

WORD GRAMMAR AND THE SEMANTICS

OF COMPOUND NOUNS

by

Maureen Deirdre Taylor

School of Oriental & African Studies
University of London

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ABSTRACT

This investigation is a mentalistic inquiry into the study of semantic structure for compound nouns in English. The phenomenon of compounding entails competence in both semantic and pragmatic aspects of knowledge. These two aspects of language are generally described by separate grammatical models with the result that traditional analyses have been unable to provide a descriptively adequate account of the meanings of English compound nouns. This inquiry adopts the grammatical model of Word Grammar which incorporates a systematic representation of grammatical competence within a model of performance. The underlying hypothesis of this model is that all propositional content of language is organised in relation to the word. Therefore, no unit larger than the word itself is required to describe the production and comprehension of compound constituency. The inclusion of pragmatic competence into the framework introduces an indeterminate feature in terms of experiential knowledge but this is offset by knowledge of the word as a common denominator with which all knowledge is projected. It is shown that Word Grammar's mentalistic framework provides an observationally adequate description of speaker competence for the meanings of compound nouns and an alternative approach that offers a credible description of the interrelation between semantic and pragmatic knowledge exploited in the comprehension of compound noun meaning.

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Chapter I

Introduction

1. The Topic

This study is an investigation into what happens to the semantic structure of two English words when combined by the process of compounding, in order to examine how speakers interpret the meanings of compound nouns. Traditional understanding of a compound noun is one of a word which has a morphological composition of two words and a meaning that is 'more than just the sum of its parts' (Allerton 1979). But the difficulty of identifying what the 'sum' is has resulted in the lack of a satisfactory definition for compounding and a wealth of literature on the phenomenon, (Adams (1973), Allen (1979), Botha (1968/81/84), Bresnan (1978/82), Downing (1975/77), Lees (1960/70), Lieber (1983), Marchand (1960), Roeper & Siegel (1978), etc.).

In this investigation it is claimed that the meanings of compound nouns are interpreted by an inferential process involving the semantic properties of the compound word's individual constituents. For example:

$$(1) \text{ roadsweeper} = N_1 + N_2 \text{ ----} \rightarrow N_3$$

the meaning of roadsweeper is conveyed by the proposition:

(1a) 'someone/thing who/which sweeps roads'

(1a) is formulated on what is inferred about the relations between the semantic structure of sweeper (N_2) and road (N_1). The noun roadsweeper refers to some agent involved in a state of affairs that is identified by the presence of the overt verb in the morphological

structure of the compound noun, i.e. sweep. Since the state of affairs entails two participants referred to by the meanings of N_1 and N_2 , the roles of road and sweeper are judged in connection with the specific action of 'sweep', and the proposition of (1a) is interpreted as the meaning of the compound noun roadsweeper.

One of the features which allows the speaker to make judgements about the relationship between internal constituent meanings is the identity of semantic properties for the verb. But the verb is not always overtly present in the syntactic composition of a compound noun. For example:

$$(2) \quad \text{matchbox} = N_1 + N_2 \text{ ----} \rightarrow N_3$$

(2) has a propositional reading:

(2a) 'box (used) for the purpose of containing matches'

(2a) is formulated on what is inferred about the relationship between the semantic structure of box (N_2) and match (N_1). The noun matchbox refers to some container involved in the state of affairs identified by the noun box. Since the state of affairs entails two participants referred to by the meanings of N_1 and N_2 , the roles of match and box are judged in connection with the action implicit to the state of affairs for container, i.e. the purpose of a container is 'to contain' something. Hence, the link between the noun box and a situation in which the participant N_1 is relevant is one involving the action 'contain'. However, in this example the action is not overtly spelt out, as it is in N_2 of (1). Its relevance is indirect in enabling the speaker to infer a more general concept of purpose inherent in the meaning of N_2 of (2).

One of the consequences of the above mentioned claim for the interpretation of the compound noun is that individual knowledge of the semantic properties may govern a speaker's ability to interpret the meaning of the word. A second consequence of this is that there may be considerable variation in the formulation of the propositions

for compound noun meanings. However, variation in the number of readings that can be assigned to a compound noun has already been observed as a characteristic of some types of compounds (see Allen's (1979) example of windmill). Moreover, it is generally recognised that speakers may and do vary in their understanding of word meanings and the same situation is claimed to exist for compound noun meanings (Gleitman & Gleitman 1970).

In the first place, compound nouns share the characteristics of monomorphemic words in naming an identifiable concept and, like the single word, the meaning varies from sentence to sentence, e.g.

- (3)(a) She placed the camera on the stand.
- (b) The defenders made a stand against the advancing army.
- (c) The football stand was filled to capacity.
- (d) They placed their brollies in the umbrella stand.
- (e) A large bandstand occupies the centre of the park.

The morphological representation may be associated with different semantic structures, e.g. compare umbrella stand with bandstand. Further, the meaning of the compound word is inferred from the relation existing between the meaning of its constituents, e.g. (1)(a) above.

Also, we can compare the compound, as a constituent structure, with the sentence, and observe that similar difficulties arise in providing a semantic interpretation for the latter. Jackendoff (1972:14), referring to the work of Wittgenstein (1958) and Quine (1960), suggests that the reasons for the difficulties in analysing sentences are not only connected with the "infinite divisibility of semantic properties" of words, but also

"... the (perhaps undecipherable) problem of choosing what information is part of the reading and what information merely follows from the reading."

Therefore, some flexibility in the method of interpreting the semantic structure of the constituents of the compound noun is necessary if it is to fulfill its role as a word of the language.

1.1. The Semantic Problem for Compound Nouns

In spite of the variability of compound noun meaning, a semantic classificatory system for this type of word has begun to emerge from the literature. It is one which separates the compound noun into two semantic types: compositional and non-compositional, e.g.

(4)(a)	dishwasher	:	someone/thing who/which washes dishes
(b)	teacup	:	cup for drinking tea
(c)	swimming lesson	:	lesson on swimming
(d)	parental refusal	:	refusal by parents
(e)	white elephant	:	useless object

(4)(a) is an example of a semantically compositional compound noun. It can be decomposed into the linguistic elements dish, wash and -er, each of which can be linked to a unit of meaning, i.e. 'dish', 'wash', and 'agent' respectively. Since compound nouns with compositional meaning are word forms whose meanings can be inferred from the identity of the internal elements of their morphological composition, there is a direct correlation between the syntactic and semantic properties of the lexical item.

Some compounds, e.g. root compounds like teacup in (4)(b), could be classified as semantically compositional because the meanings of the relations between the two internal constituents can be inferred from the meanings of the latter, e.g. the paraphrase for the meaning of (4)(b). However, the term 'semantically compositional' was initially

used to refer to endocentric verbal compounds (Roeper & Siegel 1978).

Endocentric verbal compounds are compound nouns with a constituent member which functions in the same capacity as the structure of which it is a part, i.e. the compound noun has a noun as its head. The latter contains a verb as part of this member's morphological structure, e.g. washer is head of dishwasher, and contains a verb wash. The identity of the syntactic verb is crucial to the comprehension of the semantic relation between the constituent members of the compound noun because it provides the semantic structure from which the relation is identified.

For example, wash, when functioning independently as a verb in a sentence, may take an object which can be represented by the meaning of dish. Thus, on the evidence of behaviour of similar linguistic elements for the word form and the sentence, the meaning of 'wash dishes' is inferred as part of the meaning of dishwasher.

Since Root Compounds do not have a verb as part of their morphological composition, and, therefore, cannot be assigned an equivalent sentential paraphrase, they are classified as semantically non-compositional.

Non-compositional compound nouns include Primary Compounds, e.g. (4(c & d)) above, as well as Root Compounds. To this group must also be added bahuvri-type compounds such as redcap, yellow hammer, etc. The latter contrast with those listed above because they are notendocentric. Redcap refers to a bird not a cap or hat.

On the criteria of syntactic verb identity for the semantically compositional compound noun, (4(c)) is not a verbal compound. But (4(d)) is an endocentric compound noun whose head is a derivative with a verb root, e.g. refusal (N) ←--- refuse (V) + -al; and which can be given a verbal reading, i.e. 'parents refuse'.

However, the semantic decomposition of this compound noun does not follow a pattern analogous to that of the paraphrase for dishwasher viz. *'refuse parents'. It could be argued that the construction is a phrasal one containing an adjective and a noun, but its meaning does not paraphrase into a reading which is consistent with other phrases. Compare the meaning of parental refusal with that for red book, i.e. 'book which is red'. Finally, the word is not an idiom like (4(e)) white elephant (this also has a literal phrasal reading 'elephant which is white'). Thus, in view of its semantic deviancy, parental refusal is classified as a non-verbal compound.

Before leaving this brief description of the semantically classified sets, it should be mentioned that another type of non-compositional compound noun has been identified subsequent to Roeper and Siegel's analysis. These are non-verbal compound nouns which share the same morphological representation as verbal compounds, e.g. tree eater (Selkirk 1982). The argument which classifies these compounds as semantically non-compositional is explained later in more detail, but it is reduced here for the purposes of this discussion to the basic claim that, if the constituents are identified as nouns, there is no verbal relation holding between the internal words and, hence, the meaning of the compound is non-compositional. Thus, a non-verbal interpretation of tree eater would be 'eater in trees'.

In sum, the above semantic classification of compound nouns produces the following contradictions:

(5)(a) semantic compositionality is characteristic of a subset of compound nouns, i.e. verbal compounds, but evidence of root compounds with transparent meaning shows that semantic compositionality is not restricted to one type of compound noun.

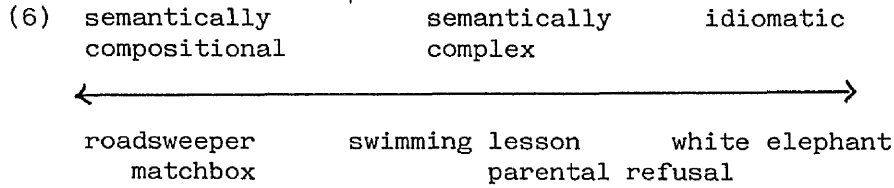
(b) the analogy with sentential structure is used to justify the claim that the subset of verbal compounds is generated by a set of rules. But, unlike sentential rules which produce an infinite number of sentences, the rules for verbal compounds are restrictive. Their output is confined to one subset of word forms which is not infinite, e.g. *angry appearer.

(c) the criterion of the identity of an overt syntactic verb creates a clear division between semantically compositional constituents, and non-compositional and idiomatic structures. But an approach using this criterion raises the question why some compound nouns containing an overt verb are semantically non-compositional, e.g. (4)(d).

1.2. Arguments Towards a Solution of the Problem

In response to the problems listed above, I would argue that they are not caused by the nature of the semantic properties of words themselves, but by the strict compositional/non-compositional dichotomy imposed by the grammatical framework from which the formulation of the semantic classification has developed (i.e. that which incorporates Chomsky's (1980) Lexical Hypothesis). First, native speakers of English do not find difficulty in using and comprehending compound nouns such as those listed above; nor other compounded words of the language in general. Secondly, compounding is a popular method of word formation, and compound nouns especially have a widespread

distribution in the language. Thirdly, on the evidence of semantic types observed so far, a gradient of semantic compositionality would be more representative of the phenomenon of compound nouns, e.g.



At one end of the gradient, there are the totally transparent meanings of morphologically compositional compound nouns, i.e. compounds exhibiting a one-to-one correlation between syntactic and semantic structure. At the other end, there are the idiomatic compound nouns which exhibit an arbitrary link between form and meaning; and somewhere in between there are the great majority of compound nouns which are more or less semantically compositional. In the case of the latter, the semantic complexity is a consequence of the deductive reasoning applied by the speaker in exploiting stored semantic knowledge (see (2a) above).

The complexity arises because the information exploited goes beyond that of the referential properties of the compound's head, to include experiential knowledge about the real world. For example, in order to understand the relation between match and box, speakers must know that boxes are used as containers. Hence, a boundary cannot be drawn between the semantic properties of the word and the relevance of its use in classifying an entity within the speaker's experience.

I therefore propose to use the grammatical theory of Word Grammar (1984), which will be explained in more detail in the next chapter. The hypothesis underlying the framework of Word Grammar is that linguistic competence is interrelated with a speaker's general knowledge and cannot be divorced from it. Word Grammar claims that

"language is a network of entities
 related by propositions."

(ibid:1)

The propositions link together entities of general knowledge and specific linguistic knowledge and consequently bring together types of properties which make up our conception of the world.

The propositions refer either to similar properties, e.g. the shared categorical status of single words and compound words as nouns; or different properties, e.g. the phonological element /s/ is linked to the semantic property of number for the noun. Also, they are part of a wider network which brings together general knowledge e.g. words and compounds are general linguistic concepts; and specific information, e.g. matchbox is a particular type of box. As a result, many of the propositions link together properties which are shared by different word-types, e.g. comb. (N/V), writing (N/V). Or words with different meanings share the same morphological representation, e.g. bowl (N) = 'a piece of crockery', or bowl (V) = 'to throw a ball overarm'.

I believe that Word Grammar's perception of the word as a composite of interrelated information from different aspects of language has the advantage of providing a flexible framework which will avoid the contradictions listed above. Further, it will enable this investigation to pursue the semantic complexity of compound noun meaning as part of a gradient. It will be shown that the gradient reflects the different degrees of generality in the type of knowledge referred to in the use of language.

This approach is in contrast to the lexicalist hypothesis which identifies the word as a composite entity but one that can be analysed in isolation from its use, i.e. as a discrete whole. It is this independence which, I shall argue, creates artificial boundaries that prevent the grammatical theory from formulating rules capable of coping with degrees of semantic complexity exhibited by the compound noun. The result is a somewhat distorted account of speaker competence for this type of word-form.

In terms of speaker competence, the semantic division

described above suggests that the majority of compound noun meanings are learnt alongside the word form because, at the very least, their meanings are only haphazardly formulated. Given that the compound noun is a constituent structure using words that also function in sentences, and that speakers generate an infinite number of sentences (Chomsky 1975) for which they are able to comprehend subtle differences in meaning, this seems counterintuitive and unrepresentative of speaker competence. The gradient of (6) above suggests that the same degree of subtlety is understood in compounding.

In my opinion, the problem has been that, in the past, analyses of compound noun meanings have revolved around the syntactic similarities observed for the behaviour of words in sentential and word structure. This is one of the inevitable consequences of the hypothesis that language reflects what is in the speaker's mind. The argument proposed is that, if sentences are the output of a system of knowledge, the rules of the system that generate sentences are part of speaker competence for language. Since compound nouns are also constituent structures containing word combinations correlating with sentential structures, the mental devices used to construct sentences may also apply in compounding. Hence, the paraphrases of compound noun meaning became synonymous with the underlying structure from which the compound's meaning is generated (e.g. Lees (1960/70), Botha (1968/81)).

However, a shift in the perspective of word meaning led to the Lexicalist Hypothesis (Chomsky 1970), which claims a generative device within the mental lexicon (hitherto a word list). This prompted Allen (1979:85) to comment on the inadequacy of previous analyses adopting the above premise on underlying structure:

"The crucial question raised is whether the paraphrasability of compound words by sentential forms (or fragments of sentential forms) constitutes an argument for deriving complex words from sentences."

and saw the development of an alternative solution. This is to

view the paraphrastic meaning of the compound noun on a parallel with sentence meaning, i.e. as the output of rules which have formulated the words. While this view has been adopted by subsequent theories of compounding, it is my view that the emphasis is still weighted towards lexical rules that have to some extent remained syntactically orientated (Roeper & Siegel (1978), Allen (1979), Bresnan (1981), Selkirk (1981/2)). The lexical rules are word adjunction rules supplemented by principles relating to semantic content and the findings of the analyses provide an adequate grammatical description of verbal compounds. However, the results fail to satisfy a problem highlighted by Lees et al., which is a speaker's ability to comprehend the meanings of non-verbal compound nouns and to formulate the latter into sentential paraphrases. The problems confronted by two major lexicalist theories are discussed in Chapter III, with the object of identifying the main problems and the reason for an alternative viewpoint.

Further, there is another factor that has received little attention up until now with regard to the differences between the paraphrastic meaning of compound nouns and sentences. It is, however, a difference which I consider important for its bearing on the approach to a semantic analysis of compound nouns. I refer to Downing (1975:42), who draws on Breckle (1970) as her source. She claims that a major difference between the paraphrase of a sentence and that of a compound noun is that, whilst both structures may function within an utterance, only the sentence asserts the truth of the uttered proposition. Her example is as follows:

(7) John dropped the wine glass.

If a speaker utters (7) above, it is asserted:

- (i) there exist two entities X ('John') and Y ('the wine glass')
- (ii) X dropped Y

but the proposition

(iii) 'glass designed for holding wine'

as a paraphrase of wine glass is presupposed to be true.

The reason for the difference of understanding for the propositions (i), (ii) and (iii) can be explained. The referents of John and wine glass in (7) are linked to individual entities known to the speaker (and possibly the listener). But this does not apply in the case of the referents of the nouns in proposition (iii).

It is likely that the original motivation for the coining of the compound noun wine glass may have arisen in the first instance from an individual speaker's experience, but the specific situation for the motivation may not be known to listeners on any subsequent utterance of the compound. Consequently, the referents of the compound's constituents cannot be assigned specific referential identity.

In turn, the difference between assertion and reference affects how speakers understand the meanings of compound nouns. For example, if box of matchbox does not refer to a specific entity, what does it refer to? In accordance with Downing's view, I shall argue that the constituents of a compound noun refer to a species or class of entity. This point of view will be discussed further in Chapter IV where it is shown that specific referential identity of events such as that given in (ii) above does not constitute the semantic content of verbal compounds. Rather the meaning of the verbal head is a heuristic device for referring to situations in general, and which are recognisable by listener and speaker alike.

I come now to the second reason for adopting the grammatical framework of Word Grammar. One of the shortcomings of the lexicalist approach is that it does not address itself to issues like those mentioned in the above paragraphs; namely, the interrelationship between a speaker's knowledge of language and real world situations. As a result of the limited focus of language structure which is the data of the lexical analysis, problems arise that are either left unresolved or assigned to a theory of performance. For example, verbal compounds are contrasted with primary compounds (Allen 1979) because the former are claimed to have only one interpretation. As a result of the many readings that can be assigned to primary compounds, a lexicalist approach (Selkirk 1982) argues against the possibility of a systematic account of their diversity. But it is interesting to

note that Selkirk also claims some verbal compounds have non-verbal readings, e.g. tree eater. If this is the case, there is a contradiction about the number of meanings that may be assigned to verbal compounds and the implication that a systematic account of non-verbal compound meaning is not beyond reach. The problem, however, is that an investigation of the meaning of compound nouns cannot be undertaken without reference to a speaker's knowledge of real world situations in which the compound word is used, viz. (7) above. However, Word Grammar claims that language is part of cognition, and concepts of a speaker's real world knowledge are part of the semantic structure of words. Thus linguistic knowledge is inseparable from general knowledge; and both types of knowledge are integral to the grammatical framework. Hence, the theory of Word Grammar provides a framework for analysing the meanings of compound nouns in general.

Further evidence in support of the claim that a speaker's competence with compound nouns is interrelated with real world knowledge is demonstrated by the compound noun's 'communicative value'. This term is coined by Downing (1975:42) to refer to the conventional uses of compound nouns. Conventions of language use are one type of speaker competence which it will be shown are incorporated into the framework of Word Grammar.

In connection with the compound noun, the principle of non-assertive properties described above is one of the features of the word's use. Another is one which has already come to notice as the linguistic principle of headedness. Most compound nouns are endocentric and have an internal head (Allen (1979), Bresnan (1978), Selkirk (1982), et al). That is to say, the compound noun is a type of word which is a subset of the major category of noun, e.g. compound noun ISA noun. But it can also be demonstrated that headedness is a reflection of the human practice to classify entities (Rosch 1977). Namely, the meaning of the compound noun refers to a

class of entities which is a subset of a major class of entities referred to by the meaning of the compound's head, e.g. 'matchbox ISA box'.

Another feature of communicative value for the compound noun is the speaker's knowledge that the relation between the word's constituents has some significant classificatory relevance (Downing 1975:42-44). For example, book novel is semantically redundant because the modifier book does not provide any additional information in connection with the entity referred to by the head novel. This means no propositional relation can be established between the constituents. Thus, Downing claims that, whilst the members of the compound noun must refer to entities which stand in 'cognitive proximity' to each other, the relationship between their meanings must also be significant. Therefore, if speakers understand that there is a principle constraining the member's relation to be relevant, some satisfactory proposition must be inferred from the meanings of the compound's internal words, otherwise the purpose of forming the compound is nullified and the word is discarded as semantically ill formed.

The theoretical principles underlying the lexicalist approach separates competence for linguistic structure from performance and has the disadvantage of not being able to describe the mutually supportive roles of linguistic knowledge and its use. The failure to show this interaction of knowledge results in a lack of evidence that the verbal behaviour connected with compound nouns corresponds to the description of the stored linguistic knowledge. In Hudson's view of linguistic theory this is a significant argument against two separate frameworks for competence and performance because it demonstrates that the grammatical theory is not psychologically real.

One difficulty for unrelated theories of competence and performance is indirectly touched upon by Botha (1968) with his criticism of early attempts to analyse compounds using a transformational grammar. He argued that the framework failed to capture the generalisation that a morphological representation of a compound noun, e.g. cartwheel, may be linked to a literal and an idiomatic semantic structure because the former interpretation is described by the theory of competence but the latter by a grammar of performance.

To return to Downing's claim in the above paragraph. Since I have already argued that the motivation for classifying the relation between the members of a compound noun is lost with the word's subsequent use, the speaker has two sources of knowledge to exploit; linguistic and non-linguistic. Linguistically, one available source is the immediate lexical environment of the compound noun's constituents. However, the meanings of the constituents refer to entities in the real world, which the language classifies with words, e.g. box, container, contents, etc. Moreover, the referents of constituents exhibit a relation which is itself a reflection of a non-linguistic situation. Namely, the relation is expected from what is known about the participants of the real world situation, e.g. boxes are containers which may have contents.

The second linguistic source is the contextual environment in which the compound noun is used, e.g. (7) above. Here again, a similar mental procedure is applied in real world situations. For example, the relevant purpose of traffic lights to control the movement of traffic (i.e. their classificatory significance to the situation) can be deduced from an examination of the situation in which they are used.

In view of the above mentioned observations, a semantic analysis of compound nouns will need to explain the speaker's competence in determining the relevance of meaning for the words. Therefore, if one of the communicative values of the compound noun is that its members enter into a relationship which is as relevant as can be made possible, part of the speaker's understanding of the compound's

meaning is achieved through deduction. The speaker is required to deduce from stored knowledge not only the significant propositions generated by the juxtaposition of members of the compound noun, but also to exploit the environment (lexical and context of utterance) of the latter to reduce the propositions to a manageable number.

I propose that one linguistic convention for the procedure of deducing the classificatory relevance of some compounds should be that of verbal relations exploited by the lexicalist approach for verbal compounds. The grammatical functions of verbs and their modifiers mirror speaker knowledge of states of affairs in the real world. For example, actions involve participants which contribute in one way or another to the situation. Therefore, I surmise that the concepts of verbal relations are most easily accessible to analytic survey because they correlate closely with descriptions of experiential learning situations in the cognitive development of individuals.

The nature of the relationship between the representation of syntactic structure for the verbal relations and the semantic propositions is best described by Jackendoff (1972:14):

"The aspect of semantic representation that is perhaps most closely linked to syntactic structure is the functional structure of a semantic reading. We can think of verbs as semantic functions of one or more variables the readings of syntactically associated noun phrases providing semantic values for the variables."

Whilst the verbal compound contains an overt verb which facilitates the identity of the semantic reading, the non-verbal compound requires more computation in order to identify its functional structure. However, given Jackendoff's description of the interrelationship between syntax and semantics; and Downing's observations on communicative value of the compound noun, I shall argue that the computation is part of speaker competence and leads to the comprehension of meanings of non-verbal compound nouns.

The meaning of a noun phrase is part of the verb's semantic

reading. Therefore, a functional structure may be inferred by exploiting the noun's contribution to the latter. Due to the nature of the compound structure and its communicative value, the possible number of semantic functions that its members contribute to is constrained by the economy of linguistic evidence. For example, the deliberate choice of the constituent members maximises the relevance of the class of entities identified by the head, and indicates any classificatory significance within the parameters of this class. However, since the semantic value of the noun is part of the variable which, in turn, is a general concept of stored knowledge, the relation between the compound noun's constituents includes the value of the variable as part of the semantic reading for the functional structure, (e.g. 'purpose' in (2) above).

Although the above claim does not apply to exocentric compounds, which fall beyond the scope of this investigation, some interesting observations in connection with these compound types derive from the approach advocated here. The proposition generated by the constituent members of idiomatic compounds is one which can be re-applied across different situations without losing its relevance. Hence, it has general classificatory relevance. But the significant connection between the relevance of the class of entities denoted by the head and the proposition of the compound is broken.

