Semantics and syntax

Parallels and connections
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Preface

Writing this introduction last, I confess to some surprise at the completed text. The book began as an exercise in defending localism as a theory of semantics, or part of a theory, and has developed into a sketch of a general framework for the handling of syntax, morphology and semantics. It has also turned into an indirect statement of the view that linguistics is an independent discipline and not a branch of cognitive psychology or formal semantics – which is not to deny there are important links between these activities.

The basic themes of the book are that syntax and morphology provide important clues to semantic structure, that semantic structure is far more complex than syntax and far more complex than many analysts realise, and that semantic structure should be based on the notions of location and movement.

The consequence of establishing very abstract semantic structures is that three sets of rules are required in a grammar: rules that generate words and sentences, rules that generate semantic structures, and rules that connect the two sets of structures. Chapter 1 sketches a grammar of syntax and morphology and is important, not just because it describes one-third of the potential model, but because it shows where localism applies in a grammar and what localism is compatible with. It develops the idea that descriptions of syntax should be concerned, not with semantic matters such as co-reference and control of infinitives, but with constituent structure groupings and dependency relations. It is argued that grammars of syntax and the representation of syntactic structure can be simplified, though at a cost: the greater complexity of the semantic component.

Chapter 2 establishes the greater complexity of semantic structure via an examination of prepositions, particles, adverbs and verb prefixes. Localism comes on stage in Chapter 3, and it must be emphasised that Chapter 2 is not based on localism and to that extent is independent of Chapter 3.

Chapter 4 develops the localist theory further by demonstrating its application to a single verb of English, GET, that occurs in a number of constructions.

Chapter 5 describes the connections between syntactic structures, with a variety of categories, and semantic structures, with only two categories: entity and relator. Chapter 5 considers the sort of rules that might map semantic structures onto syntax. The essential proposals are that the basic semantic structures are purely relational, and that the mapping rules crucially involve rules of reference, rules of predication and rules of modification. The model thus incorporates Searle's view that reference and predication are speech acts, and adds modification to the list. This move enables the model to take parts of speech defined on distributional grounds and provide semantic correlates for each one in terms of its denotation or with respect to the role it plays in reference, predication and modification or subordination.

If the model has any merit, some of it derives from the fact that it draws together many of the key concepts of traditional grammar and modern linguistics. At the same time, it pays attention to the properties of linguistic codes and contains semantic structures that are relevant both to the statement of truth conditions and to psycho-linguistics and cognitive psychology.

No rules have been formulated, except in the section on morphology. The goal has been to work out the necessary components of the model, determining the nature of the basic semantic structures and finding a niche for reference, predication and modification. I believe that it is possible, and indeed desirable, that linguists discuss substantive issues and occupy themselves with the content of potential rules without becoming bogged down in purely formal details. It must be recognised, however, that the discussion gains a great deal precisely because of the pioneering work on formal issues by Harris and Chomsky.

My immediate debt as a linguist is to John Lyons, who encouraged his students to see linguistics as more than whatever theory was currently fashionable and whose influence is obvious in Chapters 3 and 5. John Anderson introduced me to localism and dependency theory. I am particularly grateful to Roger Lass, who has commented on various drafts of Chapters 2 and 4, and to Keith Brown and George Yule for helpful discussion and advice.

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1 *On morphology and syntax*

1.1 Introduction

I assume that the main task of a syntactic description is to account for constituent structure and dependency relationships between constituents. I will argue that the account should be as simple as possible, using mostly phrase-structure rules and the lexicon, and employing transformations, if at all, only sparingly. Any transformations that are used are unordered and optional.

The above statement of intent would not look out of place in Chomsky's recent papers, but appearances are misleading. It will emerge that I share the views expressed by Matthews (1979), that a generative grammar is not a direct description of the ideal speaker–hearer's competence – or of anybody's competence – but is a statement of syntactic and morphological regularities. Correspondences between the linguist's account and the psycholinguist's will be pleasing, but they must be demonstrated, not simply assumed. (I am in fact confident that such correspondences exist.)

Another difference is that I reach the paradise of no rule ordering and all rules optional by a different route from that taken by Chomsky. Chomsky achieves his goal by fiat – let there be no ordering, no obligatory rules, no more than one element of the context specified – and by adding filters, constraints (at least, more complex constraints) and case features, controlled by the relation of government, based on configurations of constituents. The old analyses of auxiliaries and infinitives, for instance, are still visible, with tense a separate deep-structure constituent and infinitives still seen as being derived from sentences.

