

While I realize that the lack of a more conceptual definition of subject role player may leave the reader dissatisfied, the major goal of this work is

not really threatened by the absence of such a definition. That is, even if we cannot give a proper definition of subject role player, so long as we can recognize the role players of a predicate, we can go on to develop the principles which govern the domains in which predicates and their role players must appear. And that is the major job of this book.

For now, then, let us keep aiming at a more descriptively adequate definition of subject role players for nominal predicates. A reconsideration of (1–125) and (1–75) can help. In these NPs the genitive NP bears an agentive theta role, regardless of what specific action that NP actually performed. I therefore propose the following definition:

- (1–129) *Subject Role Player of N* – definition two – The agentive argument of an N is the subject role player of the predicate headed by the N.
Condition: (1–129) holds only if (1–121) and (1–122) do not apply.

This definition will now cover both Italian and the instances of NPs in which the N has implicit arguments.

Notice that we need both (1–129) and (1–122), since there are instances in which an N has more than one argument, but none of them is agentive, as in (1–127).

Let me point out that in all the examples we have seen where we posited an implicit argument, that implicit argument was agentive. If all implicit arguments are, in fact, agentive, then all implicit arguments will turn out to be subject role players. This is precisely the result we would expect with Chomsky's (1986b) Extended Projection Principle, in which he holds that subjects need not be syntactically realized, but objects must be (p. 116).

Clearly the fracturization of the definition of subject role player (hereafter *srp*) is regrettable and surely indicates that further work needs to be done here. Given the fact that N does not require an external argument, I see no possibility for conflating the definitions of *srp* of N with that of *srp* of all other types of lexical items except by way of a conceptual definition of *srp*, a definition that is not readily forthcoming. I therefore leave the issue open, hoping only to have offered definitions that are descriptively accurate.

Let us see now what these three definitions mean for the analysis of different instances of predication. First, the boldface words in all the sentences below are the predicates, where an arrow goes from the head of the predicate to its subject role player. (Some sentences have more than one predicate, but I have marked only one for exemplification.)

- (1-130) Mary **wants** potato chips **very much**.

 [That John would ever leave Sue] is **ridiculous**.

 The children aren't **onto** you **yet**.

 Those men are **fools**.

 We admire Jennifer as **a flutist**.

 Every photograph of Jennifer as **a child** is blurred.

 I consider Jeff **out of his mind**.

In (1-130) we have one predicate headed by V, one by A, one by P, and three by N, as well as a PP predicate, all of which have an external argument.

Now let us consider some Ns that have only internal arguments. Here again the predicate we are focusing on is in boldface, and an arrow goes from the head of the predicate to its subject role player.

- (1-131) **The death** of John upset us all.

That lecture of Bill's on birth control was informative.

That gem of a centerfielder is my brother!

(For the analysis of the NP in the last sentence of (1-131) as involving predication, see ch. 4.)

In analyzing (1-130) and (1-131), we have used only (1-121) and (1-122). Now let us look at some sentences where we have to use the definition in (1-129).

- (1-132) **The destruction** of that city was a shock to all of us.

Here there is an implicit agentive agent of *destruction*. We know that from the fact that we could add a rationale clause to (1-132), and the implicit agentive argument would control the PRO (as in (1-37) repeated above in this section). This implicit agentive agent is the subject role player of the predicate (and it is impossible to draw an arrow to it).

There is at least one more interesting point about the analyses that our

definition(s) of subject role player leads us to. Given (1–122), in an NP such as that in (1–133) we must call *the city* the subject role player of the predicate headed by *destruction*:

(1–133) The city's **destruction by the Huns** was a shock.

In fact, given the definition of srp in (1–121), in the passive sentence in (1–134) we must call *the city* the subject role player of the predicate headed by *destroyed*.

(1–134) The city was **destroyed by the Huns**.