I suggest that the liaison is broken because the meaning of the head word has limited classificatory significance (i) in terms of the sense in which it is used and (ii) in the context of situation to which it refers. For example, the meaning of trick in hat trick refers to a specific act in cricket, i.e. the act of taking three wickets in three successive balls. A player displaying this type of skill receives a new hat. Hence, the classificatory relevance of trick is confined to speakers who know about the rules of cricket. I also surmise that both (i) and (ii) are in this instance obscured by the notion of semantic shift in meaning (see reference to Aronoff (1976) in Chapter III) which affects word structure; namely, trick is usually associated with a meaning 'to deceive' not 'ability to win'. However, an inferred interpretation of the compound's

proposition, i.e. 'ability to be successful three times' is sufficiently general to be re-applied to different real world situations, where it can be used with equal relevance (see Lakoff & Johnson 1980 on the use of metaphor, for further discussion).

It might be argued that an analysis combining linguistic and non-linguistic knowledge of compound nouns is not viable, because cognition is too inconsistent a variable. For example, general knowledge is acquired through experience and this depends on external factors such as environment, education, age etc. Hence, there is no guarantee that speakers will share any concepts to which semantic properties are linked. Not only will the number of semantic properties differ, but so will the speaker's perception of the experiential situations, because experience affects cognitive development. In other words the speaker's mind acts as the catalyst between what is perceived in the real world and what is comprehended by the individual.

However, Word Grammar's claim that linguistic concepts are part of a wider general knowledge means that:

"A semantic component can be universal because it is part of the normal human cognitive make-up, such as the human ability to perceive shapes and colours, or because it is part of the normal human environment, such as the contrast between 'vertical' and 'horizontal', or between different members of the biological family group."

(Hudson 1980:95)

Additionally, it follows that the mental devices used in cognition also operate within language.

It is interesting to note that in spite of the differences between Word Grammar and the lexicalist approach on the parameters of analysable data, Hudson's theoretical assumptions about the structure of the mind closely correspond to Chomsky's (1976:7) view on the abstract principles governing its operation:

"The mind provides the means for an analysis of data as experience, and provides as well a general schematism that delimits the cognitive structures developed on the basis of experience."

To recap. A lexicalist analysis of compound nouns has produced a semantic classification that gives rise to contradictions. However, the contradictions are the result of the narrow premise of the grammatical framework, namely, that explanations of the meanings of words can be provided simply by focussing on the language structure. If the theoretical principles are widened to include reference to knowledge of language use, the contradictions listed in (5) above can be resolved. Our conclusions may be summarised in the following three points:

(8)(a) The semantic compositionality of compound nouns generally is a recognition of the full classificatory relevance of the linguistic and non-linguistic situation.

(b) Given that words are a collection of properties, which sanction their co-occurrence with other words, the propositions/are the rules for word and sentence structures. Consequently, the imbalance in the number of productive rules for word structure and sentences can be redressed.

The identity of verbal properties for the compound and the sentence corresponds with equal status to the overt explicitness of the verb's presence. There are, however, certain constraints on the properties of compound nouns which do not apply to sentences. Focus on temporary, transient states, e.g. stay angry, may be asserted by a sentence, but may not be significantly relevant to warrant classification.

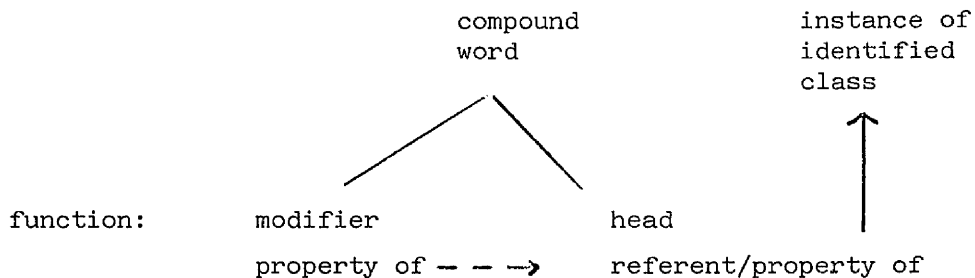
(c) The presence of the verb as part of the morphological structure is not a criterion for compositionality, but merely a reflection of the nature of verbal compounds, which make up the set of compound nouns as a whole. Lack of opportunity to invoke usage for the compound noun presents a false picture of the data, because it can be shown that non-compositionality applies only to idioms. These are non-compositional because diachronic shifts have taken place and affected the classificatory significance of the compound noun's head.

At the beginning of this introduction I avoided giving a definition of the compound because traditional criteria have been

found wanting (Adams (1973), Downing (1975)). In order to be effective, a definition would have to identify criteria that differentiate the compound from a word and a noun phrase.

Certain characteristics do separate compounds from the word and the noun phrase. The compound differs from the word inasmuch as its internal morphological structure comprises two words, e.g. egg + cup. But the two words lose their status as independent lexical items so that their function within the word is conceived as that of elements (Meys 1975). I suggest that the loss of independent status is due to the role of the constituents as part of a heuristic device. Where the modifier's role is one of identifying a property of the semantic structure of its head, the head identifies a member of a class of entities, i.e. a property of an entity which is itself a class, e.g.

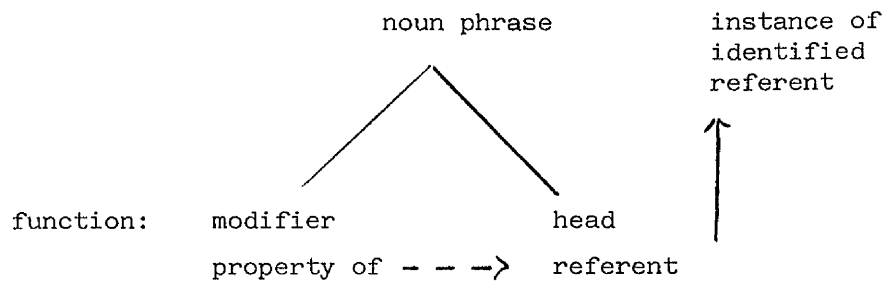
(9)



As the characteristic feature of compounding is a semantic one rather than a morphological one, the inconsistency in syntactic representation for the compound noun does not affect its recognition as a word. Therefore, conventional variations in form such as hyphenation, e.g. secretary-treasurer; or word separation, e.g. atom bomb; or juxtaposition as a continuous single word form, e.g. keyboard, will be used in this investigation without any theoretical implications coming to bear upon the meaning.

The role of the compound's members contrasts with that of the constituents of the noun phrase because the meaning of the noun phrase's head is usually considered to identify an individual entity (which may be a class or species), but it is not expected to refer to a class as a property (or member). Hence, for the noun phrase, it is generally accepted that the referential identity of the head word matches that of its function within the constituent structure. For example:

(10)



On the semantic behaviour between co-occurring words Hudson (1984:151) observes:

"It seems never to be the case that a part of the semantic structure of one word is related directly to a part of the semantic structure of another word: at least one referent always seems to be involved in any semantic relation between a pair of words."

As seen in (9) and (10) above both heads are assigned referential status. However, the knowledge of their functional role within the individual constituent structures will affect the type of judgements made on the semantic content generated by the whole.

A second characteristic of the compound follows from the loss of the head's status as an independent word. The modifier does not refer to a property that is part of the entity denoted by the head. For example, yellow in yellow hat refers to the colour of the entity 'hat'. This is part of the intrinsic makeup of the hat. The compound's internal modifier has the function of identifying some property which is in some way alienable, but nonetheless may be associated with the head, i.e. within the cognitive environment of the identity. This latter feature probably contributes to the speaker's comprehension of the compound's function as a labelling device.

The compound noun is formed to name some entity within the speaker's experience. Since the entity is in existence and the labelling device, i.e. the compound noun, is expected to be used again from situation to situation, the relationship between the constituents is perceived to have some permanent aspect of meaning (Allen 1979). The function of the noun phrase, on the other hand, is to refer to and describe an entity, but the description is only asserted to be true at the time of its utterance. Hence, the meaning of a noun phrase has the status of temporary relevant significance.

To conclude. It is emphasised here that the notion of the word has to date escaped definition. This may be due to the fact that the classificatory relevance of the word is so closely interrelated with the knowledge of the word in which we live that the nearest we can hope to come to any definition for the compound noun as an example of a word may be no more than the traditional description given at the beginning of the chapter.

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1.3. Summary

This is an investigation of the meanings of compound nouns, with the aim of establishing the nature of the mental devices used by the native speaker of English to comprehend the meaning of these word-types. Whilst accepting that verbal compounds are semantically compositional, it is claimed that the latter are a subset of compound nouns that falls at one end of a gradient of semantic complexity.

The gradient reflects a speaker competence for compounding which cannot be separated from the relevance of the compound's use. Hence, the framework of Word Grammar is to be used in the analysis to be undertaken. Word grammar is an alternative theory to Chomsky's lexical hypothesis and claims language to be a sub-part of cognition. As a result, the framework which represents the speaker's knowledge of language should provide an explanation of the effects of real world knowledge as part of competence for comprehending the meanings of compound nouns. Since the grammar does not identify boundaries between linguistic entities, it should provide a flexible framework to analyse the semantic gradient of compound nouns.

In the past, compound noun meaning has been compared with sentential meaning. The emphasis on syntactic behaviour of words, however, has not provided a satisfactory explanation for word meanings. In addition, the lexicalist hypothesis does not encompass the need to include real world knowledge and its relevance to word meaning and, in consequence, has presented an inadequate analysis of the data. Since the meanings of compound nouns can only be inferred from a knowledge of the word's relevance to situations in the real world, only a partial explanation can be forthcoming for these word-types.

I suggest that verbal structures are the most readily identifiable relations of real world knowledge, and this accounts for the transparency of verbal compound nouns. But if verbal relations are mechanisms for describing real world situations, it must also be possible to infer the semantic reading of the verb,

where the presence is covert to the noun's functional contribution. That is to say, given that speakers understand that there is a cognitive relation between two entities denoted by nouns, the functional reading involving an action can be inferred and an appropriate interpretation assigned to the non-verbal compound noun.

So far I have identified three major contributory factors for speaker competence in compound nouns. One is the behaviour of individual words, the second is classificatory relevance and the third is the content of speaker knowledge. I have also intimated that these factors can be explained using the grammatical framework of Word Grammar. Therefore, in Chapter II I will give a description of the grammatical framework of Hudson's theory and explain how the issues mentioned above are encompassed by the theoretical principles.

Chapter III will examine two theories of compounding that incorporate a traditional lexical approach to word structure. The purpose of this examination will be to identify the limitations of the analysis of compound meaning. A summary of the findings will be given together with suggestions for solutions.

Chapter IV will contain an analysis of compound nouns using Word Grammar, and my findings on the adequacy of this theory will be presented in the final Chapter.

Chapter II

Word Grammar - An Overview

1. Introduction

In Chapter I, I claim that the meanings of compound nouns exhibit a gradience of semantic complexity despite their classification as semantically compositional or non-compositional words. In particular, it is argued that the semantic division is created by the structure of the lexicalist framework of Chomsky's Extended Standard Theory, and that investigations of the meanings of compound nouns using Word Grammar shows that the gradience is a reflection of the interrelation between the semantic relation of the compound noun's constituents and its classificatory relevance in language use.

In this chapter, I will outline the theoretical principles of the framework of Word Grammar to identify its differences from Extended Standard Theory, before moving to Chapter III and a discussion of the shortcomings of two investigations that are representative of the lexicalist approach.

1.1. Theoretical Assumptions: A Comparative View

1.2. The Framework

Word Grammar is so called because the central unit of the framework is the word. But the word is also a token of the structure of the framework of which it is a part, such that no division exists between the grammar and the lexicon.

Selkirk (1982:2) describes the status of the word in

a lexicalist framework (as derived from Chomsky, 1975):

"In my view, the category word lies at the interface in syntactic representation of two varieties of structure which must be defined by two discrete sets of principles within the grammar."

The two varieties of structure referred to here are the grammar and the lexicon. There is, therefore, an immediate contrast with Word Grammar, which assumes that the same set of principles applies across word and sentence boundaries.

Selkirk goes on to argue that the system of rules for generating word forms is similar to that which generates syntactic structure and, moreover, that this system exhibits the same general formality. Since this seems to be a contradiction of her earlier claim, it is difficult to see what she means by "two discrete sets of principles", other than that two separate components are assumed to exist, i.e. the lexicon and the grammar.

Although I support and will expand later on Selkirk's claim for a similar set of rules to be applied to compounds and sentences, the consistency exhibited by words in sentential and word structures is a reflection of word properties. The rules of the grammar and the lexicon are formulations of the same entities. Consequently, two discrete sets of principles do not apply.

The division between the grammar and the lexicon in Selkirk's theory means that two sets of rules are needed to account for regularities in syntax and semantics. For example, both word adjunction rules and rules for sentential structures operate in conjunction with the same set of semantic principles (associated with Bresnan's (1982) Lexical Functional Grammar). It is the disjunction between the nature of the principles for syntactic structure (within and outside

the lexicon) together with those applied to meaning, that gives rise to the above-mentioned conflicting statements: the more so because the semantic principles are motivated to correlate with those which apply to sentences. The motivation is conditioned by theoretical assumptions, which contrast with Word Grammar, on the importance of the sentence as part of speaker competence. Added to this, the lexicalist framework here does not include any description of knowledge which connects sentential structures with performance.

A basic assumption of the mentalistic theory of Word Grammar is that the knowledge of language and its use cannot be separated. Language is a part of general knowledge and its mental representations conform to the same pattern. Both types of knowledge belong to the speaker/hearer and are individuated through personal experience. In this respect, Word Grammar contrasts with the lexicalist framework, which provides a model of idealistic speaker ability. The implication of idealism is that all speakers may achieve the same level of ability. For Word Grammar, this is an unrealistic objective, because a speaker's knowledge and experience will affect individual levels of ability.

Bresnan (1978) criticises the Chomskyan framework for being unrealistic on another account, i.e. the speaker's performative ability. The grammar describes the nature of language structures without explaining how it is used. As a result, the framework fails to show the interaction between stored knowledge of deep structure and surface representations. For example, the non-representational use of transformational rules (ibid: 2). Word Grammar follows Bresnan in seeking to provide a credible model of linguistic competence, which combines a description of ability in the organisation of knowledge with its application. To achieve this, consideration is given to the variability of factors pertaining to the phenomenon, per se. Since linguistic entities are the only consistent factor, a realistic goal is to construct a grammar of which only a subpart will represent the linguistic competence of any individual native speaker.

Selkirk's (1981/2) grammar of word-structure adopts the assumptions of Bresnan's lexicalist-interpretive model for language. But she fails to confront the full issue of language use. Her objective to provide an account of the relation between the syntax of words and their meanings does not go beyond the parameters of the ideal word (see Chapter III). Instead, her analysis gives rise to a number of unsolved problems. Why, for example, do the functional roles of the verb's roots for some compound nouns fail to generate verbal readings? Or, why are the functional roles of verbs and their meanings stored for lexical verbal compounds but generated anew for each sentence? Or, why can the meanings of certain compound nouns be defined, whilst other words are ambiguous (e.g. horn = of a car or horn = of an animal) or, even have opposite readings for different speakers, e.g. inflammable (cf. Hudson 1984:133)?

Beyond immediate lexical problems, there are also wider reaching implications of the lexicon's role within the grammar. Levi (1978), following Vendler (1967) claims that nominalisations are a device for packing information into the structural confines of the sentence. But, why make use of compound nouns where the sentence is available? And, how is it possible to predict the meaning of the compound noun on the assumption that there is a correlation between its verbal reading and the sentence when no defining characteristics of sentence meanings are available?

These questions arise because of the rigidly defined boundaries imposed by the lexicalist framework. A major claim of Word Grammar is that the framework is organised as a network of related concepts and entities. Since the network is undivided, it comprises linguistic and non-linguistic concepts which may be cross-related. For example, the notion word is a linguistic entity that is also an entity of speech. That is to say, it is a concept of an action, i.e. action = word.

Many similarities can be found between the speaker's understanding of real world situations and that of language. For example, for a given state of affairs, speakers have a set of stored concepts, e.g. apples, quantity of, quality, production, location of production, that are linked together to represent knowledge of the situation; e.g. 'some of the best British apples are grown in Kent.' Likewise, speakers have a number of stored concepts relating to words and their parts, e.g. grow, verb, proper noun, -s, /-ed/, preposition, etc. These may be linked together, e.g. -s is a suffix, grown is a past participle, Kent is a proper noun.

The structures of language and general knowledge are distinguished only by their defining characteristics. But, being part of the same network, linguistic concepts can cross-refer to non-linguistic concepts, e.g. apples ← apples, or word ← action. Where no direct correlation is found between language and non-language, the linguistic entity may function as a key to some alternative subnetwork, e.g. apple orchard cross-refers with Kent as a place where apples are grown commercially. Only where a linguistic structure cannot be linked to a concept of general knowledge is it considered unique. Hence, Word Grammar's approach to the phenomenon of language contrasts with that of transformational grammar. It assumes that investigations of language should consider the similarities with cognitive systems of organisation; whereas the transformationalist approach starts with a model of idealism that has its own unique mental representations.

One of the consequences of the network model is that individual entities are linked to more than one other concept. In addition, the type of entity varies in its degree of generality, e.g. an apple is an example of a fruit, which is an example of a plant, i.e. plant → fruit → apple. The relationship that links concepts of different degrees of generality is called instantiation. The more general concept acts as a model or prototypical example

of the instance. This has the advantage of providing a flexible method of storing information relating to different instances. For example, apple, cherry, apricot, mango, guava, are all instances of fruit (Prototype Theory (Rosch, 1976)). Additionally, it provides an economical method of storing information that assists learnability. General properties stored by the instance may be stored once at the level of the model and inherited automatically by the instance.

Another advantage of instantiation is that the instance is not an exact representation of its model. It only closely resembles it. Therefore, in identifying an instantiation relation, speakers may use their judgement on what instance best represents its model, (Best Fit Principle (Winograd, 1977)). They do not have to identify a set of necessary and sufficient properties to match the instance to its model.

Finally, if the instance is linked to another general entity, there is a degree of deviance in the number of properties associated with each type of concept. Ideally, the instance has more properties than its model, because it inherits all the model's properties (which may be more than one) and also has its own. The properties of the instance are stored within it. However, in the property-matching task undertaken with instantiation, a specific property may block the inheritance of a more general one, in which case the property of the instance has priority in its contribution to the exploited information.

Theoretically, the instantiation procedure of the linguistic hierarchy is not dissimilar to the principle of percolation advocated in the lexicalist approach (see Selkirk in Chapter III). But the similarity is superficial because in the latter framework all the properties of the root or stem of a word must be inherited by the derived word. There is no difference in the degree of generality

for the semantic properties that percolate upwards. As a consequence of these assumptions, the word is held to comprise a set of necessary and sufficient properties and, unlike Word Grammar's instantiation network, no tolerance in deviation is accepted. The relationship between the root or stem and its dominating node assigns a different syntactic status to the words concerned. By contrast, in Word Grammar all words (derived or otherwise) have the same status within the grammar. They are differentiated only in degree of computational specificity. That is to say, the compound noun is a more specific example of a noun and a word, but one of its features is that it comprises two words. This is a characteristic of the compound and, therefore, overrides a general entry of composition for the word.

Lastly, the percolation principle operates simultaneously on syntactic and semantic properties. In Word Grammar the inheritance of syntactic properties is autonomous. Consequently, it can be seen that the direct correlation between form and meaning (of the verbal compound) is not a symbol of the productivity of lexical rules (see Roeper and Siegel's framework in Chapter III). It is the close resemblance between the mental representation of language and non-language, i.e. the verb is a lexical device in a specific subnetwork, the relations of which are exploited for word structure. The compound word inherits one of the relations of the subnetwork as part of its meaning. By contrast, non-verbal compounds involve the scanning of parameters of general knowledge to which the subnetwork is linked.

1.3. Theoretical Principles.

1.4. Competence v. Performance

The lexicalist interpretative approach takes competence as an ideal model of grammatical ability to underlie the act of communication. Imperfections of the communicative act belong to the theory of performance (Chomsky (1980:59)) and are controlled by

different kinds of principles. By contrast, deviancy is inherent to Word Grammar's framework, and the act of communication, i.e. the spoken word, is part of the grammar. Thus, performance = language use corresponds to what happens after the word has been uttered. Once a word is uttered it is linked to a stored word in the speaker's network of knowledge and this provides access to a network of stored information. Hence, performance is simply a difference in the degree to which information stored in the network is exploited.

For the lexicalist model, competence includes a lexicon and two sets of different types of rules, one for sentence structure and one for word structure (see p. 114 Word Adjunction Rules). In Word Grammar the 'rules' are equivalent to the relations that make up individual word networks e.g. the instantiation relation predicts the regularity of property sharing between specific instances and their models. This relation extends throughout the speaker's ability to organise knowledge and is considered a general operating principle for word recognition.

Adjacency is the other principle that has the same important status for organisation as instantiation. The two principles correspond to the vertical-horizontal parameters of classification advocated by prototype-based theories. (Rosch, 1977). These principles will be discussed more fully below, together with the network links assigned to the word.

Before proceeding further, some notation is appropriate. In Hudson's book Word Grammar (1984) two notational forms are used; the diagram and a slot-filler device, e.g. model (x) : y. The slot-filler device represents the name of a property belonging to an entity (x) and the filler (y), a variable of this property inherited by the entity. This device will not be used here. I refer the reader to a discussion of some of the problems for this device outlined

in Hudson's Working Paper "Notation and Grammatical Relations in Word Grammar", (Jan. 1985).

In my opinion, the slot-filler approach implies that the word is a discrete whole. This conflicts with Word Grammar's hypothesis that it is a typical representation of speaker knowledge, i.e. there is a varying number of properties by which speakers identify the word, but the information may be incomplete. Secondly, discreteness suggests that the named slots are specific to individual word structures whereas properties are propositions linking different types of concepts across word and syntactic boundaries. I shall, therefore, adopt the present practice of using a formulaic representation of propositions. Propositions link two arguments (concepts) together by naming their relational link. They follow a format of $A_1 R A_2$, where $A_1/2 =$ argument and $R =$ relation. The proposition is representational of the network links throughout the framework. In this respect, the propositions are not instructions for procedure, but statements, i.e. declarative knowledge.

The framework consists of the following types of concepts:

- (i) atomic concepts, which have no internal structure.
- (ii) temporary concepts, such as uttered tokens of the word. These are represented by a bracketed pairing of 'word' with a number, e.g. 1,2,3 etc. to indicate sequence. Numbers also have the advantage of indicating the time at which each word is uttered, i.e. 'word 2 incorporates time 2.
- (iii) quantified concepts, e.g. $a(n)X =$ an instance of X
- (iv) functional concepts, e.g. subject of (word 2)
- (v) relative concepts, which reflect the connection between a head concept and a relative clause, e.g. head + which/whose. These include the relations of place, such as 'precedes' and 'follows'. Relative concepts may be abbreviated, e.g. "noun which is plural" \rightarrow (plural noun)
- (vi) sets correspond to the proposition of composition (Word Grammar 1984) and contain an ordered set of arbitrary names, e.g. the set

of phonemes /dog/ defines the internal structure of the word dog. They also cross-refer to syntactic companions, e.g. co-ordinate structures (Word Grammar 1984) where John is the shared syntactic subject of came in and sat down in

John came in and sat down.

(vii) Propositions themselves may also function as arguments, i.e. concepts (see (d) Anaphors below).

In addition to the types of concepts, it is noted that they differ in how they relate to the world, e.g.

- (a) Relational concepts are represented by propositions 'is' and 'has'.
- (b) Qualifiers by a/many/number.
- (c) Functions are open-ended. Being concepts of some base concept, functions vary as that of the base concept varies, e.g. the concept 'referent of verb' selects as many entities as the verb has referents.
- (d) Anaphors, e.g. which/whose, include "ditto" to show co-reference, e.g. subject of [adjective whose head is noun] is head of ditto.
- (e) Linker 'of'.
- (f) Ordinary concepts, e.g. 'man'.

It is clear that representation of language as a network can become extensively unwieldy in the formulaic notation of propositions if all the information is to be contained within a description.

I shall, therefore, limit the use of propositional formulae to the data at hand by the simplest representation. Diagrammatic notation is useful in providing visual representation to supplement the description of the data. Consequently, I shall use this where appropriate.

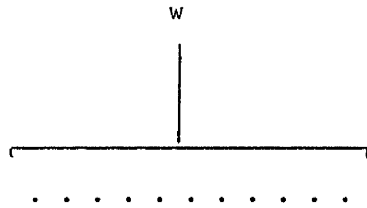
The diagrammatic form as given in Word Grammar (1984) is as follows.

1.5. The Notation.

The following types of proposition refer to words.

1. Composition. This refers to the word and its parts. The

parts are listed below a t-bar bracket. Dots indicate an indefinite series of specified parts.



w = word.

The proposition formula is: word has parts

2. Model. This is a general entity of which the word is an instance.



M = model

The proposition is: model of w is (a M).

3. Companion. This relates an entity to another entity with which it occurs. Companions may be syntactic or semantic.



c = companion.

The proposition is: companion of a word is a word.

4. Referent. All words are linked to a semantic structure which is their meaning:



The asterisk distinguishes the referent from the word itself. The proposition is:

word has a referent.