My route to a manageable model lies in a reanalysis of auxiliaries, infinitives and gerunds, attention being paid to distribution. Tense is not a separate constituent, infinitives and gerunds are not derived

1

from sentences, and all morphology is handled in the lexicon. Consigning both inflectional and derivational morphology to the lexicon is not unusual nowadays, though it has certain consequences for the syntax that are not mentioned in recent work such as Lieber (1981).[1]

My principal concern in this book is with descriptive adequacy. I should, however, say something about the criterion of explanatory adequacy, since the latter is the touchstone of success for many generative linguists. I will deal with explanatory adequacy in 1.5, from which it will emerge that, like a growing number of linguists and psycholinguists, I have grave doubts about the way in which the notion has been exploited. First, however, I present a descriptive framework for morphology and syntax, drawing on recent work in these areas.

1.2 Morphology

The treatment of morphology is a suitable starting point. The decision to confine morphology to the lexicon has important consequences: it removes various transformations whose presence caused problems for rule ordering while making rule ordering necessary, and it enables us to declare ordering *machina non grata* without destroying our capacity to write explicit rules.

These simplifications can be used as arguments for morphology in the lexicon, but we are merely returning to the traditional way of describing word structure separately from syntax. It is the standard method of description in practical grammars of any language where words with internal structure can be established and is implicit in the classic handbooks of descriptive linguistics such as Bloomfield (1935) and Hockett (1958). The mixing of morphology and syntax comes from Harris, who presented Tense as an independent constituent in his 1957 paper on co-occurrence and transformation but had adumbrated that analysis and the removal of the syntax–morphology boundary eleven years before (Harris, 1946).

The key to a lexical treatment of derivation and inflection is to list forms in the lexicon and to enter them directly from the lexicon into the phrase marker. Features such as [+Past], [+Prog] (for progressive), [+Modal], etc. express the necessary morpho-syntactic information and enable the grammar to state the correct order of

auxiliaries, to handle number and person concord and to capture the fact that auxiliaries and main verbs are different subtypes of verb, but all verbs.[2] No transformations are needed; in particular, the Affix-Hopping rule of standard transformational grammar (first introduced by Chomsky, 1957: 39) vanishes and peculiar constituents such as EN, ING and Tense are absent.[3]

1.2.1 A description of inflectional verb morphology in English.

The details of the morphological analysis are these. Stems are entered in the lexicon, each one with a set of features, and also in the lexicon is a set of rules that build word-forms by adding affixes to stems. To illustrate how the system works, I repeat the essential points given in Brown and Miller (1982: Ch. 12), after which I say why I prefer this system to the one proposed by Lieber (1981). To avoid syntactically irrelevant complications of phonological rules and abstract underlying forms Brown and Miller dealt with written English and that policy is continued here.

The stem features required for present purposes are $[+V]$, $[\pm Aux]$, $[+Modal]$, $[+Prog]$, $[+Perf]$, $[\pm Past]$, $[\pm sg]$, in addition to which certain subcategorisation frames are needed. Let us suppose too that the lexicon has rules such as those in (1), and that among the stem features are some, for example, $[+Rule\ 1]$, that refer to the rules. $[+Rule\ 1]$ indicates that Rule 1 applies before the stem is entered in the phrase marker. Rule 1 and the other rules add inflectional affixes to the stem.

(1)　　Rule 1: $X \Rightarrow X\textit{ed}$　　(where X = stem)
　　　　Rule 2: $X \Rightarrow X\textit{ing}$
　　　　Rule 3: $X \Rightarrow X\textit{s}$

$[+V]$ is a category feature, indicating, as in the Standard Theory, that the stem concerned attaches to a V node in the phrase marker. $[\pm Aux]$, $[+Modal]$, $[+Prog]$ and $[+Perf]$ and certain subcategorisation frames enable the system to express the view that auxiliaries and main verbs are all different types of verb, and to generate the correct orderings of auxiliaries and main verb. For example, BE has $\{[+V], [+Aux], [+Prog]\}$ and $\{[+V], [-Aux]\}$ (the second set of features relating to the main verb usage as in *John is tall*); CAN, like all modal verbs, has $\{[+V], [+Aux], [+Modal]\}$; HAVE has $\{[+V], [+Aux], [+Perf]\}$ and $\{[+V], [-Aux]\}$ (the latter set of features

relating to the main verb usage as in *John has a car*); RUN, like all main verbs, has $\{[+V]\}$.

