# The Limits of Subcategorization

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## I. INTRODUCTION

Any theory of language structure must include a sub-theory concerned with the restrictions that a lexical item may impose on its complements—e.g. restrictions which commonly refer to such things as morphological case, word order, syntactic category or features, lexical item, semantic role and other semantic properties.[1] The examples in (1) are representative of the various possibilities.

(1a)  In German, *folgen*, 'to follow', requires its object to be in the dative case.

(1b)  The object of *notwithstanding* may precede it.

(1c)  The object of *discuss* must be a noun-phrase (its meaning notwithstanding, it cannot be a clause).

(1d)  The verb after *have* may be a perfect participle.

(1e)  The complement of *want* may be the word *to*; that of *depend* may be the word *on*.

(1f)  The object of the verb *like* supplies the 'source' of the feeling referred to, whereas it is the subject of *please* that does so.

(1g)  The object of *scramble* (normally) refers to one or more eggs.

A wide range of interesting theoretical questions arise in connection with what I shall call *subcategorisation restrictions*—the restrictions which can be imposed by a lexical item on its complements. Those in (2) are a sample.

(2a)  Are all the properties of a complement available to be referred to in subcategorisation restrictions?

(2b)  Is the range of properties available to subcategorisation restrictions the same as the range available to syntactic rules (or, more generally, to rules of any kind, whether syntactic or lexical)?

(2c) Are there any properties which *must* be included among those referred to by the subcategorisation restrictions?

Some such questions will be given very different answers according to what other assumptions are included in the same general theory. For example, the answer to (2b) must depend heavily on what kinds of rules are envisaged, and what their formal properties are. However, others seem less theory-bound, and correspondingly more open to empirical investigation; and because of this, once we have answered them we can use our answers to evaluate theories: do they predict, explain or even allow our answers?

One such question is (2a), and it is already reasonable to launch a tentative answer to it, the 'Externals only' hypothesis.

(3) *Externals only hypothesis*

A subcategorisation restriction must not refer to the internal structure of a complement.

If we assume that complements are single words, then this hypothesis predicts that no subcategorisation restriction will refer to the morphological or phonological structure of that word, as such (in contrast with what I shall call *lexeme-based restrictions*, which pin the complement down to some particular lexeme, such as *to* or *on* in (1e)). For instance, no language will have a verb whose object must (e.g.) contain a suffix; or whose object must begin with a consonant. This hypothesis is clearly related to the hypothesis that such properties cannot be referred to by syntactic rules and leads to some interesting lines of thought in connection with question (2b). If it is true (as it is, so far as I know), then it would be nice to know why. A good theory of language would give an answer; for instance, it might be that 'lexical insertion' of complements takes place after that of their governors, so their phonological and morphological structures are not available at the relevant stage of derivation. Unfortunately for our quest for an explanation, this particular one involves a theoretical framework which has now been generally abandoned in favour of a 'static' view of rules as well-formedness conditions. An alternative explanation may one day emerge, but at present all our available theories (including, alas, my own) score zero marks for this question.

The purpose of this paper is to discuss the answer which is often given, or at least assumed, for question (2c). The question is whether there is any general type of property which *must* be included among those referred to in any subcategorisation restriction. I have formulated

the answer as the 'Categorial necessity' hypothesis:

(4) *Categorial necessity hypothesis*

Any subcategorisation restriction must include reference to the complement's syntactic category.

The term 'syntactic category' is not meant to be taken in contrast with 'syntactic features', though it was so taken until the development of X-bar theory. The salient point about this hypothesis is that it requires any subcategorisation restriction to be equivalent to a statement of the form "The R of W is a C with the following properties: . . .", where R stands for a relational category (a so-called 'grammatical relation'— (1)), W stands for the lexical item concerned, and C stands for some syntactic category.

This hypothesis seems to be implicit in all the widely accepted theories (Government-and-Binding Theory, Generalised Phrase-Structure Grammar, Lexical-Functional Grammar, Categorial Grammar, Functional Grammar), though it is hard to find explicit discussions of it. For example, it seems fair to assume that it is part of the theory presented in Chomsky 1965 [2], where a lexical item cannot be inserted into a sentence structure unless the sister categories are among those specified by the item's strict subcategorisation features (ibid: 121). If some item had a subcategorisation restriction which made no reference to syntactic category, it could not have any strict subcategorisation features, and could never be used in a sentence (so it could never be learned, and could not exist). Similar assumptions are accepted in the other theories mentioned above. If it can be shown that some lexical items have complements which cannot be assigned to any syntactic category at all, serious consequences will presumably follow for other assumptions included in these theories.

## 2. THE PROBLEM OF GO

The most obviously problematic case is the verb *go*, which allows as complement any kind of noise or even noiseless action performed by the speaker [3]. Such examples are of course hard to quote in writing, but they are very familiar from spoken language. The following examples are suggestive.

(5a) The car engine went [brmbrm], and we were off.
(5b) The boy who had scratched her Rolls Royce went [rude gesture with hand] and ran away.

(5c)  Whenever he sees a pretty girl he goes |wolf whistle| without really thinking about it.

(5d)  When you've finished, just go [belch] and I'll know you've had enough.