For referents, the diagrammatic representation of the asterisked word visually separates the meaning from the word-form. In the formulaic notation for the proposition, the separation is indicated by prefixing word- to the word form, e.g. referent of word-cat is cat.

5. Utterance-Event. On a word being uttered, it is linked to the participants of the event, e.g. speaker, addressee, time, and place.



u = utterance event.

The proposition is: word is a communication.

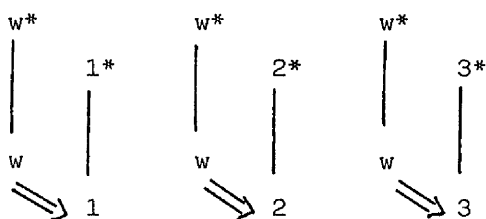
Inherent to each of the above propositions (Word Grammar, 1984, Conditions on Propositions), is the concept of identity and sequence. Identity encompasses the recognition of types, such as model or utterance event: and parts, as with composition or referent. But the relations between arguments may manifest themselves differently. For example:

- (1)(a) A Granny Smith is an apple.
 (b) An apple is a fruit.

The subject of (1)(b) is a more specific example of the object fruit. An asymmetrical relation is manifested between an instance and its model, which is represented diagrammatically by the double-barrel arrow. But one interpretation of (1)(a) refers to the symmetry between the subject and object, i.e. they identify the same entity. Symmetry is symbolised by =.

Another feature of identity is the difference between the stored word and its spoken representations. The stored word is equivalent to the lexeme (Lyons, 1977:19), which is a convenient device for referring to a part of a speaker's knowledge structures. The spoken word is distinct from its counterpart the lexeme because it manifests language in use. It may, therefore, occur in a sequence of words.

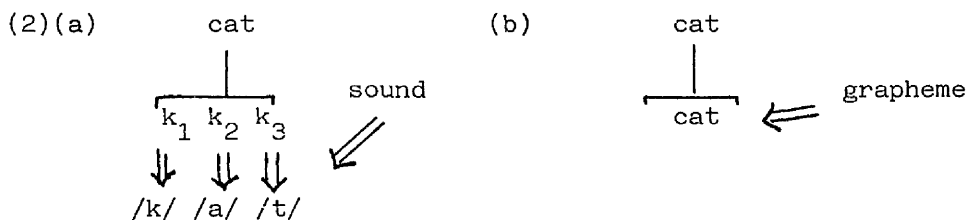
Sequence refers to order related to temporary concepts and typical examples are the longer structures where one word follows another in a string of words or utterance-event. When referring to an utterance-event, temporal word order is shown by use of numbers, which must then be linked to the appropriate lexeme:



1, 2 and 3 represent spoken words and instances of the stored word, w. This has the advantage of visually symbolising directionality. In a speech act, word 1 precedes word 2, and word 3 follows word 2 in time sequence. For the written word symbolised by < > brackets, word 2 is placed after word 1 and before word 3. Temporary concepts are therefore bound to a particular time and place with a sequence of acts.

1.6. The Word.

The word is a composite of different types of related concepts and its form projects it into the area of language use. Speakers have two types of knowledge ; the one uttered, the other written. A phonic and a graphic representation of stored concepts for the word cat is given below, using the two forms of notation:



speech sound is an action
 sound cat is an action
 part of sound cat is a/k/

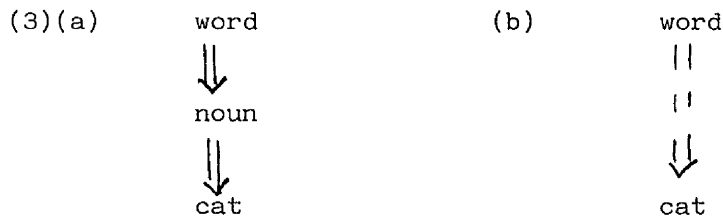
<word> is an action
 <word-cat> is an action
 part of <word-cat> is <c>

The parts of the uttered word are instances of the sound model, but they are also instances of individual phoneme models, e.g. k a t , because they may be pronounced differently on each occasion. There are also other types of variations in utterance events, besides individual characteristics. Some may relate to the influence of the linguistic context, e.g. the assimilation of the phoneme /n/ with its following sound as in /baŋk/; or 'environmental contamination' (from Cutler, 1981, reported in Hudson, 1984:42). Others may simply be due to speech impairment.

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Above the t-bracket in (2)(a) is the lexemic representation of the word. In effect, the lexeme brings together the maximum number of linguistic and non-linguistic properties known by the speaker for any particular stored word. The lexeme is always categorised according to its function as a major speech class, i.e. noun, verb, adjective, preposition, etc. The function of the noun is to identify a physical or abstract object: the verb identifies a state of affairs: the adjective identifies an attribute of an object or event: the preposition identifies a location. Each of these word-types is an instance of the word.

Word-cat is an instance of a noun, so besides having the latter as its model, it is also linked to the word model.



The instantiation hierarchy between a model and its instance is transitive. Since cat is an instance of noun and noun is an instance of word, cat is an instance of word (cf. (3)(a)). This is advantageous to the descriptive adequacy of the framework in which instances inherit properties of their models. The lexeme has a meaning (or referent), which is linked to the speaker's cognitive structure. To use Selkirk's descriptive term, meaning "stands at the interface" between language and non-language and inherits properties of the speaker's experiential knowledge. Hence, by definition of transitivity, properties of the latter may be part of (or entailed within) the semantic structure of the lexeme. As the uttered word deviates from the stored word, the number of semantic properties may also vary between the model and its instance.

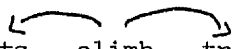
Previously it was pointed out that general knowledge is organised as a collection of mutually predictable properties. With deviancy being inherent to the framework, some of the inherited properties will be overridden. This means that not all the properties of the semantic frame need be entailed within the meaning of the word. In this respect, Word Grammar differs from prototype theory, because the models of the former are schematically incomplete. In addition, links between models are relative and no one model is the norm or basis from which all other concepts are classified. This is contrary to prototype theory, which categorises entities on the levels of general, basic and specific. Evidence from compounding supports Word Grammar's view. If the compound refers to "type of" entity, the logical assumption would be that the class of entities of which it is a token is the basic prototype. But, compounds are found at all levels of classification, e.g. general: post office, basic: post man, specific: registered post. This implies that the levels will vary according to what is taken as the norm. This, in turn, is influenced by what is salient to individual experience.

Hence, the models of Word Grammar are not themselves prototypes, but represent a collection of mutually predictable properties. This has the advantage of permitting all the available stored information of the lexeme to be processed simultaneously.

The predictable properties of a lexeme are those described above, i.e. a form, a meaning and some information on its syntactic function. The latter involves the valency relations with other words. Here Word Grammar contrasts with the lexicalist approach which uses a constituency based grammar, by adopting the principles of Dependency Grammar (Tesnière, 1959).

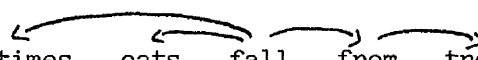
Dependency is a relation between two words, where one word, as head, sanctions the occurrence of another, a modifier. Since the uttered word takes a prominent place in Word Grammar by

relating to states of affairs in real world situations, the verb is assigned the ultimate status in word-strings. Word-strings (or dependency chains) contrast with the notion of sentence inasmuch as the latter is not part of Word Grammar's network. Contrary to the implications of constituency grammar, according to Word Grammar speakers do not store sets of sentence patterns. Sentential structures are sanctioned by the properties of the models, which the uttered word is linked into by way of the lexeme. For example,

(4)  cats climb trees

The lexical verb climb takes two companion modifiers, cats and trees. The condition on the number of modifiers for climb is inherited from its model the verb. One of the dependents for a verb is the subject, cf. cats in (4) above. This is a pre-dependent, since it usually occurs before its head. Another is the post-dependent object, cf. trees.

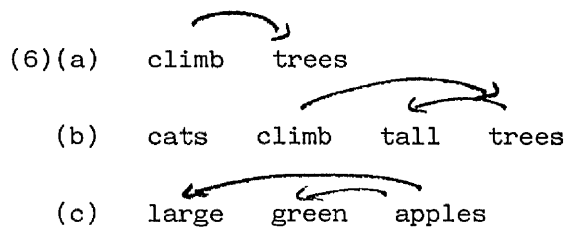
Lexical verbs which are intransitive, e.g. fall, do not inherit the post-dependent object from the verb model, because there is a specific entry to take a prepositional object. Hence, the latter overrides that of the general proposition, e.g.

(5)  sometimes cats fall from trees

The instantiation procedure corresponds to the lexical information of sub-categorisation rules for Extended Standard Theory, e.g. V [___ NP] in (4) above, (see Hudson's Working Paper "On the so-called COMP-trace effect", May 1985, for further details). But it is more informative because it provides details of the functional roles of the lexeme's dependents. In addition, the properties of the model act as well-formedness conditions on the utterance. If the uttered word inherits a prepositional object from its lexical

model rather than, say, an object noun phrase, the word that must follow the uttered verb is a preposition. Where it is not, the output is ill formed.

Dependency relations also guarantee that the modifier occurs either (i) next to its head or (ii) is separated from it by another modifier (or modifier of a modifier) of the same head, e.g.



(6)(a) conforms to the constraint in (i), and (6)(b & c) to (ii).

The functional property relating to the dependent is inherited by its head from a more general model and is thus part of the formal properties of the head. The head also links the dependent to the rest of the sentential structure. Semantically, the meaning of the dependent represents some property of the meaning of its lexical head.

To conclude. A dependency approach to the analysis of sentential structure replaces the traditional approach because the former can provide the same information. The syntactic categories of modifier and head are relative to each other and, hence, words can function as head and modifier simultaneously. For example, the preposition from in (5) is both modifier of the verb and head of the following noun trees. The result is that phrases, clauses and sentences are not needed. All the patterns for larger structures can be accounted for in terms of the head. That is to say, the noun phrase = the noun and all its modifiers; and the sentence/utterance = the verb and all its modifiers.

The companion relation in syntax correlates with a similar relation in semantics. Each concept of non-language is linked to other concepts that are its companions and help to define it. These companions, or roles, are the arguments of the propositional links in the semantic network. The greater the number of argument links, the more information is accessible from the cognitive structure and the greater the restrictions on the type of dependent for the individual lexeme. Syntactic dependency does not parallel the semantic valency of arguments, because any syntactic entity is linked to a meaning, either directly or indirectly, via another word, but not every semantic concept has a lexemic representation.

Arguments provide links (i.e. propositions) to a wider knowledge that helps to distinguish the meanings of word-types. Following the hypothesis that every entity comprises two types of property or attribute (Pulman, 1983), which are structural or functional, the proposition differentiates the composition or purpose of an entity. For example, the physical objects cup, bottle, envelope, share a proposition of purpose as instances of the model, container. Hence, their defining characteristics are in terms of structure, i.e. their composition. Bottle is usually made of glass, envelope of paper, and so on.

Other properties of visual concrete forms, e.g. size, colour, location, are optionally available for exploitation in the use of noun dependents, e.g. blue envelope. It may be that, if not dependence, at least adjacency, is a condition on arguments, because adjectival modifiers show a rigid syntactic order, e.g. *blue, old envelope, that may correspond to some cognitive method of organisation. Perhaps colour is one of the primary concepts for discriminating between individual objects. This does not seem impossible when considering animal strategies for camouflage.

To sum up. The network brings together the five propositions

that make up a speaker's total knowledge. This will, therefore, be taken as a working hypothesis for the definition of the word. A word is composed of sounds, or graphemes; it has a meaning; its companions are other words and it is an instance of an act of communication.

1.7. The Interpretative Principles.

The method of organisation for specific knowledge is governed by several interpretative principles. These principles are interpretative inasmuch as they affect the propositions which can be derived, and take the form of 'if ---- then' statements. There are two which are of particular importance to the study of compounding and which are set out in full below.

1. The Selective Inheritance Principle.

If (i) X is (a Y) and (ii) Y occurs in some proposition P, and (iii) Y is not quantified (i.e. directly preceded by a quantifier) in P, and (iv) P does not conflict with any proposition which mentions X, then, for every such proposition a new proposition can be created in which Y is replaced by X whenever Y occurs.

Ref?

The above corresponds to a similar principle of the 1984 model of Word Grammar in allowing all the properties of an instance to match those of its model. The instance automatically inherits the general properties of its model, which are reformulated in terms of the degree of specificity for the instance. This applies in all cases, except where propositions relating to the instance are deviant. For example, if 'word-climb is a verb' and 'subject of verb is before verb', then 'subject of word-climb is before word-climb'.

2. The Adjacency Principle.

If 'X is (a (dependent of Y))' then NOT
 (i) "Z is (between X and Y)" and (ii) NOT
 'Z is (a (chain-dependent of Y))' and NOT
 'X is (a (dependent of Z))'.

This means that the dependent of Y must occur as near as possible to its head.

1.8. Utterance and Utterance-Event

The term 'utterance' can refer to the word which is uttered or to the action of communication. Word Grammar differentiates between these two meanings by using utterance-event to refer to the latter. An utterance-event is a more specific instance of the utterance and, as such, an instance of an event. An event is part of speaker knowledge about states of affairs and, therefore, utterance-events can be equated with instances of knowledge. Consequently, the devices used for processing and remembering stored information equally apply here.

As an action, an utterance-event has a speaker who is the agent who carries out the action. An action is entailed in the event, and, thus, includes an actor who may be the speaker. This may not always be the case, as, for example, when an utterance-event involves reported speech. Other participants include time, which always accompanies an event; and purpose, which is the communication itself. The latter anticipates some effect, e.g. an imperative verb is a command to produce a result. The event will also be located in a particular type of deed, or occurring in some place, and involves a change which may affect another participant, i.e. the affected.

The length of an utterance-event is variable and is susceptible to changeable factors, e.g. turns involving the change of speakers, or changes in purpose of communication. Even time changes with each word uttered. Therefore, the only constant factor is the utterance, and the utterance-event, being an instance of the utterance, is considered to be invariable except where it deviates from its model, i.e. in time.

With the utterance-event being an instance of speaker knowledge, its analysis is especially relevant to the analysis of word meaning because many concepts of the former are inherent in the latter. For example, utterances which are instances of words with deictic meaning, e.g. personal pronouns and demonstratives, refer to elements of the utterance-event of which they are a part and demonstrate the close link between the semantic structures of the utterance-event and the speaker's stored knowledge.

This characteristic is not confined to deictic words. Some ordinary words refer to different kinds of utterance-event, e.g. believe, promise, etc. Definiteness (a feature of the article the) and mood (e.g. modal verbs like can and will etc.) are related to types of speaker knowledge. Mood, for example, indicates an aspect of knowledge about ability or likelihood. Stylistic variations like cat v. pussy are further examples of stored knowledge that go beyond linguistic knowledge of the utterance-event itself to aspects of social or cultural observance. Hence, the interaction of word meanings with the utterance-event provides evidence for investigating semantic structure and the nature of mental representations of knowledge without the need to separate competence from a model of performance.

In Word Grammar, the importance of the spoken word is

contrasted with that of the written word. For, whilst both types of word are part of knowledge, they involve separate channels of expression. The written word replaces the dimension of time used by the spoken word, with that of space, and is reflected in the language used to describe these dimensions. For example, the expression of 'above' and 'below', or 'speaker' which is replaced by 'writer', and 'written' which is the product of an action.

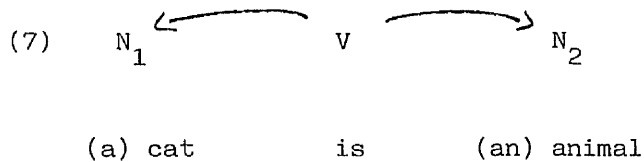
But it is suggested that the written word is parasitic of its spoken counterpart because examples can be found where spelling is dependent on pronunciation, e.g. the a/an distinction for words beginning with a vowel. For this reason, the spoken word is taken as the model for the written word, but words used in both domains of knowledge are evidence of the speaker's underlying ability which is exploited in the comprehension of meaning.

2. Constituency : Dependency

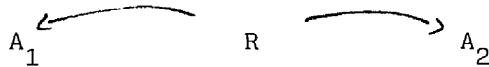
Word Grammar (1984) disputes the claim (as advocated by Robinson 1970) that constituency and dependency structures are equivalent and lists reasons to support the rejection. Therefore, I shall not repeat the arguments here. But three issues which are raised have a bearing on this investigation and, thus, are discussed below. The issues concerned relate to predicative adjectives, relative pronouns and co-ordinate structures.

The arguments for the above significantly demonstrate the exploitation of knowledge content for the sentence, relative clause and noun phrase, all of which have been used as criterial evidence in the analysis of compound noun meaning. In the following examination of these phenomena, two other issues are discussed. The first is the claim by Word Grammar 1986 that syntactic dependency in sentences is a reflection of semantic dependency for propositions. The second is the observation that the properties of words sanction the well-formedness of grammatical structures.

Word Grammar 1986 claims that sentences are made up of dependent word-pairs which combine together to generate propositions. Hence, a typical active sentence may be represented as a combination of two noun dependents related to each other via the verb, e.g.



Similarly, propositions have an internal structure for which two arguments are linked together by a relation:

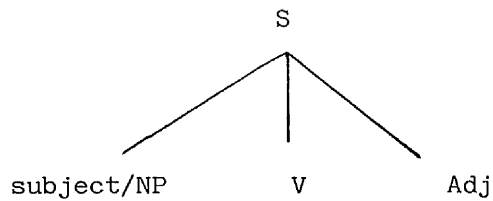


where $A_{1/2}$ = argument and R = relation. If the meaning of the verb of (7) is an instance of a relational concept, then the meanings of the two nouns cat and animal are instances of concepts which function as arguments of the relational concept 'is'. Hence, the syntactic dependency links of (7) appear to have a direct semantic correlate, where the companion arguments within the proposition exhibit a dependency link with the relational concept.

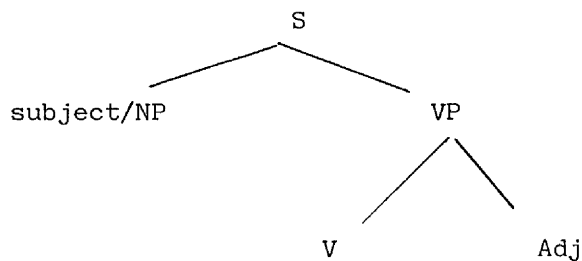
Consider now a sentence structure containing a predicative adjective:



(8) is syntactically similar to (7) above in comprising two dependency links. There is, however, a third dependency link that can be assigned to (8), which combines eyes with the adjective blue as its subject. Under constituency analysis the relationship between a subject and a predicative adjective may be shown either as



where the subject is sister to the adjective. or



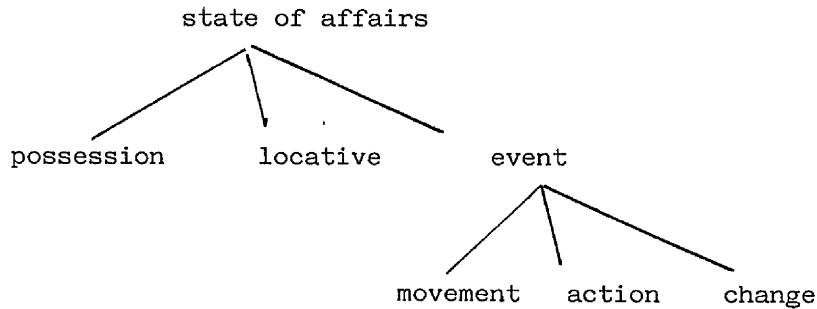
where the subject is sister to the verb phrase containing the adjective. But the analysis is unable to capture the generalisation that both of these situations exist simultaneously. In contrast, a dependency approach takes the word, in this case the verb, as the common factor in each situation, i.e.

"... the subject of the predicative adjective
whose head is some V is some other modifier
of V."

(Hudson 1984:96)

and accounts for the additional dependency link in terms of semantic companionship.

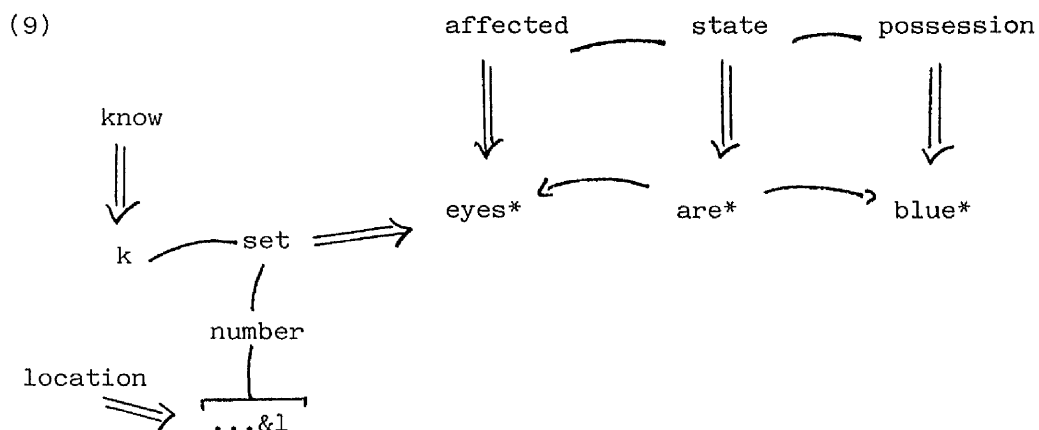
In the following description of the relationship between the subject and the predicative adjective, I shall refer to the model hierarchy proposed by Word Grammar (1984:157-9), i.e.



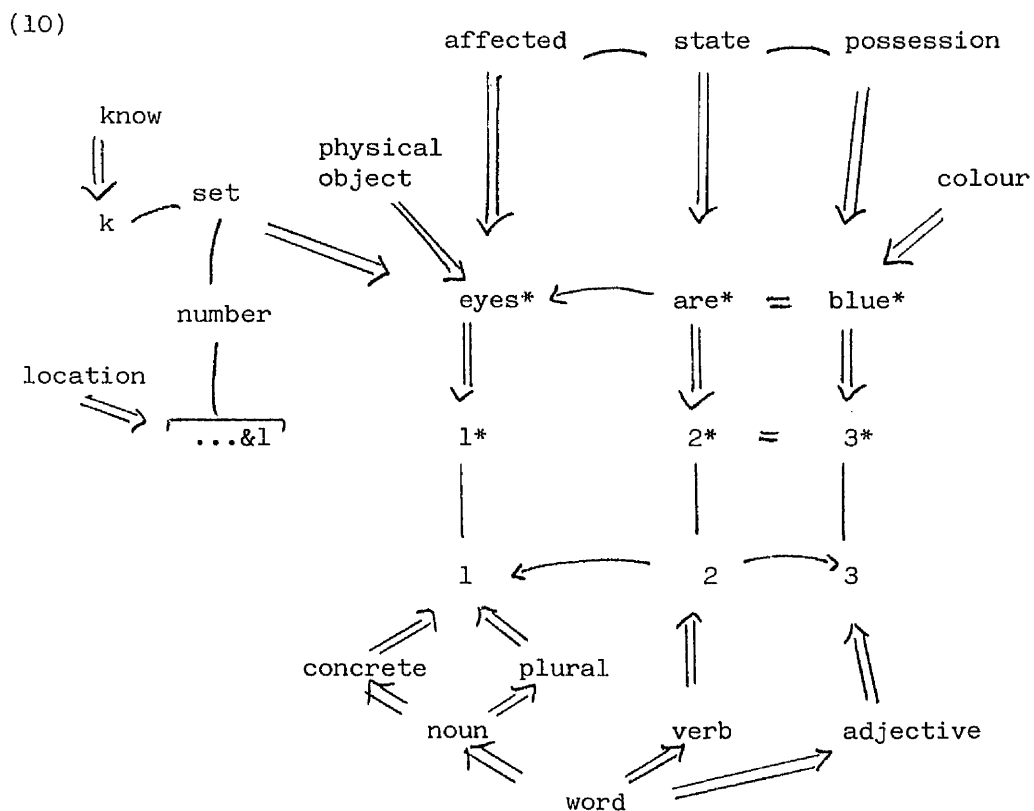
In the above diagram, the most general model in the hierarchy, i.e. state of affairs, is instantiated by more specific concepts of possession, locative and event. To this list of concepts is added a state model. The state model contrasts with an event because it does not have a feature of dynamicity. This feature is specific to the event model.

Returning to the description for the predicative adjective, part of speaker knowledge for (8) above includes the information that the referent of the verb are is an instance of the state model. Moreover, it is known that stative verbs usually take a subject which is affected by the referent of the verb. Hence, a state model has an argument which is the affected. In addition, the affected entity is always the semantic subject, which in this example is represented by the referent eyes*. In connection with the referent of eyes*, there is another parameter of knowledge; namely that the concept referred to comprises a set which has more than one member.