The correct order of auxiliaries and main verbs is captured by sub-categorisation frames. Modal verbs have the frame $[+[_{VP}[\_\_ V (X)]]]$, indicating that any stem with this feature is inserted into the VP in the first position.[4] For present purposes I regard the VP as consisting potentially of up to four verbs, i.e. as having the structure $_{VP}[V\ V\ V\ V]$. This structure does not take account of the passive, which will be dealt with shortly. Nor is it necessarily the best structure for the VP sequence, a question that will be examined in connection with dependency relationships in 1.3. However, neither of these points affects the general idea of determining order by means of subcategorisation frames.

Various subcategorisation frames are required for the forms of HAVE and BE. HAVE, or the stem form *have*, has the frames in (2).

(2) a. $[+[_{VP}[\_\_ V(X)]]]$ b. $[+[_{VP}[\underset{[+Modal]}{V} \_\_ (X)]]]$

    c. $[+[_{VP}[\_\_ NP]]]$ d. $[+[_{VP}[(\underset{[+Modal]}{V})\ \underset{[+Prog]}{V} \_\_ NP]]]$

    e. $[+[_{VP}[\underset{[+Modal]}{V} \_\_ NP]]]$

Frames (2a, b) relate to the perfect *have*, which either occurs first in the VP sequence, as in *have eaten*, or takes second place after a modal, as in *might have eaten*. Frames (2c, e) relate to the main verb *have*, which is followed by an NP and occurs either first in the VP sequence, as in *have a car*, or after a modal verb, as in *might have a car*. Frame (2d) relates to phrases such as *(might) be having a party*, which contain not *have* but *having*. Although frame (2d) appears in the lexical entry of the stem *have*, Rule 2 in (1) applies, so that the form inserted into the phrase marker is *having*. We will see shortly how Rule 2 is brought into play.

The forms *has* and *had* require the frames (2a, c). *Has* and *had*, being irregular, are listed in the lexicon, not derived by rule, and the oppositions between *has* and *have* and between *has/have* and *had* are handled by tense and number features to be introduced below.[5]

BE is treated in a similar fashion to HAVE, in that the irregular forms *been, is, are, was, were* are listed. *Being* is derived by Rule 2 in (1), but the appropriate subcategorisation frame $[+[_{VP}[\underset{[+Prog]}{V} \_\_]]]$

appears in the entry for *be*, since *being* is derived from *be* by the application of the rule when appropriate. The form *be* has the frame $[+ [_{VP}[\quad V \quad \underline{\quad}]]]$ to account for *He might be ill* and *been* has the
 $\quad [+\text{Modal}]$
frame $[+ [_{VP}[\quad V \quad \underline{\quad} X]]]$, for phrases like *has been ill*.
 $\quad [+\text{Perf}]$

These frames specify what precedes the BE form. All forms of BE can be followed by a verb, as in *was writing*, by an adjective, as in *was ill*, by an NP, as in *was a soldier*, or by a PP, as in *was in Llangollen*. The frames for the complements of BE are in (3).

(3)

a. $\left[+ \left[_{VP}\left[\underline{\quad} \begin{Bmatrix} A \\ NP \\ V \\ PP \end{Bmatrix} \right] \right] \right]$
     b. $\left[+ \left[_{VP}\left[\underline{\quad} V \begin{Bmatrix} A \\ NP \end{Bmatrix} \right] \right] \right]$

(3b) allows for *is being polite* and *is being a fool*. These two frames are necessary for all BE forms – assuming that *has been* is a grammatical sequence – and it might seem that the frames should each occur six times in the lexicon, once with each of *be, is, are, was, were* and *been*. To avoid such repetition, all the forms of a particular lexeme are gathered under one address in the lexicon, the address being the representation of the lexeme, in this case BE. Immediately under the address are put the features relating to all the forms; in this case [+V], [+Cop] (for copula), and the subcategorisation frames in (3).