Such sentences are clearly grammatical by any criteria, in contrast with similar sentences in which *go* is replaced by other verbs (e.g. *come, move, do* and *say*, to take some of the most likely candidates).

(6a)  *The car engine came [brmbrm], and we were off.
(6b)  *The boy who had scratched her Rolls Royce moved |rude gesture with hand] and ran away.
(6c)  *Whenever he sees a pretty girl he does |wolf whistle| without really thinking about it.
(6d)  *When you've finished, just say [belch] and I'll know you've had enough.

They also contrast with ungrammatical sentences in which the parenthesised events are absent; so none of the following may be taken in the same sense as the corresponding examples in (5).

(7a)  The car engine went and we were off.
(7b)  The boy who had scratched her Rolls Royce went and ran away.
(7c)  Whenever he sees a pretty girl he goes without really thinking about it.
(7d)  When you've finished, just go and I'll know you've had enough.

Similarly, it would not do to say one of these sentences while the event concerned was being performed by its original performer—e.g. I cannot say (5a) while the car itself is making the [brmbrm] noise, and not make the noise myself.

These facts together show clearly that the lexical entry for *go*, alone among the verbs of English, refers to this kind of non-linguistic event, and must say something like (4):

(8)  *Go* (in one of its interpretations) takes an obligatory complement which is a non-linguistic event performed by the speaker.

It should be clear that the facts about *go* conflict with the Categorical necessity hypothesis, if we accept the formulation in (8) as the basis for the entry for this verb. If major theoretical issues hang on the truth or falsity of this hypothesis, we should consider some of the ways in which the facts might be reconciled with standard theories.

First, we could point out that the problem is extremely peripheral to the system of English. Only one verb is involved, and most of us could probably go for months on end without ever saying sentences like those in (5). (We shall see shortly that other verbs may occur with non-linguistic objects, but *go* is the only one for which a specific mention of such objects is needed in the lexical subcategorisation.) These observations are of course quite true, and they explain why such constructions have received so little attention from linguists. However, we still have to explain why the sentences in (5) contrast with those in (6) and (7), and this explanation must be compatible with whatever linguistic theory we adopt for explaining other, more central, facts about language. So we cannot simply ignore these constructions.

A related idea is that sentences like (1) contain 'marked' constructions, and that we should expect all sorts of oddities among marked constructions which we can exclude from the unmarked 'core'. Again this is undoubtedly true, and I am in no way suggesting that sentences like (5) should be taken as typical of language. The complement of one linguistic expression is normally another linguistic expression, and this fact should certainly be respected in our theories. However, such sentences are extremely easy for children to learn (at least some children produce utterances like *pig go* |*snort*| very early in life), which suggests that markedness in this case may not relate to order of acquisition. And in any case, the theory of language still has to accommodate these constructions, even if they are marked, because there are theoretical constraints even on marked patterns—such as those formulated in the 'Externals only' hypothesis of (3). In other words, sentences like (5) are within the outer boundaries of language, and must be allowed by a theory of language structure even if it also distinguishes them from the most normal or unmarked sentence types.

Another possible tack is to claim that the non-linguistic events in (5) are in fact syntactically classifiable as phrases of a rather special type. This suggestion has been made to me several times in discussion, but it always seems to have very little content. Consider the analytical problems that would have to be overcome before we could claim that the event can reasonably be represented by some kind of phrasal node in a phrase marker. The first problem is to decide precisely what the feature-composition of this phrase should be, even in terms of major categories like 'noun' and 'adverb'. The choice seems somewhat arbitrary, since the phrase concerned has so little in common with any of the other phrase types—in fact, absolutely nothing in terms of its internal composition, and little in terms of external distribution. Maybe we could argue that it was an adverb-phrase, on the grounds that cleft sentences with *how* are marginally better than those with *what*:

(9a) *What the car went was |brmbrm|
(9b) ?How the car went was |brmbrm|

However, since these expressions cannot occur except as complement with *go*, they cannot be used in any of the familiar positions for noun-phrases or adverb-phrases. Accordingly, they would have to be restricted in some way to prevent them from occurring in any of these other positions, and this would require some kind of feature which would in effect mean "having none of the properties of an X-phrase, in spite of being called an X-phrase". This feature would be mentioned positively only in the entry for *go*, and would be tantamount to saying that these expressions are phrases of a unique kind, not subsumed under any of the standard phrasal features.

Another drawback with the suggestion is that it simply shifts the problem. Instead of worrying about how to refer to non-linguistic events in the lexical entry for *go*, we have to worry about how to refer to them in the rule for expanding the phrase-type in question. Do we assume that the events concerned are heads of their phrases? If so, do we assume that they are listed in the lexicon? Surely not. Whichever way we turn, we find the same problem: the 'expressions' represented by the unique phrase-type are different from all other expressions mentioned in the grammar, and cannot be handled by the main-stream theories of grammar as they stand.

A variant of the same idea is that these special types of expression might be represented as special types of phrase—labelled 'citation' or some such—with no attempt to fit them into the framework of general categories applied to other phrases. Finer distinctions could then be made within this category by means of features, which could be used e.g. to distinguish between non-linguistic events and quoted speech. The trouble with this suggestion is that it leaves the problem unsolved. The special category would be different from all other categories referred to in a grammar: it would not be a category of linguistic expression, but would straddle the distinction between language and non-language; it would need special rule-types for defining the internal structures of its members (which clearly could not be listed in the lexicon, since there are infinitely many of them); and some of the elements out of which the members are made up would be non-linguistic and therefore would need further unique categories for classifying them. All in all, this proposal does not seem to suggest a fruitful line of inquiry.