On the model hierarchy, it is observed that one of the companions for a state model is possession, which is syntactically instantiated by the adjective blue in (8). Thus, the syntactic dependency link between the verb and blue has a semantic correlate with the referent of blue instantiating an argument of are* as an instance of possession. A representation of the semantic network identified so far is given as follows:



One of the characteristics of copula verbs like be is that they are semantically empty. Therefore, although the referent are* is identified as stative, the nature of this state is determined by the referent that functions as its argument, e.g. blue*. This means the verb are in (8) shares its meaning with the adjective's referent, e.g. are* = blue*. To put it another way, the verb comprises two syntactic words linked to a single referent. A complete diagrammatic representation of the syntactic and semantic network is:



As a result of the semantic relations between the referent of the verb and that of the adjective, the sentence of (8) represents a functional structure of subject plus verb. Since the adjective is part of the verb nucleus (Tesnière 1959), it takes the sentential subject as a dependent. Thus, the semantic properties of the verb determine the nature of the syntactic relations. Given this information speakers are able to establish an additional dependency link for sentences like (8) above which have a predicating structure, e.g.


 eyes are blue

Turning now to the relative pronoun, a mentalistic analysis contrasts with the transformationalist view that the pronoun is derived from some co-occurring noun phrase at a higher node (cf. Evans (1980) cited in Word Grammar 1984:173). Instead the relative pronoun depends on the noun which functions as its head, and acts as a linking entity by relating information from the clause which it introduces to that of its head noun.

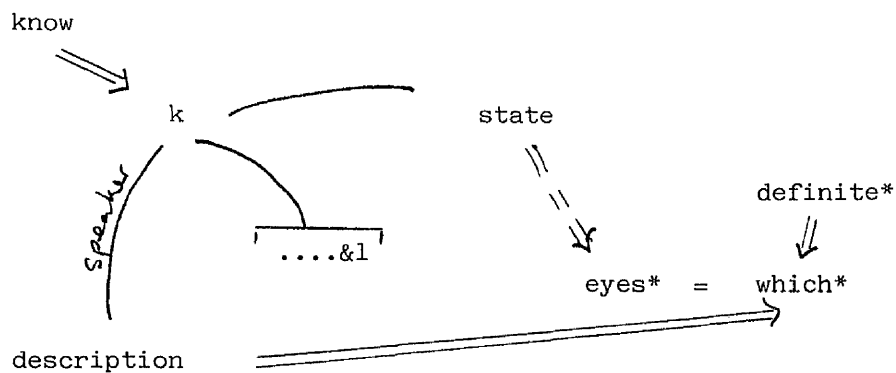
There are two types of relative clause. Either it may be defining, in which case it identifies a subset of the class denoted by its head noun. Or, it may be ^{non-}defining and supply additional information relating to the referent of its head. The type of relative clause that has been used to define compound noun meanings is the defining one.

If (8) above is altered to represent a defining clause, e.g. eyes which are blue, companion relations are similar to those of (9) with the added information supplied by the referent of which. Under a Word Grammar analysis the referent which* shares the referent of its noun head, e.g. eyes*. However, the lexeme's categorical function is one of relativity and it acts as a device to relate one entity to another. Thus the pronoun indicates certain information

to the hearer; namely, that the state referred to by the verb in the relative clause affects the referent of the noun it modifies. In using the relative pronoun, the speaker deliberately indicates some known fact that describes the referent of the class denoted by the noun on which it is dependent. The known information is, therefore, definite. This is in contrast to the ^{non-}defining relative clause, whose function is to provide additional information connected with the prototype referred to by the noun's referent.

The two functions of the wh-pronoun are disambiguated in speech by different stress patterns, and in writing by the use of commas for the ^{non-}defining relative clause. In terms of network links for the defining clause, the information would include a companion linking line for the model know to indicate the knower is the speaker and that the knowledge possessed by the latter is a description:

(11)



With the ^{non-}defining relative clause, the added information is also asserted as known or definite but the known information is part of the model for the noun's referent.

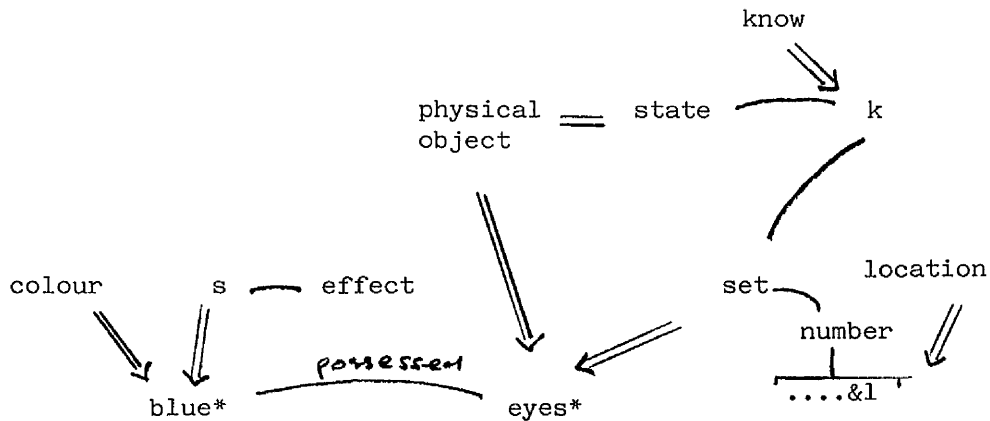
Hence, the presence of additional dependency links in the syntactic structure of the relative clause:

(12) eyes which are blue

corresponds to further propositions about the information within the network for a state of affairs identified by the sentence. If the hearer knows that the dependency links of syntax are devices that signal semantic propositions then certain deductions can be made about the function of the categories which would be relevant to the utterance interpretation. As head of the relative phrase, the pronoun signals known facts about an identified entity to the hearer. As dependent of the noun which is head of the phrase, the pronoun indicates that the meaning of the phrase is part of the meaning of the noun.

The noun phrase consisting of adjective plus noun, e.g. blue eyes, contrasts with the compound noun but can be shown to exploit a similar semantic network to that of (9) above. For example:

(13)

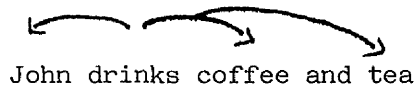


(13) above shows that the physical object itself is equivalent to a state, i.e. a participant in a state of affairs, thereby explaining the similarity of its companion network with (9). But (13) differs from (9) and (11) in the emphasis it gives to different aspects of the same network. For the noun phrase the focus on meaning is on the state of the set of eyes. In the predicating sentence structure of (9) the focus is on the assertion of blueness as a state of the

subject; and in (11) it is the definite knowledge used to describe the entity denoted by the noun. In consequence, with each syntactic dependency link there is a semantic correlate but, as shown by the example of the predicative adjective, there may be other dependency links which are not immediately apparent syntactically.

Finally, co-ordinate structures are a type of entity which Word Grammar recognises as having constituency. Rephrased in this theory, constituency is considered to refer to arguments which comprise a set. In this respect, the idea of a constituent structure being a larger unit made up of smaller ones is consistent with the transformational view. However, this mentalistic view of constituency shows that the semantic equivalent of the syntactic concept is an overall understanding of the relation between individual models and their companions. For example:

(14)



Following the principles of analysis of Word Grammar 1984, the verb in (14) has two companions inherited from its model event by the Selective Inheritance Principle, i.e. subject and object. The object comprises a set of two concepts, coffee* and tea*. In order to work out the significance of the juncture between the members of the set, it is necessary to reconstruct a link between the companion, which is a member of the set, and its model.

The guidelines for this procedure are already provided syntactically by the first conjunct head, e.g. coffee in (14) which is a dependent of the verb drinks. Thus, an imaginary model is reconstructed, based on the availability of information for the first co-ordinate, i.e. the pseudo-head or counterpart. From this reconstruction the companion for the dependent argument together with its relation is identified.

Co-ordinate structures like (14) above are only one kind of phenomenon that requires the reconstruction of information in this way (see Hudson, July 1984, Working Paper on "Multiple (alias 'parasitic') Gaps"). The type of reconstructed information varies inasmuch as it may be the counterpart of the verb's model that is invoked, e.g. as in (14), or that of the latter's argument, e.g. John in John came in and sat down (ibid:216). In (14) the argument relation is the same for both conjuncts and is indicated by the category of their word-type, i.e. both coffee and tea are nouns. But a direct correlation need not exist between category labelling and the functional relation. For example, in He is happy and in a good mood (ibid:220) the two members of the predicative have the category labels of adjective and prepositional phrase respectively. At a general level, these two members share the same function of instantiating the argument possessed for the state model of the verb be. But their specific identity discriminates between the emotions that are possessed, as indicated by the separate syntactic entities happy and in a good mood. The discrepancy between the category labelling and the grammatical function exhibited in this example is one instance of the behaviour of words which subcategorisation frames (mentioned in the previous section) are unable to show.

In contrast, Word Grammar is able to demonstrate that part of speaker knowledge for co-ordinate structures involves an evaluation of information after the network links have been exploited. That is to say, the speaker must supply information for a missing link in order to complete the interpretative process. In doing so, the number of possible variables that may be the 'missing link' is reduced on elimination of given information. By matching all the counterpart conjunct's network links with the given information of the second conjunct, that which remains, or is unaccounted for, is the missing link.

In sum, the need for constituency is the need to appeal to a more general model, in order to exploit it for the identity of information relevant to the interpretative process. Hence, the

junction of the syntactic dependency line, as in the above example (14), represents the direction in which the missing model is to be found, i.e. either as a verb/event (state) model or an as argument.

As a result of the analysis of co-ordinate structures a contrastive situation arises between the exploitation of information for the latter and the previously mentioned constituency structures, i.e. predicating sentences, relative clauses and noun phrases. With these, all the information is given by the individual networks to which the word gives access. Hearers simply have to process the information and form their own judgements. But with the co-ordinate structure, the hearer has to work out part of the information beyond processing that which is given, in order to establish its relevance to the meaning of the structure.

It is this type of procedure that requires the hearer to supply a missing link that Downing (1975) claims is a characteristic of compound nouns. Since the present version of Word Grammar advocates that compound nouns are constituent structures, there appears to be an area of agreement here that lends itself to the investigation of the meanings of compound nouns using the mentalistic framework of Word Grammar.

2.1. Communicative Value

Downing's (1975) findings on the creation of novel compounds provide significant information on the pragmatic conventions observed between speakers on the use of compound nouns. The conventions described enable hearers to retrieve a 'missing link', which is a necessary part of the interpretative procedure for this word-form,

because there is "no referent class for the compound as a whole". (ibid:47). The findings are detailed as follows:

(i) It is observed that the compound is an economical structure used to name a participant of a 'relevant act', which originally has no pre-existing name.

(ii) The choice of head constituent indicates the class to which the participant belongs.

(iii) The choice of the dependent and its relation to the head indicate the parameters of speaker knowledge considered to be of value.

This may include time, e.g. October quarter moon; composition, e.g. brick chimney; or function, e.g. rabbit rifle (ibid:46).

Translated into the metalanguage of Word Grammar, this means the compound noun can be linked to a general model by virtue of its head as an instance of some argument of this model; and there are other parameters of knowledge of equal importance in exploiting the known facts.

Downing adds to her observations that the selection of constituents under these conditions carries semantic weight, which is equivalent to the speaker discovering the missing link. According to Downing, the missing information is not given in the surface representation of the word-form. Hence, speakers facilitate the hearer's task by combining nouns that exhibit a relation of 'cognitive proximity' that assists in narrowing down the referent class in question. Moreover, the intention of using this method of word-formation is similar to that for metaphor. On the communicative task involved, Downing cites Fillmore on the use of metaphor where the hearer must work out something which might otherwise be stated simply. Her reason for reaching this conclusion is that

".... it is assumed that much of the information associated with various lexical items is stored in experiential encyclopaedic terms"

(ibid:47)

Since Downing's investigations are couched within the transformational framework, her work represents a theory of performance for compound nouns. This, in turn, influences the nature of the conclusions arrived at, e.g. the separation of referent identity from intentional use of the compound structure. However, Word Grammar's framework allows the two separate procedures for intent and referent identity to be combined within a single analysis. Further, the semantic structure of lexical items in this framework are made up of instances of cognitive concepts. Therefore, the referents of stored words are linked to encyclopaedic knowledge in addition to containing dictionary information of lexical meaning. This means that the necessary information contained within the network linked to the compound constituents is simultaneously available for exploitation in comprehending the word's meaning. Consequently, the notion of 'cognitive proximity' may apply to those arguments (or conceptual entities) which are part of a particular state of affairs to which the lexical item representing the internal head is a key. /s

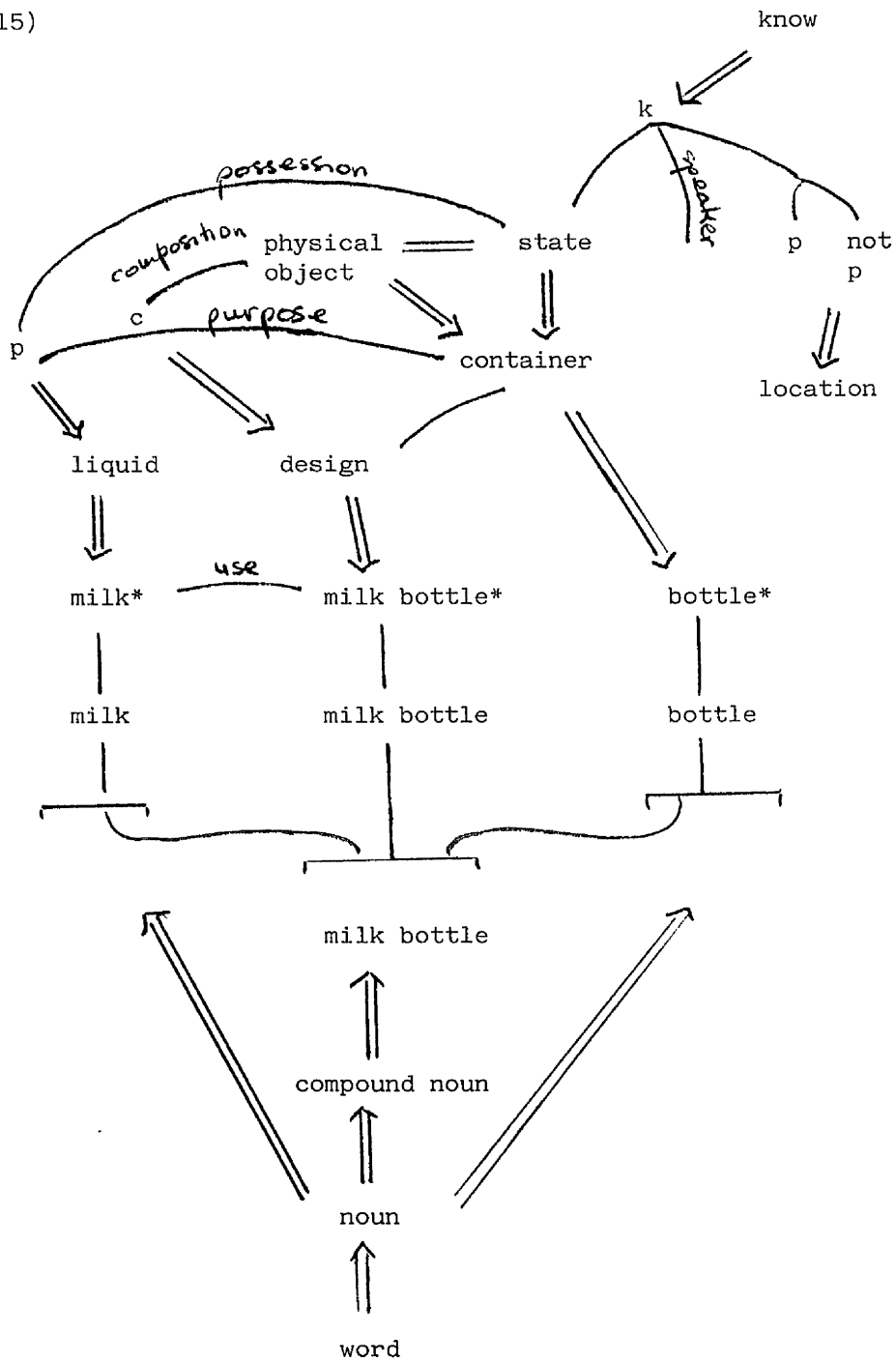
A second advantage of combining an analysis of competence with performance is that it is possible to demonstrate the amount of shared knowledge between speaker and hearer. For example, Downing points out that both speaker and hearer observe the convention that the constituents of the compound are deliberately selected in order to assist with the identity of an appropriately inferred meaning for the word. By incorporating this information into the analysis of compounding, this type of word formation is shown to be a heuristic device similar to that of the sentence, and this brings the two types

of constituency closer together. Also, in connection with the latter point, definite knowledge may be incorporated into the compound interpretative procedure even though the individual referents of the constituents for the word refer to a class or species of entities.

The question arises as to how the 'missing link' is identified for the compound noun. Using Word Grammar's framework, I shall argue that the interpretative procedure for compound nouns follows a similar description to that given above for co-ordinate structures.

The economy of word-structure for the compound means that each constituent is linked to a lexeme which instantiates an argument of the head's model. Together these arguments narrow down the propositions which may be derived for the compound's referent, which is an instance of a state of affairs. For example, the compound noun milk bottle classifies an entity which has a specific design. The comprehension of this design is conditional on the object's purpose or function as a container to hold (or possess) a particular type of liquid, e.g. milk rather than beer. The following is a diagrammatic representation of this information:

(15)



In (15) above both arguments of purpose and possession inherited from a state of affairs model are exploited by the referents of the lexical constituents milk and bottle as companions of the state model instantiated by container. Therefore, some other argument that is a companion of the model which is a physical object must be the proposition instantiated by the referent of the compound noun milk bottle, i.e. not p. In order to infer the proposition of design, the cognitive model for bottle* is exploited and speaker information on the composition of bottles as physical objects invoked. However, in order to interpret the relevance of the design argument, the hearer then needs to evaluate this information in conjunction with the given referent of milk.

To return to the issue of syntactic dependency, (15) exhibits only one modifier-head relation. The diagram shows that the semantic companions of only two models are linked to the individual referents involved and a direction of semantic dependency is established. From this information, one proposition is derived for the compound noun's meaning which indicates an attribute of the internal head's model.

To conclude. The claims made by Downing that speakers observe pragmatic conventions in the use of compounds to assist hearers to interpret meanings can be incorporated into Word Grammar's framework. By their inclusion, these conventions are shown to conform to the principles of organisation and interpretation of knowledge in general, i.e. the semantic structures are integrated with the syntactic structures. The advantage of demonstrating the interaction between grammatical competence and language use is that a description can be given of speaker knowledge and its relation with real world situations as perceived by the speaker.

3. Summary.

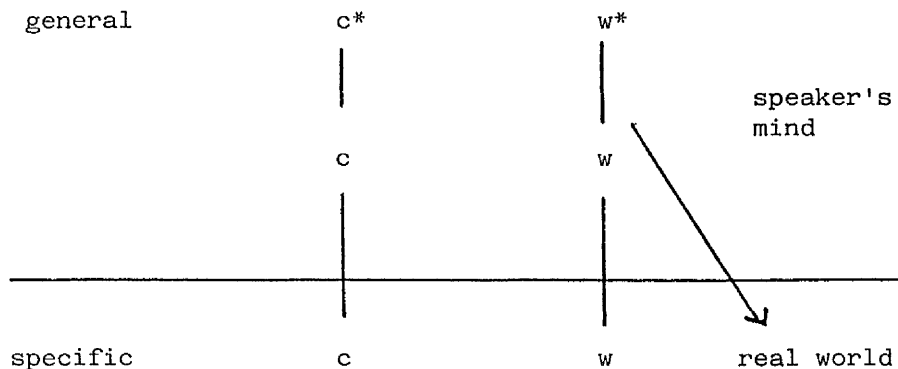
In this chapter, I have given a brief outline of the major assumptions underlying the grammatical framework of Word Grammar, together with comparisons on theoretical principles of transformationalist grammar in connection with compounding. Downing's claims on the relevance of pragmatic constraints for the phenomenon of compounding coincide with Hudson's claims for a psychologically credible theory of competence, where part of speaker competence includes knowledge of conventions for language use.

Word Grammar claims that conventions for language use should be incorporated into the linguistic framework for the grammar to provide a representative account of competence once described by McCawley (1972 from Newmeyer (1980:160)) as:

".... a speaker's internalised system for relating meanings to possible ways of expressing them and the characteristics of linguistic and extra-linguistic contexts under which particular ways of expressing them are appropriate."

In this respect the relation between a speaker's knowledge of the real world and that stored within the mind may be shown as follows:

(16) Knowledge:



(w = word, c = concept). A speaker's perception of the real world is interpreted within the context of the individual's stored knowledge. In situations of communication, this knowledge, as it is understood by the individual, is projected through words to be comprehended by the listener according to the amount of knowledge s/he possesses. As a result, the working hypothesis of Word Grammar offers the possibility of providing a more realistic account of speaker ability to comprehend the meanings of compound nouns and the use of these word-types as part of the language.

It now remains for a more detailed examination to be made of the transformational account of compounding in order to establish the shortcomings of the lexicalist framework. This will be carried out in the next chapter, before pursuing a closer examination of compound nouns using the framework of Word Grammar.

CHAPTER III

Analytic Problems for Two Theories of Compounding

1. Introduction

Following Lees' (1960/70) analyses of compound words, various investigations into the rules for compounding make the major claims:

- (a) that the formal apparatus for generating compound words has the characteristic productive power associated with sentence creativity and word-formation.
- (b) that compound rules generate morphological structures of two words whose semantic interpretation corresponds to that exhibited by the same words as constituents of sentential structures.

Lees' investigations characterise the productive feature of compounding as a derivative procedure involving the operation of syntactic transforms on deep sentential structure, thereby making the implicit claim that the formal apparatus of the grammar used in the production of sentences is also used for compounding. But Chomsky's observations (1970) in favour of a creative component in the lexicon resulted in the formulation of lexical rules for the production of derived words. A logical progression from Chomsky's remarks is that, if lexical rules generate derivative words, they will also generate compound words. As a consequence, the introduction of lexical rules as part of the formal apparatus for generating complex word forms has invalidated the implicit claim of Lees' use of syntactic transforms as part of the compound procedure.

There are, however, two schools of thought on the nature of lexical compound rules. The first is that compounding rules are lexical transformational rules. The second view is that compounding rules are morphological rewrite rules incorporating the notion of adjacency, e.g. $N_3 \text{ ----} \rightarrow N_1 N_2$

In this chapter I will examine the two lexical approaches to compound nouns which are in my opinion representative of these views within the context of a generative grammar. First, I will consider Roeper & Siegel's framework (1978) which adopts a lexical transformational approach. Then I will examine the contrastive approach of Selkirk's framework (1981/2) which incorporates lexical rewrite rules. I shall identify the major shortcomings of both these approaches and present my findings on these. In my assessment, I will draw largely on the work of Botha (1984).

1.1. Roeper and Siegel's Approach

The first comprehensive investigations of lexical rules for compounding that follow Chomsky's Remarks on Nominalisations (1970) are those carried out by Roeper and Siegel. They claim that only a subset of compound words, called verbal compounds, is generated by lexical rules and that these rules are transformational. This claim is based on their underlying hypothesis that acceptable verbal compounds, e.g. birdwatching, hand woven, roadsweeper, and sentences are formed from combinations of a verb and a word that meets its subcategorisation frame.

Working from this basic assumption, Roeper and Siegel state that if the morphological structure of the verbal compound is compositional, then its meaning is predictable. That is to say, the meaning of the verbal compound can be established by breaking down the compound word into meaningful parts: namely, the verb root; one of the following affixes: -er, -ing, -en; and an adjacent word that satisfies the verb's subcategorisation frame. Hence, the deep structure input to the lexical transformational rules in this framework consists of an inflected verb and one dependent word which falls within the scope of the verb's meaning.

1.2. The Framework

The complete operation from deep structure input to surface representation of the verbal compound involves the following procedure:

- (1) Affixation
 - Subcategorisation Insertion
 - Variable Deletion
 - Compounding

Affixation. First a compound affix rule is applied to the verb root:

$$(2) \quad [\text{verb}] \ W \implies [[\text{empty}] + \text{verb} + \text{ing}]_N \ W$$

$$\text{Example: } [\text{watch}] \ W \implies [[\text{empty}] + \text{watch} + \text{ing}]_N \ W$$

the input to the affix rule on the left of the arrow is the verb root, e.g. watch, plus its subcategorisation frame W; and the output of the rule is a noun-labelled structure as indicated to the right of the arrow.

There are three compound affix rules: one for each of the three suffixes -ing, -en, -er. Roeper and Siegel point out, however, that these three compound rules are not the source for non-compounded words with the suffix endings -ing, -en, -er. The suffix rules for the latter are separate rules.

Subcategorisation Insertion. At this stage a lexical item (a word) is inserted into the empty phrase appearing in the subcategorisation frame:

$$\begin{array}{l}
 (3) \quad [\text{empty}]_{\bar{X}} \implies [+ \text{word}]_X \\
 \text{Example:} \quad [\text{empty}]_{\bar{X}} \implies [+ \text{bird}]_X \\
 \\
 \quad \quad \quad [[\text{empty}] + \text{watch} + \text{ing}]_N \quad [\text{bird}]_W
 \end{array}$$

Variable Adjustment/Deletion. As there is only one compound pre-verbal position that can be filled by a word corresponding to a verb-frame, Roeper and Siegel propose this redundancy rule which hierarchically lists the permissible verb frames.