Below the generally applicable features come the various stem forms and the features relevant to each individual stem form. That is, the subcategorisation frames showing the complements of BE forms are stated once, under the address BE, and by convention each listed form, *be* or *was*, etc., picks up these frames. By contrast, the frame showing what precedes the BE form is peculiar to each individual item; for example, $[+ [_{VP}[\quad V \quad \underline{\quad}]]]$ appears underneath *been*.
 $\quad\quad\quad\quad\quad [+\text{Perf}]$

This technique will be applied to all lexical entries. The converse convention is that if a form is supplied with a frame or feature contradicting a form or feature attached to the general address, the latter is overridden. One case of overriding is in the entries for passive verb forms. Passive forms are treated here as adjectives, i.e. they have the category feature [+A], but they are listed under the entry for the associated active verb forms in order to capture the relationship between the active and passive forms.

Tense is marked on verb stems by the feature $[\pm \mathrm{Past}]$. This captures the generally accepted view that English, at least, has no category of future tense.

Number is also marked on verb stems, by means of the feature $[\pm \mathrm{sg}]$. From a semantic point of view this treatment appears odd, because number (in the sense of cardinality) is, according to the tradition, a property of objects, and since nouns denote objects, grammatical number should be assigned to nouns, not to verbs, and verbs should agree with nouns in grammatical number. From a purely syntactic viewpoint, in a description concerned primarily with generating morpho-syntactically correct combinations of nouns and verbs (*inter alia*), there is no reason why number should not be assigned to verbs and the nouns made to agree with the verb.

The advantage here is that this approach makes it possible to handle number concord in a straightforward non-transformational fashion in a lexicalist framework. It also fits in well with the verb-dependency analysis advocated in 1.4. (For a discussion in another framework see Benveniste (1946), and note that both Bloomfield and Hockett implicitly recognise the problem of number agreement by talking of cross-reference rather than of number concord or government.)

How exactly does a verb marked, say, $[+\mathrm{sg}]$, acquire a singular subject noun and the third person singular affix -*s* if the subject noun is third person? The answer is to use a selectional frame specifying that the noun to the left of the verb in an active construction is $[+\mathrm{sg}]$: $[+ [(\mathrm{Det})_\mathrm{N}[+\mathrm{sg}]\_]]$. This frame ensures that the N to the left of the verb is marked $[+\mathrm{sg}]$, as in Fig. 1, and by convention only a $[+\mathrm{sg}]$ noun form can be taken from the lexicon, as the features on a node in a phrase marker must match the feature of a stem form in the lexicon.

If the verb stem form is $[+\mathrm{sg}]$, Rule 3 in (1) applies, adding -*s*. But is there a guarantee that a $[+\mathrm{sg}]$ verb stem has associated with it the appropriate selectional frame? Does the frame have to be stated in the entry for every $[+\mathrm{sg}]$ verb stem? And does Rule 3 always apply when, and only when, necessary? These problems are solved by the use of redundancy rules. As in the standard model, redundancy rules state that feature X requires the presence of feature Y, but whereas in the standard model such rules were used only for inherent features of nouns, for example $[+\mathrm{Human}]$, here their scope is extended to subcategorisation and selectional frames. The rules are also allowed
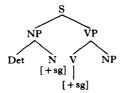
Fig. 1

to contain conjunctions of features, on the ground that a particular feature may be predictable from a combination of other features rather than from just one feature.

The problems arising from number concord are handled by the redundancy rules in (4).

(4) a. $[\alpha sg] \Rightarrow [+[_{NP} Det_N[[\alpha sg]]]\_\_]$
     b. $[-Past] \& [+sg] \Rightarrow [+Rule 3]$

Rule (4a) states that whatever the value of [sg], it is transferred to the noun to the left of the verb by the selectional frame summoned by the redundancy rule. Rule (4b) states, in effect, that -*s* is added to stem forms of non-past singular verbs provided they are not modal. Modal verbs are excluded by the simple fact that their lexical entries do not contain $[\pm sg]$. The rule also does not apply when irregular forms are listed in the lexicon, such as *is*, *has*.

Other predictable information can be eliminated from lexical entries by redundancy rules. For instance, the stem form of every main verb can occur in various environments: after a modal verb, after the progressive BE, after the perfective HAVE or on its own, possibly followed by an object NP. This information is stated by the redundancy rules in (5).