A final avenue to be explored is that sentences like (5) can be 'left to the pragmatics'. It is certainly true that a theory of pragmatics should

be able to contribute most of the explanations for the intertwining of speech and non-speech. For example, Deirdre Wilson has suggested (personal communication) that there are some situations in which it is better to show the hearer something, by a direct demonstration, than to tell them about it. Thus, if you want to insult someone it may well be pragmatically better to say *X to you*, where X is a rude gesture, than to say *I despise you* or the like. Examples like this are important and it would be disappointing if a pragmatic theory could not explain them.

However, a general theory which could explain such examples would still not be able to explain the kinds of example we have been discussing here, in relation to *go*. The whole point of these examples is that there are idiosyncratic, parochial facts which must be included in the lexicon—namely, the facts about the subcategorisation of *go*. It seems most unlikely that any general theory will make this unnecessary, precisely because there is no general principle from which it follows that the verb which otherwise means 'go' can also be used in this way (not every language seems to have any such verb, but in those which do it is not usually the verb 'go' that is used; and there are even variations among English speakers as to the facts about *go*, as we shall see below).

I hope to have established that the rather simple facts concerning *go* at least constitute a prima facie problem for the standard theories. In particular they conflict with an assumption on which these theories are based, which is that linguistic expressions consist of nothing but linguistic expressions. I have shown that in some (admittedly peripheral) cases this is not so, since non-linguistic events occur as essential parts of well-formed linguistic expressions.

## 3.   LANGUAGE COMBINED WITH NON-LANGUAGE

The examples quoted in (5) conflict with another belief which is (I suspect) held even more widely than the 'Categorial necessity' hypothesis:

(10)   *The Linguistic purity hypothesis*

Sentences consist (ultimately) of words

This hypothesis is meant as a short-hand version of the proposition that whatever complex expressions are generated by a grammar (whether or not we call these 'sentences'—[4:21, 94]) can be analysed exhaustively as a string of words (plus, perhaps, an intonation contour;

this possibility is irrelevant to our present concerns). Words must, by definition, combine the properties most clearly associated with language—a pronunciation (or spelling), a meaning and some syntactic categorisation—so we can characterise them as linguistic objects' *par excellence*. If the 'Linguistic purity' hypothesis is true, then, a grammar generates structures which consist of nothing but linguistic objects, their combinations and their parts. Non-linguistic objects need never be included in such structures.

The hypothesis can be sustained for the vast majority of sentences, whether spoken or written, and it would be quite wrong to abandon it entirely in the face of a few peripheral examples. Nevertheless, it is falsified as it stands by the examples in (5). If these are grammatical—as they surely are—then they must by definition be generated by any accurate grammar of English. But this grammar must then be capable of referring to non-linguistic objects such as belches, rude gestures and imitation car noises. It must be able to refer to them in the subcategorisation of *go*, as we have seen, but more generally it must be able to refer to them in whatever rules or principles combine words with one another.

Assuming that this capability is available, we still have a great number of interesting theoretical questions to answer. In particular, can we find any limits to the use of non-linguistic objects in combination with linguistic ones? If we can, then the present discussion need not lead to a less restrictive and precise theory of language structure. Instead, it will be a theory of language structure in which non-linguistic objects are given a precise and limited place, but which is in other respects just as restrictive as it would be if we maintained the 'Linguistic purity' hypothesis.

For the present let us limit the discussion to the question of non-linguistic objects which are used instead of words—i.e. those for which a space is left, in time, among the words of the sentence (as in the examples of (5)). We can consider other kinds of non-linguistic object later. I should like to suggest the following hypothesis governing their use.

(11)    *The Non-linguistic apposition hypothesis*

A non-linguistic object combined with a word must be in apposition to it.

'Apposition' is the traditional name for a construction in which two expressions both have the same referent (e.g. *my brother John* contains two apposed noun-phrases which both refer to the same person). This

hypothesis claims that non-linguistic objects are eligible for inclusion in a sentence only if they are in apposition to some word in the sentence.

Consider the meaning of sentence (5a), *The car motor went* [brmbrm]. This refers to an event E which has the same properties as the [brmbrm], except that it involved the car, and not the speaker. (Obviously there is a good deal of metaphorical interpretation, and it would be more accurate to add *approximately* before [brmbrm], but the need for a pinch of salt is not unique to sentences like this so we can ignore it here.) In this respect the sentence contrasts e.g. with *The car went well*, in which *went* refers to an event and *well* just defines one property of that event. Thus it is reasonable to describe the relation between *went* and [brmbrm] as apposition—especially since there are plenty of precedents for apposition between verbs (e.g. A and B in the following are in apposition: *Be a good boy (A) and put your toys away (B)*, *Do (A) you like (B) syntax?*). The lexical entry for *go* will define the semantic relation accordingly.