I believe that this is a correct analysis. I will argue in chapter 2, section 8 that an NP such as *the Huns* in (1–133) and (1–134), which is the object of a passive *by*, is not an argument of any predicate. Rather, these *by* phrases are part of the predicate (they are adverbial modifiers). For now, I merely point out the analyses of (1–133) and (1–134) which follow from my definitions of subject role player.

Returning to the principle of External Theta Assignment in (1–117), given the definitions of subject role player, we can see that whatever requirements there might be on the relative position an external argument can hold to its theta assigner will be subsumed under the requirements that hold on the relative position a subject role player can hold to its predicate. It will be the purpose of chapter 2 to lay out those requirements. I therefore leave (1–117) with no further stipulations added.

There are, however, still some loose strings to tie up. For one, in section 1.4 I adopted the position that there can be more than one instance of predication in a single clause. At this point we can state our Theta Criterion (which is essentially that of Williams 1980, Schein 1982a and b, Rothstein 1983, Chomsky 1986b, Higginbotham 1985, and others).

(1–135) *Theta Criterion*: Every argument of a lexical item is assigned one and only one theta role by that lexical item.

Every theta role of a lexical item is assigned to one and only one of its arguments.

This Theta Criterion allows an element to receive a theta role for each argument structure it belongs to.

Emonds (1985, p. 68) notes that whenever an item receives two theta

roles, it must be the subject of one of the theta assigners. Let me restate Emonds' observation as a principle:

- (1-136) *Functional Criterion*: If an XP receives a theta role from two non-intersecting sources, then it must be the subject role player of at least one of those sources.

(This criterion, of course, raises questions for modification, since modifiers assign theta roles to the items they modify. I address these questions below in this section. Motivation for this criterion is given at the end of ch. 2, sec. 5.)

Another loose string is the issue of what form of the Projection Principle I am adopting. The Projection Principle of Chomsky (1981) ensured that lexical properties would be reflected at all syntactic levels by syntactic entities. For Chomsky (1986b), the phrase-structure component is viewed as a "kind of 'projection' of lexical properties" (p. 81), and we find the explicit claim that whatever element is "understood" in a particular position is actually there in syntactic representation (p. 84). This means that if a V, for example, takes a clausal argument in its lexical structure, then one of its grammatical functions will be filled with a clause (where the GFs are GF subject, DO, IO, object of a P). The obvious question is, where do implicit arguments fit into the grammar given the Projection Principle? Roeper (1987) has argued that implicit arguments have syntactic functions (they can control PRO, for example), but they do not occupy syntactic slots – they do not hold grammatical functions such as subject, DO, IO, object of a preposition). Chomsky himself (1986b, pp. 130–1) raises the question of what to do about implicit arguments, and this is part of the reason that he allows subjects not to be syntactically realized with his Extended Projection Principle.

I propose that we modify the Projection Principle to keep its essence by simply saying that all lexical properties must be reflected at all syntactic levels, but not necessarily by entities that bear GFs. Instead, so long as an entity has syntactic functions (such as being able to control PRO), such an entity will qualify as reflecting lexical properties at the syntactic levels. Thus if a lexical item obligatorily takes an agentive argument in its lexical structure, then when we put this lexical item into a syntactic structure, the agentive argument must appear as an entity that may perform a syntactic function – whether this argument appears explicitly (in some GF position) or implicitly (perhaps in an affix, perhaps not).

In section 2.4 above I discussed Jackendoff's (1987b) nonlexical rule for adding theme *with* arguments to verbs such as *spray*. At that point I

raised the question of how such nonlexical rules affected the Projection Principle. But, as I stated there, so long as we encode in the lexical information of a verb the fact that it can undergo the nonlexical rule, then lexical properties of the verb are still reflected in all the syntactic levels. Thus I do not see Jackendoff's nonlexical rules as being a problem for the Projection Principle.

In section 1.3 above I argued that the so-called aspectual verbs are not themselves predicates, but, rather, part of the predicate headed by an item in the clause embedded as a sister to the aspectual verb. But we saw with (1–28) that the object of *to* in a clause with *seem* is a role player for the predicate that *seem* is a part of. Let me repeat (1–28) for convenience:

(1–28) Jack seems to me [t to understand French pretty well].