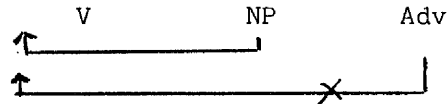
$$(4) \text{ verb} + [\text{Direct Object}] [\text{Adverb}] [\text{Instrument}] [\text{Agent}] [\text{Locative}]$$

However, (4) is constrained by the First Sister Principle (FSP)(1978:208). This principle stipulates that only one subcategorisation frame can fill the first word position in the compound.

The First Sister Principle:

"All verbal compounds are formed by incorporation of a word in first sister position of the verb."

Example: watches birds silently



Hence, the FSP together with the Variable Adjustment Rule ensures the generation of well formed verbal compounds. For example, bird functions as the direct object of the verb watch in the phrase watches birds. If the word inserted into the empty frame by subcategorisation insertion for the compound derivative watching correlates with an acceptable noun as the direct object for the verb root watch, the compound birdwatching will be well formed.

To explain the permissibility of other frames listed in (4) to occur as first members of the verbal compound, the Variable Deletion Rule is introduced:

(5) verb X [+ word] Y \implies verb [+ word] Y

where X and Y range over empty subcategorisation frames.

This rule deletes subcategorisation frames immediately following the verb. As a result, only those frames to the right of the deleted frame may occur in preverbal position within the compound structure:

(6) watches birds silently with binoculars \implies

DO	Adv	Instrument
1	2	3
		4

watching silently with binoculars \implies

 Adv Instrument

1 \emptyset 3 4

silently watching with binoculars

Thus, according to Roeper and Siegel, the following would be well formed verbal compounds:

- | | | | | |
|--------|--------------------|---|---|---------------|
| (7)(a) | birdwatching | V | + | Direct Object |
| (b) | silently watching | V | + | Adverb |
| (c) | binocular watching | V | + | Instrument |

The Variable Deletion Rule is also invoked to apply simultaneously with the compound -en affix rule. Roeper and Siegel observe that certain derivational affixes may alter the allocation of verb frames, either by assigning new ones to the derived word or by deleting existing ones. For instance, the -able suffix rule deletes the instrumental frame:

- | | |
|--------|--|
| (8)(a) | It is charged to your account by computer. |
| (b) | It is chargeable to your account (*by computer). |

Similarly, the compound affix rule for -en always deletes the direct object frame:

- | | | | |
|--------|------------------|-------|--------------------|
| (9)(a) | construct houses | ----> | *house constructed |
| (b) | construct well | ----> | well constructed |

In (9)(a) the direct object house has not been deleted. As a result, the output is an ill formed compound. By contrast, (9)(b)

is well formed because the Variable Deletion Rule has applied simultaneously with the compound affix rule. Consequently, the next permissible frame, i.e. an adverb, is met by well. By definition of the First Sister Principle, the adverb well may be inserted into the empty frame position to generate the well formed compound well constructed.

Compounding. Finally, the Compound Rule is applied:

$$\begin{array}{ccccccc}
 (10) & [[\text{empty}] + \text{verb} + \text{affix}]_X & [+ \text{word}]_X & & W & \implies & \\
 & \quad \quad \quad 1 \quad \quad 2 \quad \quad 3 & \quad \quad 4 & & 5 & & \\
 & \quad \quad \quad \quad \quad \quad \quad N & \quad \quad \quad N & & & & \\
 & & & & & & \\
 & [[+ \text{word} + \text{verb} + \text{affix}] & & & W & & \\
 & \quad \quad \quad 4 \quad \quad 2 \quad \quad 3 \quad \emptyset & \quad \quad 5 & & & &
 \end{array}$$

The Compound Rule moves the word inserted by (3) above into preverbal compound position, e.g.

$$(11) \quad [[\text{empty}] + \text{watch} + \text{ing}]_N [\text{bird}]_N \quad W \implies [[\text{bird} + \text{watch} + \text{ing}]_N]_W$$

It is proposed that by applying the above procedure, the rules will generate well formed verbal compounds and ensure a predictable correlation between the form and meaning of the members of the generated compounds. Thus, where the morphological structure of the compound may be decomposed, a similar decomposition of semantic properties is also possible. Hence, verbal compounds may be said to have semantically transparent meanings.

The hypothesis that well formed compounds are generated from verbs and their subcategorisation frames is based on the observed similarities with syntactic behaviour of phrasal units. As a result,

the defining criterion for verbal compounds does not invoke the marked morphological difference between verbal compounds and root compounds, i.e. the latter do not contain derived words as constituents. Instead, 'predictability of semantic compositionality' and 'productivity' are emphasised as characteristic of the verbal compound.

1.3. The Shortcomings of the Approach

In their analysis of verbal compounds, Roeper and Siegel identify certain similarities between the generation of clauses and verbal compounds. First, they propose that lexical rules operate on permissible constituents involving a verb and a lexical item which meets the selectional requirements of the verb's subcategorisation frame. This is the basis to their suggestion that well formed verb phrases (VPs) are mirrored by well formed verbal compounds. For example, washing dishes : dishwasher but *washes help : *helpwashing. In addition to the shared deep structure input for the two linguistic constructions, similarities in behaviour are also described in terms of lexical rules for the verbal compound which mirror the format and function of syntactic transformations in the deletion and movement of lexical items. As a result of this evidence, Botha (1984) suggests that this analysis is an attempt to elicit through the framework the similar relationships observed between VP collocations and constituents of verbal compounds, with the intention of demonstrating that the type of mental apparatus used for the creation of VPs is not conceptually different from that used to create verbal compounds.

In view of the close similarity between the semantic structure of phrases and compound nouns, I would expect the mental devices of speaker competence to apply to both. But there are a number of problems concerning the formal nature of the lexical rules that undermine the credibility of this framework. For example, Selkirk (1982:45) points out that, within the theoretical assumptions of the grammar in which the framework is couched, subcategorisation frames and syntactic representations differ in

kind such that no direct mapping between the two is possible. Traditional transformations map one syntactic representation on to another but they cannot map a subcategorisation frame on to a syntactic representation.

A second criticism of the type of rules proposed concern the redundancy rule, e.g. (4) above. This rule stipulates only one underlying representation with a fixed sequential order, i.e.

verb + [Direct Object][Adverb][Instrument][Agent][Locative]

However, Botha (1984) suggests that the rigid order of this rule is incompatible with the variable ordering possible in sentences. Hence, he argues that this rule is an ad hoc redundancy rule, specifically introduced into the framework for the generation of well formed verbal compounds and it has no independent existence elsewhere in the grammar.

There are further arguments against this rule and its role within the compound procedure. Following the application of the compound -en affix rule, the Variable Deletion Rule must apply obligatorily to guarantee no direct object is present for movement to the position of first member of the verbal compound with an -en affixed word as second member. As a result, there is a disjunction that does not correlate with sentence structure. For example, in phrase structure the passive rule moves the object of the active sentence into the position of subject for the passive sentence, as shown to the right of the arrow in (13) below:

(13) NP + V + NP ----> NP + V + by NP

Example: The hand weaves the carpet ---->

1 2 3

The carpet is woven by hand

3 4 2 1

Thus the object of the active sentence, e.g. carpet, is no longer one of the verb's subcategorisation frames in the passive sentence; and the derived subject fails to conform to the first sister principle. Therefore, it cannot occur as one of the members of the verbal compound.

The prediction that the derived subject of a passive verb cannot occur as a member of a compound is consistent with the generally accepted fact that compounds do not take subjects as first members. But the compound -en affix rule by itself does not account for the absence of the object frame. Rather, it introduces an empty frame when it is first applied. To account for the fact that a direct object cannot fill this empty frame, a constraint must simultaneously accompany the application of the compound -en affix rule. Roeper and Siegel's solution is to apply the Variable Deletion Rule. Thus the procedure for the generation of the verbal compound handwoven is:

(41) -en affix rule:

weave \implies [[empty] + weave + ed] [NP] ([Adv]) etc.

Variable Deletion Rule:

[[empty] + woven] [NP] ([Adv]) etc. \implies [[empty] woven] ([Adv]) etc.

word insertion:

[empty] \implies [(by) hand]

Compound Rule:

$$[[\text{empty}] \text{ woven}][\text{hand}] \Rightarrow [[\text{hand}] \text{ woven}] \text{ Adj}$$

With the application of the Variable Deletion Rule the derived subject, e.g. carpet is deleted and, therefore, cannot be moved into preverbal position by the compound rule. The deletion of the direct object frame then makes available other verb frames which will generate well formed verbal compounds, e.g. the agent/instrument frame [by hand].

If the Variable Deletion Rule obligatorily operates with the compound -en affix rule (and, in Botha's view, it is specific to this particular affix), then justifiably it could be argued that the compound procedure of (1) is not consistent for all three affixes. But two observations can be made to counteract the suggestion that the Variable Deletion Rule behaves in a unique way with the compound -en rule. First, it should be pointed out that Roeper and Siegel accept a general pattern of frame modification through affixation. They list the affixes -able, -er, over- and re- as frame deleting affixes, with the suffixes -er and -able deleting a [by NP] frame (i.e. an agent/instrument frame). Secondly, the claim for the deletion of the object frame for the compound -en affix rule is made on the evidence of the pattern of behaviour observed for the passive. That is to say, it reflects the features of the non-compound affix rule that whenever the -en affix rule applies, the object frame is deleted

and a [by NP] frame is inherited by the verb. Hence, on analogy with the compound -en affix rule, the compound -er affix rule will reflect the same patterns of behaviour as its counterpart non-compound affix rule. If this is the case, then the Variable Deletion Rule must demonstrate the modification of frame assignment for the compound -en and -er affix rules. As a consequence, the rule is not specific to one compound affix rule.

The problem created by the proposed lexical rules is that affixation as such may trigger frame deletion. On the other hand, the compound procedure introduces a frame. Now, to allow deletion of a frame at the same time as an empty frame is inherited makes nonsense of the compound procedure. Hence the introduction of the Variable Deletion Rule. However, it should be noted that passivisation does not, as is implied by Roeper & Siegel's analysis, reduce the number of frames assigned to the derived construction.

It simply re-orders them in such a way that the subject frame moves into a post-verbal position and the object frame into the subject position. Inasmuch as the Variable Deletion Rule is used to guarantee that the derived object's frame may be generated as part of the procedure, it is specific to compounding. But the rule fails to account for the re-ordering of dependent frames and, therefore, fails to explain the path of semantic derivation.

To recap. The Variable Deletion Rule is inadequate in explaining the derivation of meaning for the compound -en word.

Further, the rule is unique to compounding and, therefore, differentiates between the type of apparatus used for the latter procedure and that for the generation of sentences....

In addition, it should be observed that the phrase representing the demoted subject in the passive sentence may be interpreted adverbially. But a [by NP] structure may indicate either an adverbial frame or a frame for agent/instrument. For example, hand woven may have the reading 'the manner of weaving is by hand'. This then poses a difficulty for frame assignment in connection with the redundancy rule, i.e. (4) above. If the rule is satisfied, only the adverbial reading is met because this is the frame which is listed as immediately following that of the direct object. But the agentive reading cannot be generated because an agent will be the underlying subject which does not fall within the subcategorisation frame of the verb. Hence the framework fails to account for examples like moth eaten where moth is the agent of the verb's activity because the latter would never be generated into a pre-nominal position within the compound word.

A similar situation exists for other compound word types. Consider the example house builder. The compound -er suffix does not delete the direct object frame. Hence, house functions as the object of the compound's head word. By definition of the redundancy rule, other combinatory possibilities include the first compound member representing an adverb or a locative frame. In the case of the latter London builder (= 'builder in London') is well-formed but *recently builder (*'builder recently') is not acceptable. The final possible combination with an agent/instrument frame cannot be generated because the compound -er suffix rule deletes this frame on application.

This example shows that the deletion of frames does not follow a sequential pattern of elimination. In addition, an ill-formed compound can be generated because there is no constraint on the adverbial frame for the compound.

However, it is observed that the problematic frame, i.e. the adverbial frame, shares a morphological similarity with that of the agent/instrument frame. If there is some semantic connection between the two frames, then the list for (4) is inadequate without some constraint to account for the overlap between the adverbial and agent/instrument. It is interesting to note that this problem is confronted by Roeper and Siegel in connection with the -ing verbal compound, and their proposed solution is discussed in the later section on productivity.

To summarise. The shortcomings outlined above are related to the nature of the lexical transformational rules conceived as part of the apparatus that generates verbal compounds. For example, the unsatisfactory claim that lexical transformations map subcategorisation frames directly on to syntactic representations. Other criticisms include the ad hoc nature of the adjustment rule, and the violation of the principle for transformational rules by the introduction of new material that alters meaning.

1.4. The Derivation of Verbal Compound Meaning

In the following paragraphs, I will identify more problems for Roeper and Siegel's lexical approach as an attempt to maintain the claim for a non-distinct apparatus. Whilst the inadequacies mentioned so far are syntactic, their shortcomings bear directly on the generative procedure envisaged for semantic derivation. For example, if new material is introduced by the lexical rules the latter will affect the semantic content at the particular stage that it is introduced and, subsequently, the input to following rules.

As explained above, one of the effects of the compound

-en affix rule is the deletion of the verb frame for the direct object. The framework, however, takes no account of the inheritance of a derived object frame. If the NP in (13) repeated here for convenience:

The hand weaves the carpet	---->	The carpet is woven by hand
1 2 3		3 4 2 1

is compared with the word inserted in (14):

[empty] \implies [(by) hand]

and identified as one of the verb frames of (12), i.e.

verb + [Direct Object][Adverb][Instrument][Agent][Locative]

it is observed that the derived object is implicitly assumed to correspond to the instrumental frame. However, Roeper and Siegel's concentration on the deletion of the direct object frame results in the identity of a possible alternative identity for the inherited NP being overlooked. As a consequence of this, they concede that certain -en verbal compounds are problematic for their framework.

The argument concerning the problem is something along the following lines. The deletion of the direct object frame for the compound -en affix rule ensures no subject interpretation for the meaning of the verbal compound but, as a result of the deletion, the procedure wrongly predicts some -en compounds are impossible, e.g. calorie controlled. According to Roeper and Siegel, the equivalent phrase for the example should be 'control calories'. But, in applying the procedure of (14) to the direct object, calories is deleted and thus the well-formed compound calorie controlled is not generated.

To solve this impasse, a passive phrase is suggested as the sentential equivalent of the compound, e.g. 'controlled for calories'. But this is an unsatisfactory suggestion. In the first

place, as Botha (1984) observes, no independent grounds are given for preferring the passive equivalent to a procedure involving the deletion of a direct object frame. Secondly, and more importantly, it offers no solution to the problem. The passive equivalent already includes an inflected verb form and, therefore, no compound -en affix rule could apply. Hence, this is not an example of compounding, and the original problem concerning the deletion of the direct object dissolves. Under Roeper and Siegel's analysis, the construction calorie controlled would have to be treated as an example of two independent words in a phrasal construction, one of which has undergone the non-compound affix rule. On the other hand, if the claim that this example is a compound is maintained, the assignment of an equivalent passive meaning to the word form contradicts their basic claim that verbal compounds are generated from verb roots.

One alternative solution would be to determine the original phrasal equivalent as 'control for calories', which would not then cause a problem for frame assignment because there is no direct object for deletion. However, the prepositional phrase does not meet any of the frames listed in the redundancy rule. But, if this were an argument against the active form, it is also an argument against the proposed passive equivalent because in both instances the prepositional phrase introduces a concept of purpose which does not correspond to any of the listed frames.

In conclusion, the framework is inadequate on semantic grounds. The formal procedure only generates compounds whose first constituent exhibits a grammatical relation that conforms to one of the listed verb frames. Hence, the framework fails to account for the irregular correlation between form and meaning for the -en verbal compound. This creates a paradox with the -ing form where irregularity between form and meaning is permitted, e.g. beautiful dancing. For the latter, it is claimed that the adverbial frame is met but movement into pre-nominal position within the compound alters the word's morphological representation.

With regard to the redundancy rule, there is the implication that certain semantic relations found in sentences are not exploited by the compounding procedure. For example, it is generally agreed that the agentive subject is not found within the compound structure.

Bresnan (1980) observes that this is usually indicated by a possessive noun phrase construction, e.g. the child's cake-eating. However, there is something of an anomaly here. With a general claim that similarities exist between sentential and compound structure juxtaposed alongside a dependency analysis which demonstrates that there exists a subject relation between a noun and its modifying adjective (see Chapter II), it may be possible that the subject relation is exploited by compounding procedure. It seems likely, though, that this grammatical function is not assigned to the lexical item as first member of the word-form. I shall return to this issue in Chapter IV.

1.5 The Affix Rules

Another problem related to the proposed procedure is specifically concerned with the affix rules. Roeper and Siegel claim that there are two distinct types of affix rule: one for verbal compounds and one to generate single lexical derivations. One argument (Botha 1984, Selkirk 1982) against this claim is that it introduces a redundancy to the procedure that is not justified by the evidence. Botha, for example, criticises the claim because it creates an overlap in the behaviour of the rules for the two affix types, namely, that the compound rules perform the function of supplying an affix and creating an empty frame, which the non-compound affix rule and structure building rules of syntax combined also handle.

However, the reasons for introducing the two rule types do not seem to have been motivated solely on syntactic grounds.

These rules also have a semantic function which I will expand on in the following paragraphs. The two types of rules concerned are

- (15) non-compound affix rule for -er and -ing
(Roeper and Siegel (1978:220)(58):

(a) [verb] Y \implies [verb + -er]_N Y

(b) [verb] Y \implies [verb + -ing]_{N/A} Y

- (16) compound affix rule to add -er and -ing + empty frame
(ibid (59))

(a) [verb] Y \implies [[empty] + verb + -er]_N Y

(b) [verb] Y \implies [[empty] + verb + -ing]_{N/A} Y

The framework concentrates only on one type of compound on the basis of two factors which are proposed as identity criteria for verbal compounds: i.e. 'compositionality' and 'productivity'. It is claimed that these compounds are productive because the morphological compositionality of the words concerned predicts a compositional meaning. Although the presence of one of the affixes does not constitute criterial identity, it is observed that their occurrence differentiates the word-form from other compound nouns. However, since the choice of criteria is motivated by the claims for the lexicon and the type of items stored within it, we need to examine Roeper and Siegel's view of the lexicon in order to understand the role of the compound affixes in connection with the semantic criteria.

1.6. Compositionality

It is claimed that at one extreme the lexicon contains atomic and morphologically complex words with compositional meaning, as exemplified by heart and birdwatching respectively. But there are also atomic and complex words with non-compositional meaning, e.g. white elephant. Somewhere in between exists a large set of words that are morphologically compositional but must be listed as semantically

atomic because they have non-compositional interpretations (Aronoff (1976) cited by Roeper and Siegel).

In connection with the latter group of words, the situation arises that morphologically atomic and complex words with transparent meaning may undergo semantic shift, i.e. a slow change in lexical meaning, which could eventually lead to an idiomatic reading for the word. However, prior to this stage, many words are found to have two readings and I quote Roeper and Siegel's (1978:201) example comparable. This word has a compositional meaning which is 'able to be compared' and a non-compositional one of 'roughly equal'.

Within the proposed framework words of this kind are designated as atomic lexical items because they have non-compositional readings despite the fact that their morphological makeup is discernible. Some verbal compounds fall within this set of lexical items, e.g. truckdriver implies 'someone who professionally drives trucks'. The latter can be compared with the semantically compositional bike rider which cannot be assigned a similar interpretation. Therefore, an overall view of the lexicon includes words which deviate either morphologically or semantically in their compositionality but within this group there is a set of words which are both morphologically and semantically compositional. For example, the lexical item watcher can be decomposed morphologically as watch plus an -er suffix. Semantically, the word comprises a property of agency associated with the -er suffix and a verbal meaning of 'watch'. The one-to-one correlation between the decomposition of the word form and its meaning involves the notion of composition. Therefore, the criterion of compositionality may be understood to refer to the association between semantic properties and morphological entities.

Turning now to the compound word, the morphological makeup of the verbal compound is determined by the number of words which combine to form the compound. Hence, the syntactic form of the word is two words, one of which must be a derivative of a verb root.

With regard to meaning, Roeper and Siegel do not decompose the meanings of words. It is, therefore, concluded that the notion of semantic compositionality for verbal compounds refers to the semantic relations between the verb and its frame. This being so, semantic compositionality refers to a transparent relation between the formal structure of the compound and the semantic relation between the meanings of the two constituents. If the internal makeup of the compound may be decomposed but the semantic regularity for either verb root and affix, or verb root and frame, fails to correspond to an expected link between form and meaning, the meaning of the compound is non-compositional.

Having determined that compositionality refers to a one-to-one relation between form and meaning, it is observed that only three compound affixes are associated with a procedure that guarantees semantic compositionality for the compound, i.e. -er, -ing and -en. From the evidence of the analysis, especially with regard to the -er suffix, the reason for this appears to be that the three affixes can be linked to definite semantic concepts. Therefore, the earlier statement concerning the regularity between morphological entities and their semantic compositionality should be modified. If the relation between the verb root and the affix is always transparent, there are two formal areas of concern that may affect the degree of semantic predictability for verbal compounds:

- (i) a disjunction between the form and meaning associated with the subcategorisation frames for lexical verb roots, or
- (ii) the verbal compound is undergoing semantic shift.

The situation in (ii) only occurs after the compound is established as a word of the language, i.e. is part of the lexicon. Therefore, the issue does not concern the procedure of word-formation discussed here. This leaves the occurrence of (i) as a possible cause of non-compositionality for the verbal compound's meaning. Although there is one more possibility which will be discussed in more detail later; namely, that the verbal compound is not a word but a phrase, e.g. apprentice welder. If the compound word is a phrase, its second constituent has undergone the non-compound affix rule prior to lexical

insertion. But this and the guarantee of semantic compositionality are insufficient criteria to determine compound status because phrases also exhibit transparency of meaning. Hence the necessity for a specific type of affix rule in compound procedure.

From the above discussion two stages of morphological change in the compound procedure emerge as having a direct bearing on the generation of the word's meaning. One is the derivative stage when the affix rule applies and the other is the introduction of a lexical item which has a functional relation with the verb. In simple derivative procedure the latter stage would not occur. However, the introduction of the latter to offset the claim that verbal compounds always have transparent meaning implies that the framework distinguishes between compositional and non-compositional meaning as a result of the existence of the compound suffix rules.

Although this is an unsatisfactory state of affairs, it has the advantage that Roeper and Siegel can claim a similarity between the well-formedness of sentences and verbal compounds on the grounds that both are generated from verbs and their subcategorisation frames. But the existence of the compound suffix rules also implies that they guarantee semantic predictability of a subset of words, where non-compound affix rules do not.

It is unfortunate that evidence in support of the compound suffix rules does nothing to dispel the implication. Examples like apprentice welder are claimed to be phrases because the first member of the construction violates the First Sister Principle, i.e. the meaning of apprentice does not meet the selectional restrictions on the verb frame. An object of the verb weld would have to be an inanimate noun, e.g. welds metal. Since the first constituent is an animate noun, the meaning is unpredictable and, therefore, the structure is not a verbal compound.

The claim for the compound suffix rules is further supported by Roeper and Siegel's introduction of the criterion for 'existing word' when contrasting phrasal sequences with verbal compounds. They follow the Chomskyan (1975) approach for lexical insertion whereby each word of a phrase must have independent representation in the lexical core. This means a derived word has already undergone the non-compound affix rule prior to its insertion into phrase structure. Hence, apprenticewelder contains a sequence of independent lexical items: apprentice + welder.

For the compound, however, the second constituent may or may not be an independently existing lexical item, i.e. if the lexical item does not already exist, then it may be a possible word. This means the non-existent lexical item is not a stored entity, but conforms to the rules for word structure. The following are given examples of possible words:

(17)(a)	?goer	examples: (b)	churchgoer
	?breaker		heartbreaker
	?setter		typesetter

It is argued that the independent lexical items above do not have a compositional meaning, e.g. 'one who goes'. Therefore, the second constituent of the compound examples are designated as possible words because the stored equivalent has a different meaning.

However, the introduction of the notion 'existing word' is confusing. In the first place, it is used to support a claim which is not disputed, i.e. the occurrence of well established lexical items in phrase constituency. But this does not explain why speaker competence for verbal compounds encompasses the acceptance of possible words in some instances and existing words for others. Its only purpose is to justify the integrity of the compositionality claim for compound affix rules.

What Roeper and Siegel's arguments for such examples

offer is further evidence for believing that the rules are prompted by the concepts underlying the framework as a whole. For example, the notion of possible word applies in cases where a selectional restriction is violated. This means a cross reference between affixation and semantic content is being made, with the implication that the former has some constraining influence on the latter. Whilst the process of cross referral coincides with another claim of the framework that the affix rules affect subcategorisation frames (following Vergnaud 1973), there are two criticisms against the notion. One is Selkirk's argument against the mapping between subcategorisation frames and syntactic items. The other is that selectional restrictions are category constraints rather than affixal ones. If consideration is given to the affix type, the selectional restriction on the compound's first member would have to conform to a nominal constraint. But it is invoking the category of noun rather than verb that classifies the structure of our example as a phrase.