The analysis which I am assuming is similar to that proposed by Halliday [5:134], in relation to phrases like *play tennis* and *sing a song*, where the verb has a 'cognate object' which in fact refers to the same event as the verb itself.

We can use this hypothesis to explain why other verbs do not allow non-linguistic objects as complements. Take *make*, for instance. This allows noun-phrases like *a noise* (e.g. *The car motor made a noise*), but the noise and the 'making' do not refer to the same event. Rather, the noise is the product of the making. Consequently they are not in apposition, and combining them would infringe our hypothesis. Similar remarks apply to other verbs.

We can now look elsewhere for examples of constructions in which a non-linguistic event occurs in apposition to a word. The obvious place to look is in the traditional home of apposition, the noun-phrase, and we are fortunate in that Jackendoff [6] is a discussion of precisely the kinds of example for which we are looking (though Jackendoff's concerns are different from our present ones). His examples include the following.

(12a)    the noise [raspberry, imitation of a goat, etc.]
(12b)    the pattern [da-dum da-dum da-dum]
(12c)    the noise he made, [*****]
(12d)    the symbol $

The relation is clearly apposition in all these examples, though Cram [3] denies this; it is not clear why he denies it, but the semantic relations are precisely the same as one expects in restrictive apposition. The

second element in the apposed pair is a non-linguistic object, though it is perhaps debatable whether this is true of the dollar sign.

The noun-phrases which contain the non-linguistic objects as well as their linguistic 'legitimizers' are just ordinary noun-phrases as far as the grammar is concerned. For example, they can be used after *discuss*, which only permits noun-phrases as its objects. (It also allows embedded interrogative clauses, but these are irrelevant to our present purposes.)

(13a)   We discussed the noise [raspberry]
(13b)   We discussed the pattern [da-dum da-dum da-dum]
(13c)   We discussed the noise he made, [****]
(13d)   We discussed the symbol $

Usually apposition involves two elements, either of which could replace the whole combination, but this is not true here. As predicted by the hypothesis, the above examples become ungrammatical (by my judgments at least) if we remove the linguistic parts of the object noun-phrases, leaving just the non-linguistic objects:

(14a)   *We discussed [raspberry]
(14b)   *We discussed [da-dum da-dum da-dum]
(14c)   *We discussed [****]
(14d)   *We discussed $.

The 'Non-linguistic apposition' hypothesis, then, looks promising. What it means is that although a linguistic theory must permit grammars to refer to non-linguistic objects, it must not allow such objects to occur freely among the words in a sentence. They can be smuggled in, as it were, only by means of the trick of apposition—you use an ordinary word as a kind of linguistic place-holder. The same trick is already familiar from within ordinary linguistic structure. For example, as we have seen *discuss* requires its object to be a noun-phrase, so we cannot use a clause after it; but a sentence like (15a) would be easily comprehended if used, and there are indeed occasions when it would be useful to say such things. To fill this communication gap, we add a more or less neutral noun such as *fact*, with the clause in apposition, and the ungrammaticality disappears:

(15a)   *We discussed that it was raining.
(15b)   We discussed the fact that it was raining.

Interesting confirmation of the 'Non-linguistic apposition' hypothesis comes from examples pointed out to me by Deirdre Wilson. In a

sentence like *With a [belch] he was gone*, the article *a* seems to be obligatory. Why should this be? It is hard to think of a general pragmatic principle from which it follows, but it does follow from the 'Non-linguistic apposition' hypothesis, provided we assume that the relation between a determiner and the following common noun is that of apposition. If we assume that the determiner itself has a referent, and that this referent is the same as that of the common noun, then (by definition) the relation is apposition; and it seems very reasonable to assume precisely such an analysis [4:90].

Let us assume, then, that we have a theory which allows non-linguistic objects to be referred to, and allows them to occur in combination with words according to the 'Non-linguistic apposition' hypothesis. Where else might we want to refer to non-linguistic objects, apart from where we allow them to combine with words? As soon as the question is asked, a great variety of answers suggest themselves. First, we have a number of non-linguistic objects which have many properties in common with words—e.g. a nod of the head is functionally very similar to the word *yes*[7:136f]. There is no reason in principle why we should not include these objects in a grammar, once we have allowed grammars to refer to non-linguistic objects. Second, there are non-linguistic objects which frequently occur when words are uttered—gestures, facial expressions, etc (ibid: 134ff); these occur in parallel with words, rather than instead of them, but they are clearly not independent of the words. This brings the whole range of 'proxemics' and body language within the potential scope of a grammar.

Third, and most important, the semantic structures to which a grammar refers must obviously make reference to non-linguistic objects. For example, the nouns which occur in apposition to them must have meanings which pick out the kinds of events and so on with which they can occur in apposition (e.g. we cannot use *noise* in apposition to $). The need to refer to non-linguistic objects is already obvious in semantics, but it is sometimes argued that since grammars cannot refer to non-linguistic objects, the parts of semantics where this is necessary must lie outside the realm of 'grammar'. We can now see that this conclusion is not necessary. Of course, individual workers may choose to exclude non-linguistic objects from their consideration as a matter of taste or expedience; but we can no longer argue that a grammar, as such, must not refer to non-linguistic objects.