The question now is whether such an analysis poses a problem for the Projection Principle since the object of the *to* does not appear in the lexical structure of *understand*, which is the head of the only predicate in this sentence. The question is a tricky one. The Projection Principle says that lexical properties must be encoded in the syntax. But its spirit is to see the syntax as a reflection of lexical properties. So the syntactic presence of the object of *to* but its absence from the lexical argument structure of *understand* is problematic for the spirit, if not the word, of the Projection Principle. And, unlike with our discussion of theme *with* above, we cannot say that the ability to co-occur with *seem* is part of the lexical information of *understand*. Instead, every predicate has the potential of appearing with these aspectual verbs. And since this potential is not lexically idiosyncratic, it should not be built into the lexical structure of individual lexical items. It would seem, then, that our grammar must allow for items in the syntax which do not appear in the lexical structure of a given lexical item, but which can be attracted into the network of role players of the predicate headed by that lexical item.

A final point I would like to address here is where modification fits in. I argued in section 1.4 above that in my approach to predication, there must be a distinction made between modification and predication. And I believe that the fact that a modifier (such as an AP) falls within the maximal projection of the item it modifies (such as an N), so that it is an intrinsic part of the sense of the entire phrase (such as being an intrinsic part of the reference of the NP), is so different from the relationship of a predicate to a role player that this difference demands recognition in the theory.

Others have identified modification with predication. For example, Williams (1980) calls some AP predicates “modifiers” (p. 204), and Higginbotham (1985) calls some AP modifiers “predicates” (p. 564). Yet Williams’ coindexing rules for predication will not apply to instances of modification such as

(1-137) the big butterfly

since his coindexing rules coindex phrases only, but *butterfly* is an N and not a phrasal level – so we cannot coindex the AP *big* with the N *butterfly* in (1-137). Furthermore, Higginbotham is forced to posit a special rule of Theta Identification to allow the AP *big* to discharge its theta role to the N *butterfly* (where other discharge rules apply to phrases, again). Thus, even though these linguists have not made the distinction in terminology that I have made, their theories require special rules to handle the assignment of a theta role from a modifying AP to the head N it modifies.

Certainly, however, there is much in common between predication and modification, and any theory of grammar should capture the similarities, as well as recognize the differences. In the present theory one way a predicate and a modifier are similar is that the head of both assigns a theta role to at least one argument. But I believe the similarity goes beyond that.

The specific proposal I would like to make is that one of the theta assignment principles I have given in this section can handle theta assignment from a modifier to an N: the principle of External Theta Assignment. That is, if we allow “argument” to be loosely understood to include “head of an argument,” a theta role can be assigned to an N and not just to NP. That way External Theta Assignment can account for theta assignment by modifiers, since the N receiving a theta role from an A that heads a modifying AP is always external to the AP.

Given this analysis, a modifier will have an external argument. But then it takes only a small relaxation of our definition of subject role player in (1-121) to allow modifiers to have subject role players. That is, we need say only that the external argument of a lexical item is the subject role player of a predicate or a modifier headed by that lexical item. Now we can see that the Functional Criterion in (1-136) can stand unchanged, adequately handling instances in which an item receives a theta role both because it is a role player of a predicate and because its head is being modified (where I am assuming that if N gets a theta role, that theta role will percolate up to N”), as in:

(1-138) I saw [the tall kid].

The curved arrows in (1-138) indicate theta assignment. Here *kid* is the subject role player for the modifier *tall*, as predicted by the Functional Criterion.

I suggest further that the coindexing principles that I will develop in chapter 2 for coindexing a subject role player and its predicate will also hold for coindexing an N and its modifier. However, since modification is not the focus of this work, I will not go any further with this suggestion, but leave it for the interested reader to (trivially) confirm.