The description of apprentice welder seems counter-intuitive for a number of reasons. First, apprentice is not usually considered to function as an adjective. Its most frequent role is nominal.

Second, even if it is accepted that this word is functioning attributively, the semantic interpretation for the structure is not similar to that found with phrasal sequences. For example, the adjective small in small book denotes a quality which is a property of the entity 'book'. This contrasts with the role of apprentice which refers to a status of the position held by someone who is a welder. That is to say, the meaning of the first word of the construction apprentice welder follows a similar pattern to that claimed for the compound meaning in that it falls within the scope of the meaning of the second member. But unlike the phrasal meaning, the nature of the attribution is not integral to the concept of the head's meaning.

Given the above observations, I suggest that apprentice welder is not a phrase but an example of a primary compound, which in Roeper and Siegel's framework is an instance of a non-compositional compound. The reasons for my suggestion are as follows. If apprentice

usually functions as a noun, the combined sequence of the construction is noun plus noun. This is a frequent combinatory pattern of primary compounds. In addition, the construction cannot be separated by infixation, e.g.

- (18)(a) small book: small red book
- (b) apprentice welder : *apprentice large welder

Further, the construction may be assigned several readings, although the most likely interpretation is (19)(c) below:

- (19)(a) welder who is an apprentice
- (b) one who welds when an apprentice
- (c) one who is serving an apprenticeship in welding.

This pattern of behaviour corresponds to Allen's (1979) observation that primary compounds exhibit variability in meaning. Finally, the constituent is analogous to similar combinations discussed in the later chapter on an analysis of non-verbal compounds using Word Grammar's framework. Namely, the construction exhibits an appositional structure where both constituents refer to an agent of an occupation.

Since primary compounds fall outside the scope of Roeper and Siegel's framework, they are unable to do more than argue that examples like this are not verbal compounds. The problem arises that with the introduction of the notion of existing word, a contrastive generative procedure is established which is presented as the only viable alternative rule-governed system. As a result, primary compounds are classed as atomic lexical items belonging to a subset of words with non-compositional meanings. However, the semantic transparency of welder and the non-compositionality of goer undermine the general claims for the framework in being unsatisfactorily accounted for.

By association, the arguments for the semantic behaviour of welder and goer in connection with non-compound affix rules also set up contradictory claims. If both are generated by the non-compound suffix rules, then these rules generate semantically compositional and non-compositional word-forms. This suggests a constraint on the generation of the latter which is unexplained because semantic

shift can only take place after lexical storage. For example, one possible constraint on the non-compound affix rule which would explain the non-occurrence of a semantically compositional derived word is the prior existence of an alternative morphological form with a semantically transparent reading (Aronoff 1976).

Another constraint which is closely interconnected with the latter is the motivation to name an entity. For example, the categories of noun and verb refer to the same concept, e.g. 'drink' but drinking (V) refers to the action and drinking (N) to the act of drinking. In other words the two categories refer to different aspects of the same concept.

The emphasis on syntactic behaviour of words obscures this significant distinction, although the analysis for existing words hints at it. The following are another subset of verbal compounds containing possible words in second member position:

- | | |
|------------------------|--------------|
| (20)(a) flower growing | (b) ?growing |
| bee keeping | ?keeping |
| habit forming | ?forming |

It is claimed that the examples in (20) contrast with well established examples like drinking (N) which has been generated by the non-compound affix rule. The argument presented for their contrast is based on sentential evidence, i.e.

- | |
|------------------------|
| (21)(a) I hate growing |
| (b) I hate drinking |

(21)(b) is a construction comprising a verb plus an object, whilst (21)(a) comprises a reduced subordinate sentence, i.e. I am growing. On the evidence of the above, the meaning of growing is similar to that in (20). Therefore, in having a meaning which is closer to a verbal reading than a nominal one, the referent of the -ing word in (20)(a) differs from that in (21)(b).

But, if growing in (21)(a) is a verb, its semantic structure differs from the example in (20)(a) because the former refers to an activity and the latter to an act; and the contrastive senses in (21)(a & b) are a reflection of this difference. The contrast in meaning between growing in (20)(b) and drinking in (21)(b) are a consequence of the semantic properties of the individual lexical roots (Aronoff 1976). Added to which, the verb drink has two compositional readings, one of which is a default interpretation for alcohol.

The interrelation between already existing words of the language and the coinage of new ones is conditional on the above motivation (ibid) in that individual derivations do not have the same aspect of reference. This provides the affixation procedure with the flexibility to capture difference nuances of meaning that relate to one entity. For example, compare

- (22)(a) The tomatoes are growing well.
- (b) The growing of flowers might be considered a leisurely pastime in comparison to the demands of child rearing.
- (c) The growth of vegetation has been rapid.

The morphological representation growing in (22)(a) refers to an action; in (22)(b) to an act and in (22)(c) growth refers to a process.

Finally, there is one other criticism against the notion of existing word. There are some established word-forms which will not occur as a constituent of a verbal compound and yet have a compositional meaning, e.g. thinker in *peace thinker (Allen 1979). It will be shown later that the explanation for this constraint is connected with the inherent semantic properties of the verb. Think contrasts with verbs like go, wash, grow, etc. in being a verb of cognition (Quirk et al 1971), and does not take a direct object. Hence, well-formed examples like sweet smelling, good looking, etc. But this information alone is insufficient to explain the occurrence of stative verbs in compounds which can take direct objects yet fail to undergo compounding, e.g. * president becomer. However, it serves to support the criticism of the syntactic approach. It also suggests that the direct correlation between morphological and semantic

compositionality is not a guarantee of predictability for the word's meaning. Indeed, if the hypothesis that suffixation affects the presence of verb frames is accepted, the final rule of the compounding procedure is simply a movement rule and only guarantees the morphological well-formedness of the compound.

In sum. The discussion so far on the evidence of the proposed framework leads to the definition of compositionality as a direct correlation between morphological units and associated semantic properties. As a result, an instance of a compound word which is fully compositional is identified as the verbal compound. However, in order to support the claim for this compound type Roeper and Siegel assert that the compound affix rules overgenerate to form possible words. This is found to be an expedience to sustain the claim for semantic compositionality of the compound's derived head because both types of affix rules are capable of generating existing and possible words. The motivation for this assertion is determined by the underlying principles of the framework. That is to say, the transformational framework is a system of cyclic rules which permits the incorporation of the notion of possible word (see Allen 1979). However, there is no reason why the non-compound affix rules should not also generate possible words. It is generally accepted that word-formation rules are formulations of observed regularities in the patterns of behaviour between word properties (Hudson 1975).

Therefore, the rules predict acceptable patterns that are already part of the language and simply reflect speaker competence with word-forms.

It is concluded, therefore, that the introduction of the notion of existing word leads to confusion on the issue of the two types of compound rules; and it is a contributory factor to Roeper and Siegel's assessment of the rules (1978:221). They concede that they cannot offer a satisfactory explanation for the irregular output in meaning for the two types of affix rules other than an unspecified semantic constraint. As pointed out above in the criticism on the emphasis for syntactic data, the framework fails to provide an adequate description of the semantic content for the meanings of derived words.

1.7 Productivity

The second criterion of verbal compound identity is the notion of productivity which is initially introduced in conjunction with the notion of semantic compositionality:

"Semantic compositionality is always present where morphological rules are productive. This is because we can understand new derived words only by systematically decomposing them."

The term 'productivity', however, is ambiguous. It can refer to the high output from rule application in terms of the number of words produced. Or it can refer to the systematic regularity of patterns that are found to exist between the different types of entities in language that produce a particular word type. In the context of this framework, both interpretations are used but the second interpretation is considered to be the intended definition of the term.

The first interpretation could be said to apply because consistent analogy is made between the characteristics of verbal compounds and sentences. For example, both structures are formed from an underlying structure consisting of a verb and its subcategorisation frame. This finite structure enables an infinite set of sentences to be generated. Therefore, by analogy the verbal compound may also be considered productive in generating an infinite number of compound words. However, the observation is disputed by the evidence of non-occurring forms already mentioned and those suggested by Roeper and Siegel, e.g. *angry appearing. Secondly, Botha (1984) points out that this interpretation of productivity is not restricted to the subset of verbal compounds. An equally high proportion of primary and root compounds exist in the language (see Jackendoff 1975, Levi 1978, Allen 1979, etc.).

With regard to the second definition of productivity, Roeper and Siegel cite Aronoff's (1976) use of the term, where a number of constraints on the output of word-formation rules are identified.

These constraints are exploited within the transformationalist framework and include the blocking of the generation of a morphological form, the notion of an already existing word, and reference to the meaning of the verb to predict the semantic structure of the derived word.

For example, Aronoff identifies one constraint on the acceptability of a new word form as the type of word base which co-occurs with the affix. He observes that the behaviour in the output for the suffixes *-ity* and *+ness* is relative to the morphological form of the root to which they attach. Both *-ity* and *+ness* form abstract nouns from adjective roots, but when *+ness* co-occurs with a base *Xous*, it generates a higher number of new words than the suffix *-ity*, e.g. compare fabulousness with *fabulousity.

The constraint from existing words has already been touched upon in connection with the verbal compound. Aronoff maintains that existing words listed in the lexicon are subject to loss of productivity because their meanings undergo lexicalisation or semantic drift. With the loss of compositional meaning, the direct correlation between morphological form and word meaning is diminished, making it difficult to compute the number of possible words that can be formed. Roeper and Siegel take up the issue of semantic compositionality in identifying compound words with more than one type of meaning.

'Blocking' (ibid:43) is the prevention of a new word form due to the prior existence of a lexeme already denoting the same concept. For example, a word with an *Xous* stem will take the *+ness* suffix, e.g. gloriousness, but fails to undergo suffixation with the affix *-ity* because the semantic output would refer to a concept already named by the word glory. This argument underlies the criticism of the framework's inadequacy to take into consideration the semantic properties for the individual verb bases.

There is one other factor identified by Aronoff which is indirectly connected to the claims for verbal compounds and this is the nature of the base word. For example, the prefix *mal-*

('badly'(Adv.)) is a borrowing from French and subject to morphological constraints from its source. Mal- only occurs with some roots and stems that are verbs or verbal derivatives, e.g. maltreat(ment) v. *malplace(ment). In turn, this constraint extends to compounds, e.g. *mal crystal placement. But native-latinate combinations also show that infixation between this prefix and its verb hinders interpretation because the semantic relationship of the compound's members takes precedence. Consider *mal dental treatment and *mal bone formation which have acceptable verbal derivatives as heads but fail to take mal-prefixation.

Since the above mentioned constraints are found within the framework, it is concluded that productivity refers to the systematic regularity between form and meaning. As a consequence of these constraints, however, some representations of verbal compounds which are generated by the compound affix rules will be greater in number than others. Given this definition of productivity, it is observed that the latter will also justify the claims relating to other compound types as output of a regular system, albeit not one that falls within the scope of this framework.

1.7.1. Constraints on Productivity

When the constraints on the output of applied rules are evaluated within the context of Roeper and Siegel's framework, it is found that the above mentioned conditions are used to explain the discrepancies in the compositionality of form and meaning for verbal compounds. This inclusion undermines one of the major claims that verbal compounds are fully productive and it diminishes the argument on the predictability for semantic compositionality. But the presence of these constraints helps to provide the framework with a flexibility for coping with degrees of semantic compositionality (previously suggested as a characteristic of compound nouns generally).

First, the constraint of blocking accounts for systematic gaps noted by Roeper and Siegel with the following:

(25)(a)	-er N	(b)	-ing N
	*beautifully dancer		*beautifully dancing
	*smartly dresser		*smartly dressing
(c)	-en Adj	(d)	-ing Adj
	beautifully danced		beautifully dancing
	smartly dressed		smartly dressing

The non-occurrence of the ill-formed noun examples above is explained by the existence of a verbal compound with an adverbial reading, represented and mirrored by an adjective plus noun combination, e.g. beautiful dancer. The latter example has a similar morphological representation to that of a noun phrase but a semantic interpretation of '(someone) who dances beautifully'. Hence, Roeper and Siegel claim that adverbs ending in -ly need not occur as members of verbal compounds because an equivalent reading is projected by the use of the adjectival base.

Support for this claim is provided by an analogous phrasal sequence with an adverbial interpretation but where the noun head does not share the morphological structure of a verb root (see Siegel 1976/8:222), e.g.

- (26)(a) beautiful tailor
 (b) marvellous butcher

The reading for (26)(a) is 'someone who does the job of a tailor beautifully' not *'someone who tails beautifully'. Phrase structure rules fail to generate the latter proposition because they only operate on independently existing words and *tail is a non-existing verb. Hence, alternative constructions like (26)(a & b) are used to meet the communicative gap. Similarly, Roeper and Siegel argue that expressions like beautiful dancer whose first member meets the First Sister Principle and, therefore, conforms to compound structure, may be attributed with an adverbial interpretation.

It is a shortcoming of the framework that the discrepancy between the form of the adjective and its link with an adverbial meaning is not handled by the rules of the compound procedure. In the first place, the redundancy rule which sanctions the availability of the adverbial frame also requires selectional restrictions to be met. For example, no verbal compound *early molester exists because the verb molest does not co-occur with an adverb early. But even where an appropriate adverb does conform to the selectional restrictions of the frame, e.g. beautifully, syntactic requirements on modifiers are constrained to appropriate category agreement between the noun as the second constituent of the compound and its internal modifier. Secondly, given the availability of the adverbial frame, a lexical item carrying this function is moved into first position for the compound once the compound rule has applied. Since the compound rule is simply a movement rule and does not account for any morphological change in the representation of the lexical item moving into first position, the only guarantee that an appropriate item is generated to first position is if the lexical adjective shares the same morphological representation as the adverb, e.g. early in rises early ----> early riser. As the compound rule does not account for derivational patterns concerning first position constituents, the disjunction between form and meaning has to be stipulated as a constraint on the rules. However, the fact that a constraint is needed suggests that there is a consistency between the semantic structure of the verb and the combined structure of the noun and its modifier which is not taken up and exploited.

The example early riser is also an example of another constraint on productivity; namely, the generation of possible word. This example is classified as a verbal compound because the first member of the construction conforms to the First Sister Principle. Thus, it has an equivalent well formed verb phrase rise early. However, the application of the -er affix rule to the verb rise generates a non-occurring derivative on the evidence of *riser. In spite of its non-occurrence, the latter word is considered

Insertion:

The non-head of *early molester is contrasted with examples in slow burner, early riser, on the First Sister Principle. This seems counter-intuitive when comparisons with phrasal equivalents are made, e.g. burns slow, riser early, molests early. It is simply that early does not normally occur with molest. Co-occurrence restrictions of this kind also bear upon the issue of frame deletion for the -er suffix (Roeper & Siegel 1978 P.254). It is claimed that the non-compound affix rule triggers the deletion of a prepositional phrase, e.g. 'writes a letter to me' v. 'writer of the letter'. If a similar constraint applies for the compound suffix, as the First Sister Principle suggests that it does, only the object may function as non-head of the -er verbal compound. But the examples like slow burner and others that argue against the claim for the non-compound suffix rule (e.g. 'the manufacturer by Royal appointment') are counter-evidence where frame deletion depends on the lexical nature of the base to which the suffix attaches.

The inadequate explanation of *early molester is further confused by the example child molester on the criterion of 'existing/possible' word. Child molester becomes a counter-example to both verbal compounds and phrasal sequences because the meaning of the head word is not compositional. The compound has a pejorative meaning that includes a property of 'sexual assault'; and the head word only seems to exist independently in a highly restricted context, e.g. 'The molester was arrested yesterday'. Following these observations, I consider child molester should be classified alongside apprentice welder. #

morphologically and semantically acceptable as a possible word of English. Therefore, on the evidence of verb frame agreement and the notion of possible word, the construction is included within the set of verbal compounds.

It is interesting to note that the ill formed *early molester contrasts with child molester which has as many problems as apprentice welder. A well formed equivalent phrase exists for child molester, i.e. molests the child, but I suggest that it fails to generate a well-formed verbal compound. The reason for this is the frame deletion claim for the suffix rule. In short, the non-occurrence of this example as a verbal compound is determined by its failure to undergo the compounding rules and, therefore, is due to a different constraint from that involving a possible word. On the other hand, an explanation of the morphological representation child molester as a phrasal sequence would be just as intuitively unsatisfactory as that for apprentice welder. #

The criterion of possible word is also invoked to explain the occurrence of verbal compounds where the first member shares a morphological deficiency, e.g. slow burner. The latter has an equivalent phrasal structure of verb plus adverb, i.e. burns slowly, and, on analogy with beautiful dancer, a verbal reading can be assigned, e.g. slow burner. But the second member of the compound is not an independent word, i.e. *burner, with a semantically compositional meaning. Therefore, following the same arguments for early riser, burner is classified as a possible word and the compound of which it is a member is included in the set of verbal compounds. With

regard to the notion of possible word, this has already been identified as unsatisfactory for other reasons. In Chapter IV it is shown that this constraint is not required to explain the irregularities between form and meaning for compound nouns. Examples like beautiful dancer will be seen to conform to the category constraints of the individual lexical items and the semantic structure of the word's meaning to be sanctioned by the inheritance procedure for semantic properties.

The constraint on latinate base forms does not appear to affect the productivity of word combinations for compounds. Unlike affix plus root combinations, both latinate and native roots/stems occur as members of compound words, e.g.

native:native	hallmark	door knob
latinate:native	career girl	postman
latinate:latinate	insect repellent	science fiction
native:latinate	child nutrition	staircase

The explanation for this contrast is one involving the integration of loan words into the host language (Fleischman 1976). Affixes which are part of the borrowed words are only separated away from their roots after the morphologically complex word is firmly established into the language. Therefore, whilst the words themselves conform to language specific rules, the affixes may still be subject to the constraints of the source language.

In contrast, there are constraints on the bases from which verbal compounds may be generated inasmuch as the latter cannot be formed from compound verb stems, e.g.

*She will peacemake ----> peacemaker
 *He time consumes ----> time consuming
 *They gift take ----> gift taken

In this respect, Roeper and Siegel concur with Marchand (1969) that compound verbs such as babysit, windowshop, etc. are backforms of verbal compounds, e.g. babysitter, windowshopper, etc. This means that the latter are coined first and suffix deletion takes place subsequent to the word's acceptance.

Roeper and Siegel support the above claim on the evidence of the cyclic behaviour of the rules for compound procedure. For example, the prefix re- attaches only to lexical items which are verbs.

(27) Examples (48a) & (49a)

(a)(i) rebrainwashing	(ii) *brainrewashing
(b)(i) *restory-telling	(ii) story-retelling

With the above examples, Roeper and Siegel state that *brainrewashing is ill formed because the second member is a derived noun, i.e. washing. Thus the prefix re- cannot apply. On the other hand, rebrainwashing is acceptable because prefixation has preceded the application of the nominalising suffix to the compound verb, e.g. [[re [brainwash]]ing]. In contrast, the prefix rule applies prior to the compound suffix rule in (27)(b)(ii) to generate a well formed verbal compound but (27)(b)(i) is ill formed because the prefix fails to attach to the compound as a derived noun.

The conclusion reached on the procedural application of rules described above lead Roeper and Siegel to claim that the prefix re- rule and the compounding procedure are extremely productive. On this occasion, productivity is being used to refer to high numbers because the comparison with the prefix re- is based on its scope of occurrence which is wider than some other affixes, e.g. the above mentioned prefix mal-.

The descriptions for the rule procedures in the above examples, however, are unsatisfactory. First, there appears to be no motivation for the different procedures. For example, on what criterion is washing a noun rather than a verb? Or alternatively, why is it that re-prefixation cannot occur prior to the nominalising suffix for wash because rewash is an acceptable word of English? Secondly, a contradiction arises for (27)(a)(i) because the derivative procedure involves a compound verb. Thirdly, the argument for the

compound suffix rule contrasts with that for the behaviour of the non-compound suffix rule. For example, there is a set of well formed existing words in English with a similar morphological structure to that of the noun rewashing:

- (28)(a) The rewriting of the book.
- (b) The recycling of the paper.
- (c) The rewiring of the plug.

On the basis that the prefix attaches to a verb and not to a noun, prefixation has occurred prior to the nominalising suffix in the above examples. If these nouns may be generated following this rule ordering, it raises the question why the second member of (27)(a)(ii) cannot follow the same cyclic procedure, especially when the order is already sanctioned for (27)(b)(ii).

One answer is that brainwash is not a verbal compound, as confirmed by the second above-mentioned observation. Also, the first member violates the First Sister Principle, giving the semantically compositional reading for the verb wash as 'cleanse with water'. Hence, it is concluded that the compound structure has a non-compositional reading. However, it should be noted that the non-compositional reading for this example is assigned to the structure as a compound verb and not as a phrase or verbal compound.

In my view, the description of the rule procedure for (27) is inaccurate because morphological data alone fails to provide a satisfactory account of the phenomenon. Syntactically, the verb wash takes an object which may be exemplified by brains. Hence, the acceptability of brainwash. But the non-compositional reading is assumed on the evidence that all speakers understand the meaning of wash to be 'cleanse with water'. In this respect, a more limited view of meaning is given to the verbal compound than to its sentential equivalent where meaning of the individual words varies. It is interesting to speculate that if the meaning of wash is simply understood as 'cleanse' and that of brains as 'thoughts', then a semantically transparent reading for brainwash would be 'cleanse thoughts'. In consequence, the structure might then be identified as a verbal compound. However,

aspects of speaker variability for meaning do not fall within the boundaries of the competence theory in which this procedure is formulated.

For example, the stage at which it is apparent that the rules of the compound procedure will not generate a semantically compositional verbal compound is on word insertion. At this stage of the procedure, a judgement based on speaker knowledge of real world situations is needed, in which case the behaviour of the affix does not differentiate between verbal and non-verbal interpretations of compounded structures. Additionally, the compound rules are only productive in predicting semantic regularity where there is a general consensus on the semantic input. As indicated in the previous paragraph, this will depend on the salience of particular concepts within the speaker's range of knowledge.

In the preceding paragraphs it is argued that inferences as to the compositional nature of the meanings associated with compound nouns can only be made on what is known about the inherent semantic properties of the verbal base. As Aronoff (1976:50) points out:

"The output of a word formation rule will always be a function of the meaning of the base."

There are, however, mitigating factors to the amount of knowledge that speakers will have stored in connection with semantic properties for the meaning of words. Further, word meanings vary, e.g. washing (N/V) and, as suggested by Roeper and Siegel, some lexical items have more than one semantically compositional reading, suggesting that productivity as a concept of a predictable correlation between form and meaning is less straightforward than proposed by this framework .

To recap. The constraints found within this framework correspond to the conditions identified by Aronoff as general restrictions on the generation of word-forms. On the evidence of

these constraints, productivity is defined as the consistent output of the compound rules in exhibiting a systematic relation between the morphological structures and the semantic properties generated by the procedure. Any disjunction between the regularity in form and meaning is explained as the result of one of the above constraints. In this way, the framework attempts to account for the deviances in the regularity of the system which credits the analysis with some flexibility in what is otherwise a limited perspective on compounding.

1.8. Summary

A major claim of the theory is that verbal compounds and sentences are generated from the same source; namely the verb and its subcategorisation frame. In addition, the nature of the rules proposed for the compound procedure are transformational and their output which is compositional is typical of the creativity associated with sentence production. Given these shared characteristics, there is an implication that a similar apparatus is used for the formation of both types of constructions.

There are, however, a number of criticisms against these claims. One is the need for two types of affix rules. These two rules have contrasting functions. The non-compound affix rule generates occurring (and possible words) which are then subject to phrase structure rules; whilst the compound affix rule attaches an affix to the verb root and introduces new material for the verb frame. Where the non-compound derivative takes modifiers consistent with its newly acquired categorical status, the modifier of a derived word as a member of the compound structure is predetermined before derivation occurs. Hence, the two affix rules exhibit different patterns of behaviour.

A second criticism against the notion of lexical transformational rules is that they differ from standard rules that do not introduce new material. Traditionally, transformational rules re-order existing information whilst preserving meaning.

With regard to the analogy with sentences, the constraints imposed by the First Sister Principle operating in conjunction with the redundancy rule for verb frames is unsatisfactory. The frames are listed in a fixed linear order which does not apply sententially.

Whilst the main generative capacity falls to the two affix type rules, affixation as such is not invoked as the criterion for compound identity. As a result, greater emphasis is given to the affiliation between verbal compounds and sentences using the characteristics of compositionality and productivity. These two attributes, it is claimed, are shared by the verbal compound and the derived word which functions as a member of a sentence. In contrast, the verbal compound can then be shown to differ from non-verbal compounds in having a semantically compositional interpretation similar to sentential equivalents. Arguments against the characteristic of semantic compositionality and productivity for the subset of verbal compounds are provided on the evidence of primary and root compounds. Both of these compound word types fall outside the scope of this framework but display defining attributes of verbal compounds. Moreover, in order to uphold the hypothesis of predictability which follows from this criteria, constraints are introduced to the framework to explain the discrepancies created by the application of the affix rules.