## 4. THE WORD GRAMMAR SOLUTION

In this section I present a solution to the problem of *go*—the problem of providing a subcategorisation restriction which refers to non-lin-

guistic objects. It will exploit the theory called 'Word Grammar' (WG). WG is a theory of language structure in which linguistic knowledge is presented as a particular case of general knowledge. This is true in two respects. On the one hand the formal properties of linguistic knowledge can be shown to be similar to those of non-linguistic knowledge (4:35f). More importantly for our present concerns, however, our knowledge of language is itself part of a more general knowledge structure. This means that notions such as 'word' or 'speech sound' can be related to non-linguistic categories like 'action'. Of course, the same could presumably be said of any linguistic theory, but WG allows these connections to be made in a principled way.

Let us assume (with WG) that the two basic units of language structure are 'word' and 'speech sound'. What is a word? It is a particular kind of human action which consists of a sequence of speech sounds (and which has various other distinctive properties to which we shall return below). This allows us to see 'word' as part of a hierarchy, related to 'action', and via the latter to 'event' and ultimately to 'process' [ibid: 243]. (The term 'process' is borrowed from Halliday [5], to refer to the most general kind of 'state of affairs'.) Following recent work in WG [1, 8, 9] we can use semi-natural metalanguage to formalise this hierarchical relation:

(16) a.  word is an action
     b.  action is an event
     c.  event is a process

As a first approximation, we can now define the complement of *go* as something which is an action. This can be expressed easily in terms of the recently developed WG notation and terminology:

(17)  complement of *go* is an action

One of the implications of taking 'word' as a type of action is that the former should inherit all of the latter's properties, including the property of having an actor. This is of course correct, since the actor of a word is its speaker. We can exploit this fact in order to express the restriction that the complement of *go* must be performed by the speaker:

(18)  actor of complement of *go* is actor of *go*

Similarly, the times of *go* and of its complement are related, in an obvious way:

(19)  time of *go* precedes time of complement of *go*.

However, this constraint need not be stated explicitly because there is a general rule for English which requires complements to follow their heads [ibid: 103f]. This is an interesting example of the advantages of taking linear order specifically as temporal order (in contrast with the spatial order needed in written language). It would have been much harder to relate the complement-action to the verb if the latter's position had been defined in spatial terms.

It should be clear that WG makes it easy to state the necessary restrictions on the complement of *go*. Moreover, it is equally easy to define the meaning of *go* in such sentences, given that its relation to the complement is one of apposition. In WG, verbs, like other words, have 'referents' (mental entities, rather than real-world objects to which these correspond), so *go*, too, has a referent:

(20)  referent of *go* is a complement of *go* whose actor is referent of subject of *go*

In more expanded prose, "the referent of *go* is an instance of the complement of *go* in which, however, the referent of the subject of *go* occurs as the actor". For example, suppose Fred says *Mary went* [belch]. Here the actor of *went* is Fred, and so is the actor of [belch]; but the subject of *went* is Mary, so the sentence refers to an event which is like Fred's belch except that its actor was Mary.

Rule (20) is unusual in that it mixes up the levels of semantics and syntax [ibid: 134]: the referent of one word is defined as (a case of) its own complement. In this respect, however, these sentences are like self-referring sentences such as *The eighth word in this sentence is dog*.

If WG can cope this easily with our problem sentences, it could be objected that we have provided too much theoretical power. If even extraordinary sentences like ours can be accommodated, probably the same is true of virtually any pattern imaginable and WG loses any interest as a theory about language structure. A good theory will allow our problem sentences while at the same time indicating that they are quite untypical. This too can be done, again in a principled way, by WG; indeed, one of the most general principles of WG predicts the existence of deviant sentences, because the theory is centered round the notion of stored and normalised models of which particular cases may be more or less deviant instances [ibid: 14f]. The following brief explanation should help to make this clear.

As mentioned earlier, a complement is a particular kind of dependent. The latter is a particular kind of 'companion'—a co-occurring element. One of the characteristics of words is that they normally co-

occur with other words, and this normal pattern may be enshrined in rule:

(21)    companion of word is a word

Since heads and dependents are themselves particular cases of 'companion', it follows that they would normally be expected to be words. But it is always possible for a more particular rule to override a more general one (as, for example, the particular rules of irregular morphology override the regular ones); and this is what happens in the case of *go*. According to rule (17), the complement of *go* is an action— i.e. it is less restricted than would be allowed by rule (21). Therefore to that extent *go* and its actant are deviant, and untypical of language in general—precisely the picture that we want a theory to show.

In summary, WG has two attractions that are relevant to our problem sentences. It allows us to distinguish explicitly between typical and untypical constructions without recourse to the rather crude binary distinction between 'core', or 'unmarked', and 'periphery' or 'marked'. This is an advantage because we can characterise the problem construction as untypical but at the same time we can explain why it is so easy to learn (because it exploits non-linguistic categories which are already known).

The other attraction of WG is that it relates our categorisation of words explicitly to our categorisation of other, non-linguistic, categories of behaviour. In contrast, the standard theories present linguistic structures without reference to the structures of other kinds of behaviour, on the implicit assumption that the two kinds of structure are never combined (our 'Linguistic purity' hypothesis). The facts about *go* show clearly that this assumption is false.