(5) $[+V] \& [-Aux] \Rightarrow [+_{VP}[\quad V \quad \_\_ X]] \& [+_{VP}[\quad V \quad \_\_]]$
     $_{[+Modal]} _{[+Prog]}$

     $\& [+_{VP}[\quad V \quad \_\_]] \& [+_{VP}[\_\_ (NP)]]$
     $_{[+Perf]}$

If a main verb stem does occur after the progressive BE or perfective HAVE it acquires the affixes -*ing* or -*ed*, supplied by Rule 2 and Rule 1 in (1). The redundancy rules are stated in (6).

(6) a. $[+_{VP}[\quad V \quad \_\_]] \Rightarrow [+Rule 2]$
     $_{[+Prog]}$
     b. $[+_{VP}[\quad V \quad \_\_]] \Rightarrow [+Rule 1]$
     $_{[+Perf]}$

Because of the redundancy rules, the lexical entries are very concise, most of the frames and rule features being called up by the redundancy rules.

The correct positioning of tensed verb forms has not yet been regulated. One major argument for the old rule of Affix Hopping was that it expressed the fact that tense is marked on the first constituent of the verb phrase. This formulation, and others like it, reflected and reinforced the idea that tense was an independent constituent, to be moved around by transformations. A formulation more appropriate to the present description is to say that the first position in the verb sequence must be filled by a tensed verb form, which translates into the redundancy rule in (7).

(7) $[+_{VP}[\underline{\quad} (X)]] \Rightarrow [\pm Past]$

That is, the verb form might be followed by no constituent or by various sequences of constituents, but the important point is that the verb form is in first position in the VP.

Another reason for the Affix-Hopping rule was that in the *Syntactic Structures* model (Chomsky, 1957), rules applied to strings of internally unstructured categories or morphemes. Since the idea that categories need not be thought of as unsplittable atoms appeared only with the development of the Standard Theory, the notion of 'tensed verb form' had to be interpreted indirectly in the *Syntactic Structures* model, in terms of a tense morpheme adjacent to another category. For a discussion of auxiliary verbs, main verbs and Affix Hopping, see Huddleston (1976: Ch. 5).

If we wanted to capture the fact that the distinction between singular and plural is relevant only to non-past main verb stems in English, we could express it by the redundancy rule in (8).

(8) $[-Past] \& [-Modal] \Rightarrow [\pm sg]$

Only $[-Modal]$ is mentioned and not $[-Aux]$, because the auxiliaries HAVE and BE do have different singular and plural forms, but these, being irregular, are listed in the lexicon.

The system makes use of the standard devices in the standard model: features, subcategorisation frames, selectional frames and redundancy rules. It can easily be extended to handle the complex

inflectional morphology of other languages – the matter is simply one of detail, possibly very great detail, depending on the language. It can also capture important correlations between classes of items and syntactic or morphological characteristics. Suppose a language had a class of stative verbs that occurred in particular syntactic environments and whose forms had special inflections. The inflectional endings would be added by rules of the sort exemplified in (1) and the feature [+Stative] would call up, via a redundancy rule, the features relating to the morphological rules and the subcategorisation features stating the syntactic environments.

1.2.2 Lieber's model of morphology. The inflectional morphology of English, then, can be dealt with in a lexicon provided with a set of morphological rules adding affixes to stems. This treatment of morphology differs somewhat from the treatment in Lieber (1981), which is currently the only readily accessible, detailed, systematic account of morphology within the framework of generative grammar – though it draws on previous pieces of research by Siegel (1974) and Williams (1981). Some words of explanation are required on the differences between the two frameworks.

Lieber's central idea is very attractive: there is a single context-free rewrite rule generating unlabelled binary branching trees representing the internal structure of words. All stems and affixes are entered in the lexicon appropriately labelled and with the appropriate features. To take an English example, the prefix *en-* would have as one of its labels $_V[\_\_\_ _N[$, indicating that it is added to a noun to derive a verb, as in *enrage*. *Rage* would have the labels $_V[\_\_\_]_V$ and $_N[\_\_\_]_N$, indicating that it can fill either a verb or a noun slot. *-ed* would have the label $]_V\_\_\_]_V$ and the feature [+Past]. (Remember in the system proposed here [+Past] is a feature of the stem form, [+Past] calls up [+Rule 1], and *-ed* is added to stems by Rule 1. *-ed*, that is, is not listed in the lexicon.)

The unlabelled tree representing the structure of *enrage* is shown in (9).

(9)

The three forms are entered from the lexicon, taking their labels with them, as shown in (10).