It is claimed that the compound procedure will predict the meaning of the verbal compound because the verb frame is inserted with the application of the affix rule. However, lexical insertion to the subcategorisation frame is a variable predetermined by the inherent semantic properties of the verb. Therefore, the affix rules do not predict the semantic output. It is also observed that, if the power to generate compounded words is given to the affix rules, the compound rule is a movement rule which makes no semantic contribution to the meaning of the verbal compound. The semantic content of the word is generated prior to this stage of the procedure.

The introduction of the existing/possible word to explain the non-compositionality of some verbal compounds is argued against. In the first place, it does not adequately justify the morphological variability of the constituents, e.g. slow burner v. early riser. Secondly, it leads to inappropriate conclusions on the data, e.g. apprentice welder. Moreover it implies a non-existent contrast between the two types of affix rules because they are both capable of generating possible words.

The emphasis on syntactic rules also results in unjustified conclusions on the productive capability of verbal compounds to parallel affixation in scope of output, e.g. prefix re- v. brainwashing. However, this aspect of the analysis is also criticised as inadequate in terms of speaker competence. Further, the regularity between form and meaning in the context of the definition of compositionality given here does not take into account degrees of variable knowledge about the relationship between entities referred to by the semantic structure.

1.9 Conclusions

The ability to comprehend the meanings of verbal compounds is conditional on two facts known to the speaker, i.e. compositionality and productivity. Compositionality refers to the direct correlation between the formal make-up of the word and its semantic content. In respect of the latter, the verbal compound has two recognisable stages where the guarantee for semantic compositionality may break down. According to Roeper and Siegel, speaker competence enables an appeal to be made to the notion of possible word to overcome any deviancy at the first stage. Whereas, any breakdown in the correlation between form and meaning for the second stage is understood as a violation of the First Sister Principle.

If semantic compositionality is a characteristic of rule-governed procedure, then its identity solely with regard to the verbal compound and the sentence can be disputed. First, some root compounds are both compositional and predictable despite the lack of morphological complexity, e.g. matchbox, lemon peel, etc. Secondly, Levi (1978) presents arguments for a rule-governed procedure to generate a set of complex words which contain morphologically complex words other than those listed in Roeper and Siegel's analysis, e.g. national exports, swimming lesson, sports equipment, etc. Thirdly, Allen (1979) provides additional support for arguments against the restricted scope of semantically compositional verbal compounds by her examples of lexicalised compounds, e.g. sky scraper, caretaker, etc. Finally, Roeper and Siegel themselves point out that some verbal compounds have meanings that are not strictly compositional, e.g. truckdriver; or may have both types of interpretation. For example, the non-compositional reading of outgoing = 'gregarious' versus the compositional reading of '(something) going out (in the mail)'.

This suggests that the proposed procedure is too limiting with regard to compound nouns in general and that the non-verbal compound types mentioned above may also be generated by some principled method of word-formation.

In conjunction with the above mentioned, it is observed that the semantic claims are limited to the application of three suffixes, which reduces the scope of the analysis to the exclusion of other compound types with a deverbal second member, e.g. teacher trainable. However, Roeper and Siegel offer no explanation for the restriction beyond an initial discussion of verb frame adjustment. In this, they appeal to the behaviour of other affixes to support the claim for deletion by the selected suffixes. For example, the two verbs wash and define show similar patterns of behaviour under application of the -able suffix.:

- (23)(a) John washed the car.
 (b) The car is washable.
 (c) Mary defined the problem.
 (d) The problem is definable.
 (e) *The problem is definable the boundary.
 (f) *The car is washable the Ford.

Both verbs fail to take an object after the application of the suffix rule. Hence, the ill-formed sentences of (23)(e & f). On the evidence of (23) that the above affix also attaches to a verb root, its non-occurrence within the list of compound affix rules implies that the resulting output of the rule's application is one of semantic non-compositionality. Therefore, it is assumed that the -able suffix together with other suffixes which attach to verb roots are not included in the list of compound affix rules for semantic reasons. Given the evidence for the examples in (23) above, this seems an unconvincing conclusion, but the only one to be arrived at given the proposed description.

It is noted that in the attempts to describe the generation of semantically compositional words as the output of syntactic rules, the resulting semantic content remains transparently verbal. However, if compounding is a derivational procedure, it is to be expected that there will be some change in the content of semantic properties from the verb to the noun. But the compound procedure presents only a partial account of speaker competence and leaves aspects of the meaning of the verbal compound unaccounted for. Moreover, the inadequacy can be identified in connection with the analysis of affix behaviour, e.g. the meaning of dishwasher to denote some (in)animate entity with the capability for washing, rather than referring to the verb's activity. The latter example contrasts with the first constituents of non-verbal compounds with similar morphological form, e.g. swimming lesson. Hence, the derived constituent is appropriately assigned a nominal reading, 'act of swimming'.

Concentration on the sentential aspects of generating meaning obscures this feature of the compounding process. But this is a shortcoming of the developmental stage within transformational grammar itself. At this time, productivity is characteristic of the type of rules that generate sentences. It is a natural progression, therefore, to envisage that transformational rules, which generate grammatical structures, should also apply within the lexicon. However, this sets up an unnatural division between a set of stored words and a set of generated structures. A contributory factor to the division also comes from the idealism inherent in the notion of grammatical competence, because semantic non-compositionality of compound nouns could be explained as the result of pragmatic influence. Under this pretext, constraints such as lexicalisation and blocking are offered. However, whilst providing a feasible explanation of the behaviour, they also raise problems on the principles of generative procedure, where, paradoxically, they are introduced as a solution. For example, if both affix types generate possible words to overcome the problem of blocking, why is it that the generative path does not encompass the existing word-form in order to guarantee semantic compositionality? One answer is that suffixes are restricted to the categories to which they attach. But, examples exist where one form characterises different categories, e.g. washing (N/V). So zero derivation provides one answer to the problem. Roeper and Siegel's restrictive definition of compositionality predicts that one form is associated with one meaning, but this is contradicted by the very nature of their proposed procedure.

In order to find an answer to the above question, the emphasis on sentential structure must be relinquished in favour of a different perspective, i.e. the behaviour of the word as a common factor for all larger structures. As a result, the properties of words take on a greater significance and can be shown to explain the acceptability of irregular morphological structure. The relations

between form and meaning, however, remain productive. Another result of the inappropriate analogy with sentences is that the function of the compound is implied to be the same. But, the difference between the underlying representation and the surface structure of the compound is evidence of the individual functions of the two constituents. If the content and function of the compound is equivalent to that of the sentence, it would be difficult to justify the existence of both. As communicative devices for providing the maximum assistance to the hearer, one would be redundant unless its function offers additional information on what the speaker wants to convey to the listener.

On productivity, there appear to be two conflicting views. After the word is stored in the lexicon its productivity is reduced, but existing words (i.e. stored lexical items) may be generated from possible words, e.g. Allen (1979) tooth ----> ?toothed ----> sabre toothed. This latter observation seems to account for the speaker's ability to overcome the first constraint on productivity. But the question of blocking raised earlier remains unexplained.

The claim regarding possible word assumes that both types of affix rule are capable of generating a morphological representation of a possible word. But for the non-compound affix rule, this would only occur where an existing concept requires naming. Therefore, the notion possible word encompassing the idea of non-existence only refers to the unacceptability of the morphological representation.

On this argument, the meaning of ?toothed already exists as part of speaker knowledge. By decomposing the word semantically, the meaning of ?toothed comprises the concepts of 'tooth + possessed'.

The possession of teeth, which would be described by the -ed word form is a typical property of animate entities and this would be understood by speakers using the word tooth. Hence, the meaning of tooth has a default reading of possession, (Minsky 1977), which blocks the acceptance of the morphological

representation ?toothed. However, within the set of entities which have teeth, there is a subset described as possessing 'sabre teeth'. This subset is named by the compound sabre toothed. If ?toothed is non-existent, the compound form must have been generated from existing data, i.e. tooth, which results in a root compound noun, sabre toothed. The existence of -ed as a concept of possessed deictically refers to a subset of entities possessing teeth. The morphological compositionality of the word, however, is not in direct correlation with semantic structure. This compound form contrasts with verbal compounds in not having an overt verbal presence. But the evidence has shown that there is a similarity between root compounds and verbal compounds in terms of the inclusion of semantic properties.

In my view, the emphasis on syntactic data misrepresents the main area of concern for a theory of compounding, i.e. the change in semantic perspective brought about by the procedure of derivation. Roeper and Siegel's analysis of the adverbial reading for the construction comprising an adjectival modifier seems to be to provide more insight into the difficulties inherent in formulating rules to capture the regularities between form and meaning. That is to say, semantic compositionality is not conditional on the morphological decomposition of words. The example of brainwashing also indicates that where semantic transparency does not exist, speakers are able to supply a relatively compositional structure. This example presents another complication for the criterion of semantic compositionality in conjunction with the notion of possible word. It is noted that this latter concept is not invoked for first members of verbal compounds. Thus, the violation of selectional restrictions on the First Sister Principle remains straightforward. The word inserted into the empty frame when affixation takes place must be semantically compositional and an existing word, cf. brainwashing. Otherwise the overall semantic transparency of the word's meaning is affected. But, if these criteria fail, the subcategorisation frame allocation may be invoked, cf.

apprentice welder, calorie controlled.

On the semantic evidence so far, the diversity of word behaviour is shown to be a reflection of the organisation of semantic properties of lexical items. Therefore, it is considered that a framework which offers an analysis of the word as a common denominator for larger structures will provide a more realistic description of competence for compounding. For this reason, I shall now turn my attention to Selkirk's theory of word-structure. But it is noted that Roeper and Siegel's approach presents some relevant issues for a semantic analysis of the constituents of compound nouns, which are taken up again in connection with Word Grammar.

2. Selkirk's Approach

In contrast to Roeper and Siegel's approach, there is another school of thought (Siegel 1974, Allen 1979, Selkirk 1981/2, Lieber 1981) within the lexicalist tradition which advocates that word formation rules are morphologically determined. This view replaces the concept of lexical transformational rules with the proposition that word formation rules are formed on the principle of adjunction, such that juxtaposed morphological elements are rewritten as a single word:

$$N + \text{affix} \longrightarrow \text{Adj}$$

Example: $\begin{matrix} [\text{window}] \\ N \end{matrix} + \text{ed} = \begin{matrix} [[\text{window}] \\ N \end{matrix} \begin{matrix} \text{ed}] \\ \text{Adj} \end{matrix}$

Thus, compound formation rules are subject to the same formal procedure as derivatives and inflectional words, e.g. $\begin{matrix} [\text{window}] \\ N \end{matrix} + \begin{matrix} [\text{pane}] \\ N \end{matrix} = \begin{matrix} [[\text{window}][\text{pane}]] \\ N \end{matrix}$.

This approach to lexical rules denies the implication found in Roeper and Siegel that compounding is a word formation procedure that mirrors sentential formation. In other words, the hypothesis for non-distinct apparatus in the formation of sentences and verbal compounds is supplanted by a claim that the rules of sentence formation differ from those for the generation of words.

There are, however, varying opinions within this school of thought as to how semantic derivation might best be represented. In this section, I propose to examine Selkirk's (1981/2) theory of compounding, which follows the principles of Chomsky's wider theory of language but, according to Selkirk, offers a viable alternative framework to the Roeper and Siegel analysis.

Selkirk argues that the basic concepts underlying her framework avoid the shortcomings of the transformational approach, although implicit in her theory are the characteristics of semantic compositionality and productivity. However, these features are not invoked as criteria for the classification of compound types.

2.1. The Framework

Selkirk's theory of word formation takes the word as the basic unit. As a result, her approach is in direct contrast to the framework examined previously, because it does not emphasise the importance of sentential features in the generation of compound words.

Selkirk observes that words have a dual characteristic and are, therefore, subject to two sets of rules. In phrase structure they are the basic units of syntax and within the lexicon they are

the maximal units of internal word structure. As a result, word formation rules need not be a reflection of sentential rules. Thus, rules of compound procedure may differ from rules which generate phrase structure. Taking this view of lexical rules, Selkirk argues in opposition to Roeper and Siegel's hypothesis, that non-verbal compounds and verbal compounds will be generated by the same set of formal rules.

In order to account for the different semantic output for the two compound types, the word based theory incorporates Bresnan's (1979) framework of Lexical Functional Grammar. In phrase structure, this grammar assigns a grammatical function to all lexical items associated with words. Grammatical functions are syntactic roles assigned to words by virtue of their position in the phrase, e.g. subject, object, to-object. Linked to the grammatical function is an argument structure or thematic role. Argument structures are thematic relations such as agent, source, goal, etc. (following Jackendoff, 1972 and Gruber, 1965).

Selkirk observes that grammatical functions are assigned to words by syntactic rules. Hence, she envisages a similar procedure (Bresnan, 1979:100) for lexical rules to assign grammatical functions and predicate argument structures to lexical items. For example, part of the lexical entry for eat is:

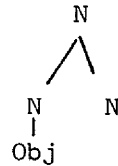
eat	:	subj/∅	obj/∅	:	grammatical function
		agent	theme	:	argument structure

(∅ denotes optionality)

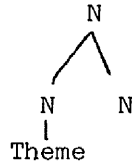
When the lexical entry occurs as a member of a compound,

the compound inherits the properties of the lexical entry. As a result, the grammatical functions are assigned to the first members, e.g.

grammatical function assignment:



argument structure assignment:



Hence, the relation between the words that function as members of compounds is established in terms of grammatical functions mirrored by phrasal sequences. With grammatical function assignment, identity of argument structure will permit the assignment of a thematic relation to the juxtaposed words, which, in turn, is then inherited by the compound as part of its meaning. Thus, the semantic properties of compound words are characterised by thematic relations.

The difference in semantic content for verbal and non-verbal compounds is explained by grammatical function assignment to the individual lexical entries; the details of which will be discussed in the following section. The meaning of the verbal compound includes a semantic property, which corresponds to a thematic relation between the head and its non-head. The identity of this thematic relation guarantees a verbal interpretation for the verbal compound. By contrast, the second member of a non-verbal compound is not assigned a grammatical function. Therefore, the compound cannot inherit a thematic relation as part of its meaning and its reading is classified as non-verbal.

2.2. The Lexicon

The lexical component of the grammar contains words and bound/unbound morphemes, plus a set of word formation rules. The word formation rules are context free rewrite rules for the adjunction of a lexical item and an affix:

$$\begin{array}{ll} N \longrightarrow V + \text{affix} & V \longrightarrow \text{affix} + V \\ N \longrightarrow A + \text{affix} & A \longrightarrow \text{affix} + A \\ A \longrightarrow N + \text{affix} & N \longrightarrow \text{affix} + N \end{array}$$

etc.

As a method of word formation, compound rules are context free rewrite rules comprising two categorical words; and the combinatory possibilities are formulated by Selkirk as follows:

$$\begin{array}{lll} \text{(a)} & & \text{(b)} & & \text{(c)} \\ N \longrightarrow \left\{ \begin{array}{c} N \\ A \\ V \\ P \end{array} \right\} N & & A \longrightarrow \left\{ \begin{array}{c} N \\ A \\ P \end{array} \right\} A & & V \longrightarrow P V \end{array}$$

After lexical insertion, the following morphological structures are generated, subject to lexically specified conditions imposed by the items concerned.

From Selkirk 1982: 2.1/2/3

Nouns

N	N	apron string	teacher training
A	N	high school	well wisher
P	N	underdog	onlooker
V	N	scrubwoman	rattlesnake

Adjectives

N	A	skin deep	heartbroken
A	A	worldly wise	hardworking
P	A	ingrown	above mentioned

Verbs

P	V	overdo	offset
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Within the set of rules listed above, systematic gaps are noted. First, no rules exist for the generation of compound verbs. Like Roeper and Siegel, Selkirk also concedes that compound verbs in English are generated by the process of backformation, being the product of a different process from that considered in her theory of compounding.

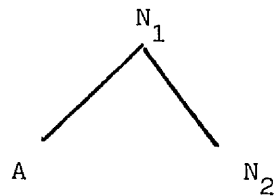
Compound Verbs:

N	V	air condition	housebreak
A	V	dry clean	whitewash

Secondly, there are no rules to generate compound verbs or adjectives with a verb as first member, e.g. *V ----> V V, *A ----> V A. Examples of this type are non-existent in English. However, one advantage of the context free rewrite rules is that there is no constraint on the number of times the rules can apply. Thus, after the first application, the rules can be re-applied to generate larger structures of combinations of compounded words. In this way, the framework accounts for the recursive feature of compounding, e.g. bathroom towel rack designer training.

With words forming the basis for phrases and word structure, the lexical categories for compounds are the same as the syntactic categories. Therefore, a condition is required to differentiate the higher level categories of the compound which will eventually function in phrases from those categories that act as input to the

compound rules. The differentiation of the two levels is necessary to ensure that the category of the constituent mother dominates the lower input categories. For example, with the rewrite rule $N_1 \rightarrow A N_2$ the lower level noun category N_2 to the right of the arrow is dominated by N_1 to the left of it. Alternatively, the structural description is diagrammatically represented as:



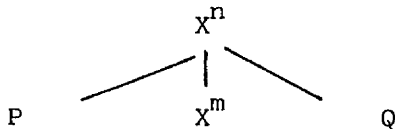
The category N_2 is the input item and dominated by the compounded constituent category N_1 which denotes the output of the rewrite rule. Unlike N_2 , N_1 is then available for input to the syntactic rules. Hence, some principle or constraint is required to explain the different functional status of the lexical items as members of the compound procedure to their role in phrase structure.

Selkirk proposes that the principle of headedness observed for syntactic structure be extended to the morphological component, on the grounds that the type of compounds generated by the rules are endocentric. This is to say that verbal and non-verbal compounds exemplify a construction of English words with a head on the right. In phrase structure, the head is that constituent which has the same feature matrix as its dominating category, but is one level lower in the \bar{X} hierarchy. When this is applied in the lexicon, Selkirk equates the role of head for the compound with the lower level input category and labels it the nucleus of the whole morphologically complex constituent. Its role is to determine the distributional possibilities of diacritic features for inflectional and derivational morphemes that might co-occur with the lexical item when it functions as head. Thus, the head of the compound in the diagram above and its associated rewrite rule is N_2 .

Selkirk's proposal to introduce the notion of head within the lexicon is based on Williams (1981) Right-Hand Head Rule (RHR), which defines head identity to be the right hand member of a complex word. However, Selkirk modifies the RHR because she argues that certain verb-particle combinations are compounds with a left-headed structure, e.g. sit in. It is noted here that this class of compounds contrasts with the compound verbs, e.g. air condition and, again, with the endocentric examples, e.g. overdo. There also exist stored inflectional words where the affix is obviously not the head, e.g. trousers.

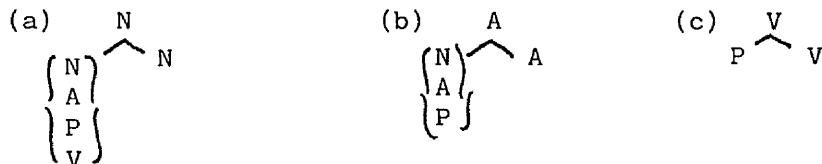
If the rules which generate the verb-particle compounds and the stored inflectional items are consistent with Selkirk's general claim that all words generated in the lexicon undergo similar procedures, the principle of headedness must also hold for these examples. Hence, the RHR is modified to:

Selkirk's (2.11) Right-Hand Head Rule Revised ,

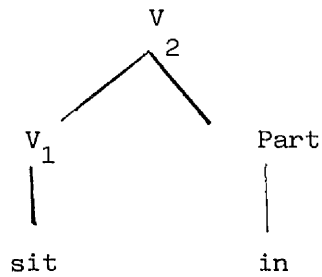


where X stands for a syntactic feature complex and where Q contains no category with the feature complex X, X^m is the head of X^n .

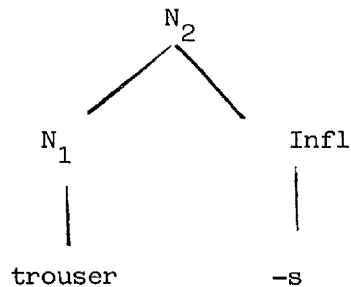
By definition of this rule, the category of the lower level, sharing the feature complex of its dominating node, is the head. For endocentric compounds, this is the right hand member, e.g. (a) N, (b) A, (c) V:



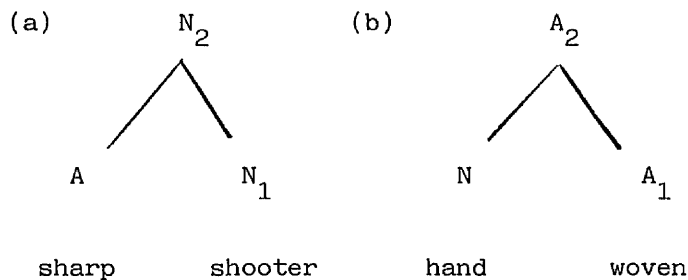
The head of the verb-particle compound is the lower level verb (V_1):



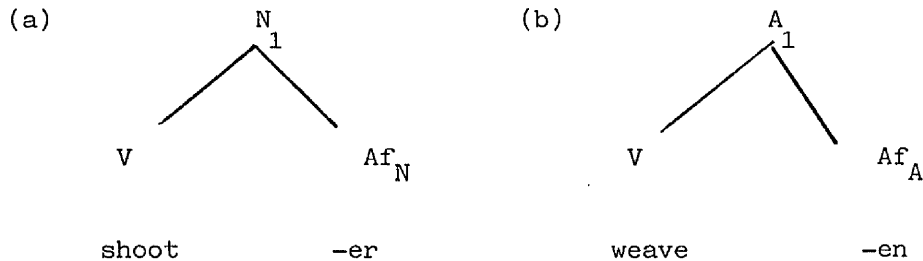
and for inflectional items like trousers, the lower level category of the base, e.g. noun (N_1)



When examining Roeper and Siegel's analysis two stages of word formation are identified as specifically relevant to the compounding procedure. The first stage involves derivation of the compound's head and the second is that of compounding. These two stages occur sequentially on application of the compound affix rule. In contrast to the emphasis on affixation, Selkirk's analysis gives greater importance to the role of headedness. Thus, according to which stage is focussed upon, the nature of the head differs:



e.g. N_1 shooter and A_1 woven are heads of their respective compounds, N_2 and A_2 . In turn, the derivative comprises a root and an affix, which is the head, e.g. -er and -en respectively, on the grounds that the latter share features with the dominating category, e.g.



Hence, compounds may share the same morphological structure, e.g. bird watching (N) and man eating (Adj) but their categorial function will be differentiated by the affix's lexical entry under the rule for headship, i.e. the Right-Hand Head Rule revised ((RHR) revised).

Category assignment by the process of derivation is identified as a feature of the affix and the idiosyncratic properties of the latter are listed as part of its lexical entry, i.e.

- (a) the category type plus syntactic and diacritic features.
- (b) the category which in morphological structure is sister to the affix.
- (c) its meaning characterised by its function.
- (d) its phonological representation.

Hence, on application of an affix rule, the characteristic features of individual affixes in conjunction with those of its base, establish the inflectional and diacritic properties of the compound's head.

Where the derived head of a compound exhibits the same formal appearance but functions differently, the framework must ensure

that particular affix features match those of the dominating compound node. To this end, Selkirk imposes a well-formedness condition to operate in conjunction with the RHR (revised). This condition is formulated as follows:

Selkirk (1982:21(2.12)) Percolation Principle:

"If a constituent α is the head of a constituent β , α and β are associated with an identical set of features (syntactic and diacritic)."

To recap. Selkirk's theory of word structure posits a set of lexical rewrite rules that operate on a list of stored lexical items: words and affixes. Both types of linguistic items have lexical entries which when combined may be used as input to the compound rules. To capture the relation between the compound node and the internal member that shares its feature matrix, the notion of headship is introduced into the lexicon. The head of the compound is the lower level lexical item, which shares the categorical status of its dominating node. It is the nucleus of the compound and is assigned all the properties of the lexical item inserted into this position.

To ensure that only the constituent with the feature complex similar to the mother node is assigned head status, lexical identification follows the RHR revised. This rule operates in conjunction with a principle of percolation, which allows the features of the compound's head to percolate upwards from the derived lexical item inserted into this position. Thus, the principle guarantees that the compound inherits all the properties of the complex head.

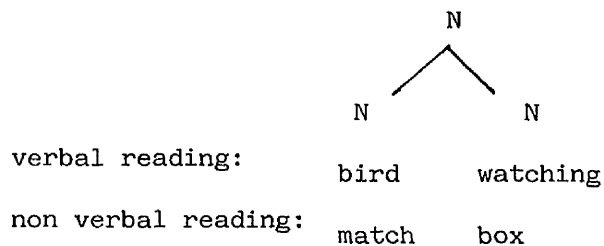
As the meanings of compounds differ according to their classification, Selkirk incorporates Bresnan's Lexical Functional

Grammar to handle verbal and non-verbal interpretations. This grammar identifies thematic roles for lexical items containing grammatical function assignment in their feature matrix. For compounds, the grammatical function assignment applies only in instances containing deverbal heads.