## 5. THE PROBLEM OF REPORTED SPEECH

I have shown that some well-formed sentences contain non-linguistic objects, contrary to the predictions of the 'Linguistic purity' hypothesis. In some cases, namely where the non-linguistic object depends on *go*, the subcategorisation restrictions for the verb allow its complement to be a non-linguistic object. On the very reasonable assumption that syntactic classification does not apply to non-linguistic objects, it follows that the complement of *go* cannot be defined in terms of syntactic categories, contrary to the predictions of the 'Categorial necessity' hypothesis.

We now turn to a different class of exceptions to this hypothesis, which are in many ways similar to the constructions already surveyed: reported speech. Take the verb *say*. Its complement may be an instance of reported speech, but how should we show this fact in terms of subcategorisation restrictions? We might consider a syntactic category, the most obvious candidate being 'sentence', but this would be wrong because the complement of *say* need not be a complete sentence, can be more than one sentence (without coordination), and can indeed be just a string of unconnected words—in fact, it may be any string of words which may be uttered. The following examples suggest the range of possibilities.

(22a)   He said, "Well if I . . .", then stopped.
(22b)   He said, "I can't take any more. I'm going away. It's no good— you won't change my mind."
(22c)   He said, "Take. Taking. Took. Taken."

To make matters even worse, the reported speech need not even be in the same language as the matrix sentence, or may be ungrammatical instances of this language.

(23a)   He said, "Bonjour, monsieur. Je m'appelle Maurice."
(23b)   He said, "Me Tarzan. You Jane."

The problem is that all of these sentences must be accepted as well-formed, however deviant the contents of the reported speech may be.

It may seem that there are simply no constraints at all on the complement of *say*, but this is not so: it must be made up of linguistic expressions. For example, a belch or wolf-whistle would not do as completion of the sentence *He said . . .* Moreover, I think the constituent expressions must be recognisable as words, even if incompletely uttered ones. For instance, *He said -ing, -s, un-* strikes me as at least much worse than (12c). The word concerned need not be an ordinary one; it may be an interjection (e.g. *pst*), or even a nonsense word like *zimble*. All that is necessary is that it be the kind of object which one would be willing to call 'a word'; and of course any fuzziness in this category will be reflected in uncertainties in our judgments on sentences. For me, *He said [sigh]* is very much on the borderline, for instance.

· Various suggestions have been made for the treatment of reported speech. Cram [3] gives a useful critical survey of earlier attempts. He shows that the quotation must be integrated into the structure of the

quoting clause, but that it must be taken just as a 'syntactically opaque' (and therefore uninterpreted) string of words. However, he suggests that this can best be achieved by taking the quotation as a lexical item. This suggestion seems to face insuperable problems, not least of which is the fact that the lexicon would then have to be infinitely large. The basic problem remains that the quoted speech cannot be treated as part of the grammar which generates the main clause—and this remains true even if the lexicon is considered as the relevant part of the grammar. What is needed is some way of referring in this grammar to a precisely defined class of objects which are outside it.

Let us assume, then, that the generalisation to be captured is that the complement of *say* must be a string of words (from any language). At first sight it might seem that this ought to be easy to formalise in any grammar—after all, every grammar (nowadays) recognises word boundaries. Some theories include the category 'word', along with 'phrase', 'sentence' and so on—this is particularly true of Systemic Grammar [5]—and in X-bar Theory I assume that the corresponding category is $X^0$—i.e. any feature-bundle that has no bars at all. However, it is much harder to see how the notion "series of words" can be formalised in terms of the notation systems which are generally provided in these theories—and particularly if the words concerned are to be allowed to come from any old language.

WG provides a ready solution here too. The notion 'word' is of course extremely accessible, because it is the primary category of the theory, and 'is a word' is one of the (inherited) properties of any word. For example, *take* is related to 'word' via the hierarchy in (24):

(24) a. *take* is a verb
     b. verb is a word

'Is a word' is a property of 'verb', so it is also inherited by *take*.

WG also allows us to make the restriction neutral as to language, because (I assume) we distinguish languages by classifying our words for language [ibid: 5]; so *take* will also fit into the hierarchy of (25):

(25)      *take* is a English-word is a word

(This classification by language is clearly crucial in the case of a bilingual speaker.) Thus when we require the complement of *say* to be (made up of a series of objects, each of which is) a word, we allow it to come from any language.

It is also easy to capture the notion 'series of' in WG, where the notation '. . .' has precisely the required meaning. This is used at many

points in a grammar—to represent the meaning of plural or conjoined nouns, for instance [ibid: 197ff], to stand for a series of phonemes [ibid: 59] or to represent an indefinitely long chain of dependency links [ibid: 81]. In the more recent notation, we can capture the same notion by means of the term 'part of', as in the rule below, which expresses the restriction on the complement of *say*.

(26)      every part of complement of *say* is a word.

This very short rule implies a rule "*say* has complement with . . . as part", which by general convention need not be stated. With this implied rule, (26) covers all of the facts about *say* which I have outlined, and does so in a direct and natural way.