Let me also point out that modifiers can take more than one argument, as in *anyone talented at the piano*. Here *talented* assigns a theta role both to *anyone*, which it modifies, and to *the piano*. But the arguments of a head of a modifier that appear in addition to the object modified will always be internal to the maximal projection of the head of the predicate. Therefore, Direct and Compositional Theta Assignment will easily handle theta assignment to these arguments.

5 The feasibility and desirability of a formal definition of *predicate*

At this point the reader who is familiar with the literature on predication may still be longing for a formal definition of predicate within the framework here. I will now show that such a formal definition is not possible, and I suggest that it is not desirable, although the real evidence for its undesirability comes from the fact that the present theory is more nearly empirically adequate than the other theories with formal definitions of predicate discussed in this book. That evidence is found in chapters 2 through 5.

We will begin by considering an existing formal definition of predicate. And the examination of this formal statement will allow us to see that formal definitions of predicate that have appeared in the linguistic literature accessible to nonlogicians are not helpful to us.

I have chosen the definition of Culicover and Wilkins (1986) because it is recent, because it is well supported in their work, and because it has points of similarity to most other formal definitions of predicate in the nonphilosophical linguistic literature. It is not, however, useful to us with the framework we are adopting here, for reasons we will see immediately.

(1-139) “A predicate is any non-propositional major category $X^{\max}$, immedi-

ately dominated by V^n , which (a) bears no grammatical relation to the verb, or (b) is an infinitival VP.”

(From Culicover and Wilkins 1986, p. 121.)

First, we have seen that predicates need not be maximal projections (that is, they need not be $X^{\max}$). In fact, the only predicates that are maximal projections are headed ones that just happen to fill the maximal projection of their head, unheaded predicate PPs and VPs (the idiomatic cases – see sec. 2.5), and appositive relative clauses (see ch. 5, sec. 5).

Second, we are not restricting our predicates to being immediately dominated by a projection of V. For example, to use a variation of a sentence from Emonds (1985, p. 273), in (1–140) the phrase *as Hamlet* predicates of *Meryl*, yet this phrase is immediately under S (or I') (where S is the phrase consisting of a GF subject and the rest of the clause, and where I' is the node dominating Inflection and its sisters):

(1–140) Meryl **as Hamlet** would be a poor choice.

Third, we have made no restriction against our predicates' bearing a grammatical relation to the verb. Culicover and Wilkins are using this restriction to ban predicates (except infinitival VPs) from being assigned theta roles. That is, they take grammatical relations to be what I have been calling GFs (syntactic subject, DO, IO, O(b)ject of a P(reposition)), but since their predication theory involves a coindexing rule that operates in a structure they call R-structure and since R-structure is formed from DS, the GFs of interest to the definition in (1–139) are what Chomsky (1981) calls GF-theta. We differ, then, from the definition in (1–139) by allowing items such as *helpless* in (1–108)a, repeated here for convenience, to be predicates (where the sole role player of *helpless* is *John*), even though such a predicate is theta-marked by the verb, in this case, *rendered* (see Emonds 1985, p. 83, and sec. 3 above).

(1–108)a. The medication rendered John helpless.

Fourth, we do not allow VP to be a predicate except when it is an idiomatic VP or a headed predicate that just happens to fill the entire VP (see secs. 2.5 and 2.6).

In sum, the theory presented here differs from Culicover and Wilkins' on almost every formal aspect of their definition of predicate. I contend that it would be impossible to write a formal definition of predicate in our sense using syntactic terminology such as categories and projections of

categories and domination information. This is trivially so because we are allowing strings which do not form constituents to be predicates (such as *take . . . to task*).

In chapters 2 through 5 of this book, I hope to make it clear that definitions of predicate and theories of predication which gain their formal properties by relying on syntactic configuration properties are not desirable in any case, even if we were to allow only constituents to be predicates. Predication is a semantic relationship and predicates are semantic entities, and there is no one-to-one correlation between semantic entities and syntactic entities. Hence, a useful definition of predicate and a theoretically valid and empirically adequate theory of predication must be built on semantic notions.