Let us now return to the analysis of *go* given in section 2. What is the relation between *go* (in this sense) and *say*? One apparent difference is in the number of elements allowed in each of their complements, but this is only because the analysis of *go* is incomplete. It too allows a series of events (as in *The car motor went [brmbrmptptpt brmbrm ptptpt]*), so we can revise the entry for *go* to bring it into line with that for *say* in this respect:

(27)      every part of complement of *go* is a action

A more important difference is that *go* allows non-linguistic events as complement, but *say* does not. Indeed, one could take the possibility of occurring after *say* fairly seriously as a test for 'word', as I hinted earlier. However, the relation between *go* and *say* is even more intimate than this analysis implies, because they are in complementary distribution: *go* not only *allows* its complement to be a non-linguistic event, but actually *requires* it to be non-linguistic. Thus sentences like the following are not permitted.

(28)      *He went, "How are you?"

Sentences like (28) should be possible if rule (27) is true, because *How are you?* (or rather, its constituent words) is an action. Consequently we need to impose an extra restriction by means of rule (29).

(29)      every part of complement of *go* is not a word.

A comparison of this rule with (26) shows that between them the two rules capture the complementary relation between the two verbs.

Interestingly, some people—e.g. my children—do not restrict *go* in

this way, but use it quite freely with reported speech, just like *say*. This is a natural development if the difference between the two verbs is due to an extra restriction on one of them. A grammar which contains rule (29) is more complex than one which lacks it (other things being equal), so the change—assuming that it is a change—is a move towards simplification.

We can even go on now to define the meaning of *say* itself, following the pattern of our analysis of *go* (rule 20). Take a sentence like *He said, "Hello!"*. This refers to an event in which he was the speaker (i.e. the actor) of the words in quotes, so the rule needed is the following.

(30)  referent of *say* is a complement of *say* with referent of subject of *go* as actor.

Notice how this analysis exploits the analyses given earlier. We have already required the complement of *say* to be a series of words, so it follows automatically that the event to which it refers consists of words too. Since a word is an action, this event must also be made up of actions, each with its actor, and because of this we can refer to the actor of the event without saying explicitly that it has one. It will be seen also that the relation between the verb and its complement is again apposition, just as in the case of *go*, so if it were not for the special constraint on *say* in (29), it too could be used with non-linguistic objects as its complement.

It could be objected that there are in fact some complements which could be used with either of *say* and *go* (even in the speech of those people who respect the general restriction on the complement of *go* in (29)). Imagine Fred is wanting to make fun of a particular way of speaking; in order to focus attention on the sounds and style rather than the content, he can use *go*, whose complement normally has no meaning: e.g.: *If you're singing for the D'Oyley Carte, you go [pedantic diction and stylised gestures] 'I am the very model of a modern major general'* (example supplied by Deirdre Wilson, together with its explanation). In this example *go* has a linguistic complement, contrary to the normal rule, but the deviation can be explained pragmatically. This kind of possibility is precisely what is expected in view of the way in which categories are used in WG—as resources to be exploited, rather than as scientific classification systems. A related possibility has been drawn to my attention by Mary Wood: a complement may be a mixture of words and non-words (e.g. "hurray [whistle] bravo [clapping]"), in which case either of *say* and *go* would be equally suitable (or unsuitable).

The analysis of *say* makes it possible to move on to an analysis of other verbs which also take reported speech, such as *whisper* and *mutter*. I take it that these require the same rule as *say* for restricting their complements, and also for linking the actor of the complement to the subject of the verb. However these verbs can be used without any complement to refer to a particular manner of speaking (e.g. *He was muttering*), i.e. a special type of verbal action. To cover such uses we need a set of rules such as these:

(31a)  referent of *whisper* is a whisper
(31b)  whisper is a word
(31c)  loudness of whisper is less-than average
(31d)  voicing of whisper is null

When a complement is present rule (31a) can still apply, with the effect of giving the referent of the verb two separate models: 'whisper' and the words contained in the complement. The event referred to has all the properties of the reported speech except for those which are overridden by other factors—namely, the identity of the speaker, and the manner of speaking. (Another difference, which I shall not discuss here, is in the times of the two sets of words; this can also be handled in a straightforward way with the help of WG.)

This discussion of reported speech has shown that if a verb is subcategorised as taking reported speech, this fact cannot be stated in terms of any of the normally available syntactic categories. It is true that the subcategorisation restrictions on reported speech refer to the syntactic category 'word', but this category is used in a completely different way from the way in which syntactic categories are normally used, because the internal structure of the reported speech is not constrained by the rules of the grammar which generates the rest of the sentence.

If the relation between *say* and the reported speech is again one of apposition, we might expect to find similar constructions among nounphrases. This expectation is confirmed by examples like the following, most of which are again taken from Jackendoff [6].

(32a)  the word *run*
(32b)  the sequence *up a*
(32c)  the syllable *pa*
(32d)  the phrase *the phrase*
(32e)  the French word *bon*

The second part of each of these noun-phrases is clearly similar to

reported speech in various respects, even though it is not in fact reported. It need not be a syntactic constituent (32b, c), and indeed may be a random sequence of words (32b); and it may be taken from a foreign language (32c).

It is obvious what constraint applies to the second part, given that its relation to the first part is apposition: the second part must be an instance of the concept defined by the first part. For example, (32a) is well-formed because *the word* refers to a word, and *run* is indeed a word. In contrast, we could not combine *the word* with *pa*, because the latter is not a word (and not even a potential word, for English at least; no doubt the acceptability of 'the word *pa*' would be much higher for linguists than for most English speakers).

We can easily generalise from these few examples. Any noun whose meaning is *metalinguistic* may be combined with any expression which is an example of the concept concerned. For simplicity let us call this expression the 'complement' of the noun. If the noun defines a standard syntactic category, then its complement must be an instance of that category—as in the following:

(33a)   the phrase *the dog*
(33b)   the preposition *in*
(33c)   the plural of the noun *dog*, (namely) *dogs*

Interestingly enough this restriction is imposed on the complement via the *semantics* of the noun, and it would be quite wrong to assume some kind of syntactic subcategorisation restriction as such. However, very many metalinguistic terms from natural language do not correspond in this way to syntactic categories needed in the grammar (as this is ordinarily understood), as in the following examples:

(34a)   the French saying *plus ca change plus c'est la meme chose*
(34b)   the vulgarism *I ain't*
(34c)   the pattern *as far as . . . is concerned*
(34d)   the ungrammatical phrase *dog the*.

In examples like this, it seems clear that it would be futile to impose any syntactic subcategorisation restrictions at all on the complement—another counterexample to the 'Categorial necessity' hypothesis.

## 5.   A FRESH LOOK AT SUBCATEGORISATION

The negative conclusion of this paper is that the 'Categorial necessity' hypothesis (4) is wrong, although it defines the normal pattern.

More generally, the 'Linguistic purity' hypothesis (10) is also wrong, with the same reservation. The positive conclusion is that the use of non-linguistic material in grammatical sentences is controlled by the 'Non-linguistic apposition' hypothesis (11), so the wedge of which we have introduced the thin end is not in fact very large, though important.

I should like to end the paper on an even more positive note by listing a few hypotheses about the limits of subcategorisation which are compatible with WG and with the facts noted above. We have already seen one limit, in the 'Externals only' hypothesis (3), though I admitted that this remains mysterious. Another hypothesis is what I shall call the 'Semantic relation' hypothesis:

(35)   *The Semantic relation hypothesis*

The semantic relation of any complement to its head must be restricted

According to this hypothesis no lexical item will be allowed to have a complement whose semantic relation to it is left undefined. The formulation of the hypothesis leaves open the question of whether the restrictions are imposed by the lexical entry or by some more general rule.

Another limitation is the 'Direct dependency' hypothesis:

(36)   *The Direct dependency hypothesis*

If a word A governs some other word B then A and B must form a dependency chain, and must be separated in this chain only by words which are restricted to particular lexical items by A.

According to this hypothesis the possible syntactic relations between the two words involved in a subcategorisation (the 'governor' and the governed) are quite limited. The hypothesis is roughly equivalent to the rule in Chomsky [2] that strict subcategorisation applies only to sisters (and to the one in Chomsky [10] that only positions governed by X may be subcategorised by X). There are two major differences between the two theories, however. In WG a subject and its verb form a dependency chain (the verb is head of the subject), so we expect some subcategorisation restrictions to apply to subjects, as they do. In particular, the verb restricts the subjects's semantic role. (For other evidence that subjects should be accessible to lexical subcategorisation, see Bresnan [11:290]. The dependency approach avoids the problems in this respect of approaches which recognise a 'verb phrase' which excludes the subject (e.g. Chomsky [10:36]).

A second difference between the classic transformational approach and the 'Direct dependency' hypothesis lies in the clause "must be separated in this chain only by words which are restricted to particular lexical items by A". This recognises the properties of idioms like *look for*, in which *look* determines the semantic role of the object of *for*, which is separated from it by *for*. The string of intervening words may be quite long (e.g. *pull the leg of X*), but our hypothesis predicts that the governor must fix the particular lexical item of which each of these words is an instance. The prediction, then, is that no governor will allow the pattern 'A ... F ... L', where A is the governor, F is a freely selected word in the chain from A to L, and L is lexically determined. For example, there should be no combinations of 'verb—preposition—noun' in which the verb refers to the lexical content of the noun but not to that of the preposition. This follows simply from a dependency analysis of such patterns, because the preposition connects the noun to the verb; it is less obvious how it applies to a constituency-based analysis in which the preposition is just a niece of the verb [4:94f].

A final hypothesis predicts that many different types of subcategorisation restriction will be imposed, subject only to the mysterious 'Externals only' hypothesis:

(37)   *The Any property hypothesis*

In every language subcategorisation restrictions may refer to any property of the element restricted, and this possibility is exploited.

This hypothesis takes us back to the list of examples with which we started, (1). When we consider this list, we find that it includes all the known properties of words (except for their internal morphological or phonological structure)—morphosyntactic features, linear order, syntactic categories, lexical identity, semantic relation, and other semantic properties. Moreover, we have also seen that the list can be extended to include the word's metalinguistic categorisation (e.g. as a vulgarism), and that subcategorisation restrictions may be applied to non-linguistic objects whose properties may be in some respects different from those of words. The prediction of this hypothesis, then, is that this wide range of possibilities is not a peculiarity of English, but will be found in every natural language. One of the attractions of WG is that it provides an analytical framework in terms of which any of these types of restriction may be formulated.

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