In this way definitions of predicate in the philosophical tradition turn out to be more nearly consonant with mine than definitions in the GB literature. Thus, as Bill Croft (personal communication) has pointed out to me, what in natural language counts as a single predicate in first-order logic is anything, with the only condition being that referring expressions cannot be predicates or parts of predicates.

6 Semantic head versus structural head

There is one final distinction that needs to be made. As Abney (1986) has pointed out, a phrase has a structural head and a semantic head. Thus the structural head of a VP is the V and this is also, typically, its semantic head. But Abney argues that the structural head need not be identical to the semantic head, and he analyzes nominals in such a way that the structural and semantic heads are not identical.

I do not follow Abney in his analysis of nominals for reasons extraneous to the present work. However, we will see in chapters 3 and 4 that there are NPs in both Italian and English (and many other languages) whose syntactic head is not identical to their semantic head. Thus I analyze an NP such as (1–64), repeated here for convenience, as having *matto* as its syntactic head, but *Giorgio* as its semantic head:

- (1–64) *quel matto di Giorgio*
 that madman of Giorgio
 ‘that madman Giorgio’

Since theta roles are semantic entities, I contend that theta assignment trickles down to the semantic head of a phrase. Of course, this will become an issue only when the semantic and syntactic heads of a phrase

are not identical. We will see the ramifications of this contention in chapters 3 and 4.

7 Conclusion

We have defined several terms and offered three principles of theta theory in this chapter. They are listed below for ease of reference as the reader goes on to later chapters. We begin with the definitions and then list the principles.

First, we never set aside a definition of predicate as a numbered example. But we have developed the idea that a predicate is an event lexical item with certain specifiers and modifiers, taking at least one role player. We allow a lexical item to be not just a single word, but a string that may or may not form a constituent and may or may not be continuous (such as *look after* or *take . . . to task* or *off his rocker*):

(1-16) *Head of a predicate*: The lexical item which assigns a theta role to the role players of a predicate containing that lexical item is the head of that predicate.

(1-121) *Subject Role Player*: The external argument of a lexical item at SS is the subject role player of the predicate headed by that lexical item.

(1-122) *Subject Role Player of N*: If an N takes only one argument in the lexicon, that argument is the subject role player of the predicate headed by the N.

If an N has no external argument at SS but does have a genitive argument, the genitive argument is the subject role player of the predicate headed by the N.

Condition: (1-122) holds only if (1-121) does not apply.

(1-129) *Subject Role Player of N – definition two* – The agentive argument of an N is the subject role player of the predicate headed by the N.

Condition: (1-129) holds only if (1-121) and (1-122) do not apply.

(1-46) *Principle of Coincidence*: The arguments of a lexical item are the role players of the predicate headed by that lexical item.

(1-109) *Direct Theta Assignment*: A lexical item assigns a theta role to its sister arguments.

(1-110) *Compositional Theta Assignment*: A lexical item assigns a theta role to its prepositional arguments.

(1-117) *External Theta Assignment*: A lexical item may assign a theta role to at most one argument that is external to the maximal projection of (the head of) the lexical item.

- (1–135) *Theta Criterion*: Every argument of a lexical item is assigned one and only one theta role by that lexical item.
Every theta role of a lexical item is assigned to one and only one of its arguments.
- (1–136) *Functional Criterion*: If an XP receives a theta role from two non-intersecting sources, then it must be the subject role player of at least one of those sources.

We did not set aside any formulation of the Projection Principle as a numbered example. However, we took the Projection Principle to require that lexical properties be reflected in the syntactic levels by syntactic entities, where syntactic entities need not fill GFs, but must be able to function syntactically. Thus we see implicit arguments as no problem for the Projection Principle. We noted, however, that the so-called aspectual verbs call for a revision of the Projection Principle to the effect that the grammar must allow role players to be attracted into an event structure via the syntactic mechanism of embedding (where the aspectual verbs take an embedded clause). I leave the exploration of the details of this revision for future research.

The next chapter discusses the restrictions on coindexing a predicate with its subject role player, which is a core part of a predication theory.