2.3. The Procedure

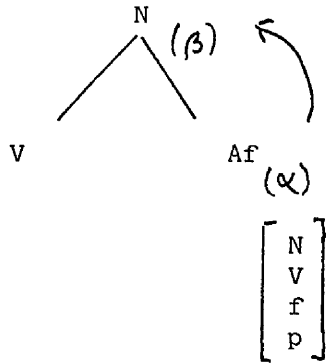
The word structure rules operate on stored lexical items which are assigned to words. The input to these rules may be simple or complex items, e.g. box, watching, friendly, etc. In turn, the complex word, which is the output of these rules, is then available, together with the simple lexical items, for input to the compound rules.

Because the compound rules are a subset of word structure rules, no formal distinction is made in the generation of English compound words. Hence, Selkirk's framework does not differentiate between verbal and non-verbal compounds on morphological grounds. Thus, the generation of a verbal compound by, for example, the rule $N \rightarrow N N$ may have the one structural description but two different readings, e.g.

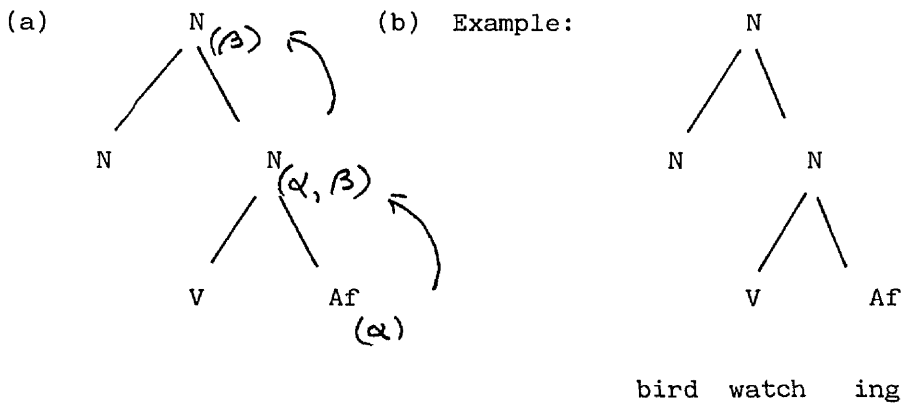


Two principles operate in conjunction with lexical insertion

to the word structure rules. One is the RHR revised, which identifies the head of a complex word structure to be either an affix or a word. The other principle is that of percolation. By this principle, the properties of the feature matrix for the affix as head percolate up to the node dominating the derivation:



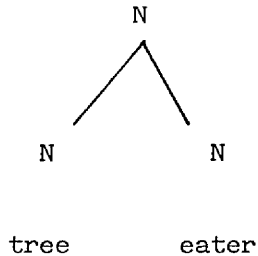
In turn, the properties of the derived word as head of an endocentric compound percolate upwards to the compound node:



Thus, the compound, as the mother node, inherits the properties of its internal head, or daughter node, which may itself be a complex lexical item.

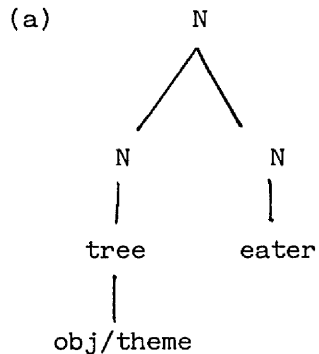
One of the features of the percolation principle is that

it permits a non verbal reading for a compound exhibiting a morphological similarity with a verbal compound. I refer to Selkirk's example tree eater, which may be given the verbal reading, 'one who eats trees' and the non verbal interpretation with a locative reading of 'eater in trees', i.e.



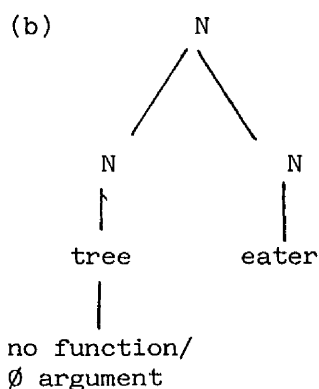
- (a) verbal reading: 'one who eats trees'
- (b) non verbal reading: 'eater in trees'

Compounds like this can be disambiguated because the verbal compound has the optional grammatical function assignment. Thus, where the lexical entry for the head of the compound includes a feature of grammatical function assignment, the compound will inherit this by definition of the percolation principle, and it will be represented by the lexical item which is its non-head member. The verbal compound tree eater has the grammatical function of object linked with a semantic relation of theme:



Hence, the compound inherits the thematic relation linked to the grammatical function as part of its meaning.

For the pseudo-verbal compound and its non verbal reading, the head does not have the property of a grammatical function listed in its lexical entry. Therefore, no thematic relation exists between the latter and its non-head for the compound to inherit:



Thus, a phrasal relation is assigned to the members of the compound, which is uncontrolled by the verbal base of the derived head. As a result, a locative interpretation is given to the word.

The two meanings of tree eater are possible because the lexical verb eat has an optional object function as part of its entry. Thus, well-formed sentences can be generated with or without the presence of the object: He eats and He eats bread. By contrast, a verb with a similar meaning to eat, i.e. devour, must always take an object in any sentence in which it occurs for it to be well-formed, e.g. *He devours. Thus, the obj-function for devour must always be satisfied in the generation of a well-formed constituent structure. On the basis of this, Selkirk argues that a compound like tree devourer can have only one interpretation, and that is the verbal reading of 'one who devours trees'.

Inasmuch as the semantic relations between the members of the verbal compound are determined on lexical insertion to the rewrite rules, this compound procedure displays a conceptual similarity to Roeper and Siegel's formula for semantic compositionality. The meaning of the verbal compound is based on the recognition of the transparent thematic relation generated by the verb. The thematic relation is transparent because it is part of the meaning of the verb. In addition, the number of meanings generated for verbal compounds is limited to those relations associated with the grammatical functions of object, i.e. agent, theme, source, goal, etc. All other semantic relations which are associated with the verb are assigned to meanings of non-verbal compounds. By comparison with verbal compounds, these are unlimited. This implies that verbal compounds are generated by a more systematic method than that for non-verbal compounds.

Another grammatical function which is usually associated with the verb is that of subject. In phrase structure, the word that is assigned the grammatical function of subject also represents the agent of the action denoted by the verb. However, the subject function is not a feature in the lexical entry for a compound head. For example, girl writing does not exhibit a grammatical function assignment of subject to the non-head girl. But the subject function can be assigned to a noun outside the scope of the argument assignment for the compound, e.g. The girl's letter writing has improved. On this pattern of behaviour for the subject, Selkirk (1982:34) formulates the following constraint:

"The subj argument of a lexical item may not be satisfied in compound structure."

In contrast, the thematic argument linked to the subject

function, i.e. agent, may continue to be assigned to the compound's non-head by means of the by-obj function. Like Roeper and Siegel, Selkirk adopts Vergnaud's (1973) hypothesis that affixation affects verb frame assignments. She observes that with adjectives that have a passive participle as a base, the theme relation is reallocated to the subject function, whilst the agent argument is assigned to the grammatical function of an object. Compare hen pecked with *carpet woven.

The disjunction of argument assignment with particular grammatical functions is described as the effect of lexical rules modifying stored lexical items. In particular, the modification is represented by the individual lexical entry for the affix which causes the reallocation of grammatical functions, e.g.

The suffix rule for -en
pass

obj ----> subj
subj ----> by obj/∅

When the affix rule applies, the properties of the suffix's lexical entry are inherited by the derivative in accordance with the percolation principle. Thus, when the derivative is subsequently inserted as the head of the compound, the modified property distribution is inherited by the compound as a whole. Hence, girl written may be well formed with the meaning 'by the girl', after the above rule has applied. This contrasts with the ill formed *girl writing because the -ing suffix does not contain a similar pairing modification to that of the -en suffix rule. Selkirk stresses that only one grammatical functional assignment is allocated for each compound structure. This generalisation is formulated as the Condition of First Order Projection (1982:37)(CFOP):

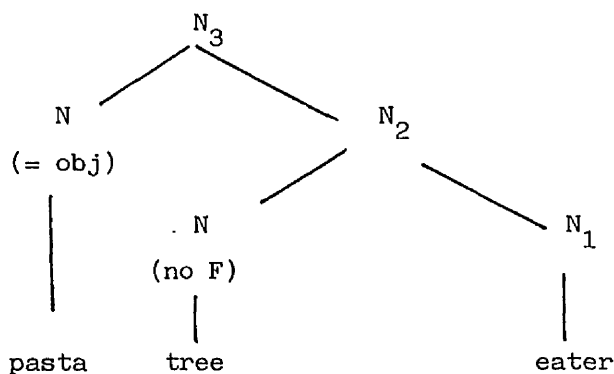
"All non-subj arguments of a lexical category X_i must be satisfied within the first order projection of X_i ."

This condition corresponds to Roeper and Siegel's First Sister Principle to ensure that the grammatical arguments are sisters to the verb.

The effect of this condition is demonstrated by Selkirk's examples:

- (29)(a) *tree eating of pasta.
 (b) *pasta tree eater.
 (c) tree pasta eater.

(c) is well-formed because pasta, which exhibits a relation of theme, is sister to the compound's head, but no explanation is offered for the acceptable locative phrase represented by tree in pre-sister position. (a) and (b) are ill formed because the non-subj argument of the deverbal head is not dominated by the compound node, i.e. it occurs in pre-sister position. The members of the constituent dominated by the compound node do not share a thematic relation because there is no grammatical function assignment. Although the word pasta in pre non-head position will satisfy the grammatical function of object for the compound's head, the intervention of tree prevents a well-formed constituent structure being generated, e.g.



The intervention of the non-head with no function assignment violates

the condition on verb sisters and renders the structure ill formed.

There is a small set of verbs which are problematic to the above principle, because they take double objects, e.g.

hand	}	subj	obj	to obj
put				
give		agent	theme	goal

Examples: (a) the handing of toys to babies
 (b) the putting of boots on the table
 (c) the giving of books to children

*toy handing, *boot putting, *book giving
 *baby handing, *table putting, *children giving.

But the problems are sidestepped by Selkirk's claim that these verbs fail to undergo compounding and, therefore, fall outside the scope of the theory. However, the solution is unsatisfactory in not providing an explanation of why they fail to undergo compounding despite the fact that one object falls within the CFOP.

To recap. In Selkirk's theory of word structure the lexical rules for the generation of compounds are context free. Hence, no formal distinction is drawn between verbal and non-verbal compounds.

The different semantic derivations for the two types of compound are accounted for by the incorporation of Lexical Functional Grammar (Bresnan, 1979) into the framework. This grammar assigns grammatical function argument structure as part of the lexical entry for a verb. Wherever a derivative of the verb functions as head of a compound, the compound will inherit the functional argument

by definition of the percolation principle. The functional arguments of compounds mirror those identified by their position in phrase structure, namely those which function as objects. The head of an endocentric compound is identified by the revised RHR as being the second member of the compound. On lexical insertion to the rewrite rules for a verbal derivative, the grammatical function is allocated to the non-head.

Grammatical functions are linked to thematic relations. Hence, a compound which inherits a grammatical function also inherits a thematic relation as part of its meaning and this is called a verbal compound. If the function is an obligatory feature of the verb, the compound's meaning will always be verbal. If the function is optional, the compound has two readings; a verbal and a non-verbal interpretation. Non-verbal interpretations occur where no functional assignment is made to the non-head. These apply to compounds whose members are simple and derived lexical items, e.g. tree eater, matchbox.

For the verbal compound, a condition is imposed that the non-head must be a sister of the verb which is the root of the compound's head. In addition, the sister of the lexical item which functions as head must be an object argument, thereby restricting the occurrence of subject arguments, as non-heads of verbal compounds. One exception to this generalisation concerning object arguments exists and that is that verbs with double objects do not function as heads of compounds.

Where the relation between grammatical functions and thematic roles is not 1-to-1, i.e. the assignment of the agent relation to a compound non-head, it is explained as the result of affixation rules. These rules modify the assignment of grammatical functions with thematic relations and the modification is represented in the lexical entry for individual affixes. By definition of the percolation

principle, these modifications are inherited by the compound as part of the feature matrix for the word as a whole.

2.4. The Shortcomings of the Approach

Selkirk's claim that all compounds are subject to the same formal rules implies that the range of interpretations for each structural combination is the same. Hence, for each compound rule there are two possible readings: a verbal and a non-verbal interpretation. However, given the inherent properties of the head, which are inherited by the compound, one of these readings may be ruled out, cf. tree devourer. Hence, the output of the compound rules is constrained by the properties of the individual heads.

In connection with this procedure, Botha identifies three instances which reflect problems similarly encountered by the transformationalist theory. One is that the $[V N]_N$ combination is particularly problematic to the semantic procedure described above. First, this set consists of two types of compound: the exocentric type, e.g. pickpocket, scarecrow, etc. and the endocentric type, which does not have a deverbal noun as head, e.g. scrubwoman, swear word, etc. Secondly, if these are compounds generated by Selkirk's framework, then there is a conflict with the motivation for the introduction of the principle of headedness to the lexicon. I shall return to this issue later in this section.

With regard to the exocentric compound, by definition neither member is the head. For example, daredevil is not 'a devil who dares' but 'someone who dares the devil'. If, as Selkirk claims, these compounds are generated by the rewrite rules, the mapping of lexical properties between the compound and its second internal member

(which would normally be the head for an endocentric compound) does not take place, i.e. percolation is blocked. A restriction on percolation means that the compound fails to inherit semantic properties from its members. In order to overcome the problem, Selkirk suggests that the meanings of exocentric compounds be generated by a different set of rules applied specifically to non-headed compounds. However, this is an unsatisfactory proposal because it undermines the claim that all words formed by the compound rewrite rules are derived from the same apparatus.

Compared with exocentric compounds, endocentric compounds with a simple noun as head are more problematic to the theory. These words conform to the formal description for compounds, but the non-head member fails to satisfy any frame assignment for its head. Hence, a non-verbal analysis seems necessary. But this is also inapplicable because the lexical item functioning as head seems to exhibit a subject relation to the verb as non-head, e.g. scrubwoman = 'woman who scrubs'. As a solution to this impasse, Selkirk proposes that a pragmatic analysis assign an 'argument-like' interpretation to the head, e.g. 'noun which has some relation to verb'. However, like Botha, I query the meaning of the undefined term 'argument-like' and the reference to an undescribed pragmatic analysis.

If the possibility of a pragmatic interpretation within the parameters of Selkirk's framework were to be contemplated, it would result in a contradictory analysis for endocentric compounds. In the first place, Selkirk claims that the morphological structure would be generated by the rewrite rule for compounding. Therefore, the noun as second member would be identified as the syntactic head, in order to account for the percolation of inflectional and diacritic features. However, semantically the verb in first member position would be identified as head to allow for selectional restrictions

imposed by the subcategorisation frame. Recall that, in order to assign a thematic argument to a non-head, a grammatical function structure must first be established. In the absence of any evidence for what is intended by a pragmatic procedure, I will not pursue this matter further. But two observations on categorical identity are worth mention. First, if the 'argument-like' criterion is invoked, the function of the noun cannot be that of subject, because lexical items with this feature do not occur in compound structure. Secondly, it will be recalled that the need to distinguish between the level status of categories in word structure motivates the introduction of the revised rule for headship. Hence, if the verb is treated as a non-head and it is also a lower level category, then the claim that no higher level categories may function as members of the compound structure conflicts with the original premise. Apart from the combination $[V P]_V$ which is not problematic because the dominating node is the verb, these compounds are the only type containing a lower level verb. Given the importance of the verb within the sentence, it could be argued that the verb is a higher level category. In this case, the $[V N]_N$ combination violates higher level category domination because the verb may not occur below any other category node. As no further solutions are offered by Selkirk, it is noted that the framework fails to account for examples like rattlesnake, swear word, etc.

Another area of controversy for the framework concerns the $[A N]$ combination. Under the general formula of $[A N]$ there are two categorical combinations, i.e. $N \rightarrow Adj + N$ and $N \rightarrow Adv + N$ to which both a verbal and a non-verbal reading may be assigned. However, according to Selkirk, lexical insertion provides language specific constraints. Thus, as $[Adj [V af]]_N$ construction for English is blocked because the adjective will not meet a grammatical function of the verb frame and cannot be assigned

a thematic relation. So, a verbal reading for the $[\text{Adj} + \text{N}]_{\text{N}}$ compound with a deverbal head is not possible. Therefore, the only representation of a compound with this construction is one with a simple noun as head, e.g. $[\text{Adj} + \text{N}]_{\text{N}} \text{ ----} \rightarrow$ high school.

However, counter evidence is available with Roeper and Siegel's examples like beautiful dancing. Their solution to account for these exceptions is to permit the compound rules a partially productive morphological output to operate in conjunction with semantic compositionality. Hence, the adjectival construction generates a semantically synonymous reading to instances where the adverb normally occurs and blocks the latter as redundant. Selkirk's theory cannot offer the solution of morphological redundancy because (a) it is not a decompositional one and (b) semantic transparency for the compound is characterised by only one feature, i.e. thematic argument structure.

Turning now to the structure $[\text{Adv} \text{ N}]_{\text{N}}$, Botha claims that only a verbal interpretation is available, e.g. well wisher. However, once again the notion of semantic compositionality arises. If the structure is considered a phrase $[\text{Adj} + \text{N}]$, a non-verbal reading is forthcoming on a parallel with 'well person'. In this respect, the framework contrasts with Roeper and Siegel in failing to discriminate between phrasal combinations and compound constituency. One significant feature of the difference between these two structures is that where an adverb is considered to occur with a noun it usually occurs in post-nominal position, e.g. the room downstairs .

The last rewrite rule whose output is not fully productive in the sense that two readings are generated, is $\text{N} \text{ ----} \rightarrow \text{P} \text{ N}$ e.g. underdog, onlooker. The pro-form P may represent a preposition

or a verb particle. It is observed that there is no non-verbal reading for the [Prt N] combination, because the verb particle never occurs with a noun in phrase structure. Moreover, Selkirk herself points out that rewrite rules operate only in conjunction with major categories of speech.

Where P represents a preposition in non-head position of the compound, it should correlate with the prepositional role associated with a noun, e.g. underdog: 'dog under ___' or 'dog which is under ___'. But the phrase requires completion to be semantically well-formed and, even then, it fails to match the meaning assigned to the compound. According to the Shorter Oxford English Dictionary (1983:2409), underdog has an idiomatic reading: 'an oppressed or (socially) inferior person'. In other words, the compound is not semantically compositional, but is an example of an exocentric compound, like pickpocket, etc. With regard to the latter, Selkirk suggests that such compounds are subject to a different set of semantic rules. Therefore, the N ----> Prep N rule does not follow the semantic procedure proposed for the compound rules. In view of this, and the observations to be made on the behaviour of the preposition in the following paragraphs, I disagree with Botha that the non-verbal compound [Prep N], as defined by Selkirk's theory of word formation, is found in English.

There are significant characteristics of the preposition which distinguish its function as a major category of speech from its role as a verb participle. First, the distributional properties of the latter differ from those of the preposition. Compare the following sentences containing the word on:

- (a) He looks on the chair for the book.
- (b) She looks for the book on the table.
- (c) On the road island, they looked right and left before crossing the road.

- (d) *They look for the book the floor on.
- (e) *They look for on the book the chair.
- (f) They look on from the top of the hill.
- (g) They look on at the football match.
- (h) He looks on in the stand.
- (i) She looks on the scene.
- (j) *They look from the top of the hill on.
- (k) *He looks at on the football match.

The examples in (30)(a) and (i) show that the preposition and the particle on may be followed syntactically by a noun phrase. But (30)(f, g & h) demonstrate that the particle may occur with a preposition, whilst the latter must be followed by a noun phrase. The preposition may appear elsewhere in the sentence, e.g. (30)(b) and (c) as long as it occurs with and in front of its dependent noun phrase, cf. (30)(d & e). Linked with the distributional properties, there is a difference in meaning depending on whether the word functions as a preposition or a particle. For example, the structural description of (30)(a & b) introduces a phrase of location. But in (30)(f, g, h & i) the structure represents a construction of VP PP/NP, with the word on functioning as part of the morphologically complex verb look on. Whilst both verbs entail the meaning of 'look', the phrasal verb refers to the activity in the sense of 'watching detachedly', and the verb look has the sense of 'search'.

Following these observations, I suggest that the meaning of the compound onlooker corresponds to a verb-particle construction. The meaning of the word, i.e. 'spectator', includes the sense of 'watch detachedly' rather than that of 'searching'. As a consequence, I surmise that the function of the particle is adverbial and synonymous with the word at. In this connection, on refers to how the action of the verb is carried out. Thus, descriptively, the construction is a combination of $[\text{Adv } [V \text{ af}]]_N$. If this approach is adopted, then within Selkirk's grammar onlooker is an example of a verbal compound. However, if on is simply classified under P, the compound is

a word structure exhibiting a non-compositional meaning. On the semantic evidence for these compound types I find Selkirk's compositional approach unsatisfactory.

Turning now to consideration of the non-existence of the verbal compound $[\text{Prep N}]_N$, the grammar operates within the principles of \bar{X} theory and incorporates the notion of headship. Therefore, it may be argued that the preposition is head of the prepositional phrase. However, a complete semantic structure for the phrase requires the presence of the dependent noun phrase. Since this cannot be satisfied within the compound structure owing to the restriction on constituent members, this combination fails to be generated. Additionally, the preposition's syntactically dependent noun cannot function as a pseudo head for the prepositional phrase's meaning because the grammar contains no mechanism for handling such a notion.

In conclusion the rewrite rule $N \rightarrow P N$ may have an output of one verbal interpretation associated with a $[\text{Prt}[V Af]]$ construction if the particle is treated adverbially. Otherwise, it has a non-verbal interpretation for $[\text{Prep N}]$ which corresponds semantically with the meaning of an exocentric compound. Thus the framework does not satisfy the feature of semantic compositionality implied by the claim that a thematic argument structure is assigned to verbal compounds. For each semantic output of the three rewrite rules examined, the meaning generated is not consistent with the predicted meaning.

Conflicting claims also arise for argument structure assignment in connection with language specific properties. The general claims are that the set of compound rules describe characteristics of compounding that are universal. At the same time, the rules are able to predict language specific features in respect of possible

combinatorial properties. Language specific properties are determined on lexical insertion to the compound rewrite rules. On lexical insertion the feature complex of the lexical entry assigns a semantic relation to the non-head which, in turn, is inherited by the compound as part of its own feature matrix that constitutes its meaning, e.g. tree eater ----> 'eater of trees'. However, it is difficult to evaluate the claim for language specific constraints on the evidence given.

For example, of the thematic relations listed for verbal compounds, Botha queries why no locative reading is given to the verbal compound tree eater.

In order to find a solution to this query we need to refer back to the initial premise on which Selkirk bases her theory. Although the manner in which the relations are presented implies that they may be unlimited, Selkirk (1981:23) gives as her source references Jackendoff (1972) following Gruber (1965). In addition, her condition on first order projection restricts the scope of thematic relations to those that are sisters to the verb.

The principle for first order projection ensures that only those lexical items that meet the selectional restrictions of the verb's subcategorisation frame in phrase structure will occur as non-heads in a verbal compound. Hence, all non-heads have a thematic assignment determined by the properties of the deverbal head. All other argument functions which for present purposes will be called optional arguments, fail to meet the condition of being a sister to the verb. An example of an optional argument is the sentential adverb recently, e.g. Recently, we ate pizza; where the scope of its modification extends across the whole sentence.

With regard to Selkirk's source, Jackendoff (1972:43) presents an ordered list which is hierarchically comprised:

Jackendoff's Thematic Hierarchy (ibid (2.64))

1. Agent
2. Location, Source, Goal
3. Theme

According to Jackendoff these semantic relations may be assigned to sisters of a verb when they occur in object position for phrase structure and fall within the scope of the verb's meaning. In other words, the listed entries are subject to a similar constraint as that of Selkirk's condition of first order projection. Whilst these relations contrast with the semantic relations assigned to optional grammatical functions in being dominated by the verb's meaning, a good deal of similarity is noted for the two, e.g.

- (31)(a) John stayed in the room.
 (b) In the room, the table was covered with flowers.

The prepositional phrase of (31)(a) has a thematic argument assignment of location, whereas the locative phrase of (31)(b) is an optional modifier whose absence would not affect the well-formedness of the sentence. However, in (31)(a) the locative phrase falls within the domination of the verb's meaning, as defined by Jackendoff (ibid:31)

".... the thematic relation associated with the NP expressing the location, in a sentence with a verb of location."

Hence, by definition a locative theme is assigned to a grammatical function associated with a locative verb, e.g. stay.

Returning to the original query regarding the verbal compound tree eater, if thematic argument structure is assigned to grammatical functions on the basis of Jackendoff's principles, I surmise that the thematic locative argument is only assigned to the non-head of a verbal compound where the head is a locative verb. As eat is not a locative verb, it does not contain any property of location as part of its lexical entry, hence a derivative of the

verb will also lack the appropriate entry for the compound's non-head.

To conclude. Three factors are isolated in support of the assumption that Selkirk's intention is to incorporate Jackendoff's list of thematic relations into her theory. One, there is the evidence that argument structures are assigned only to those grammatical functions of the verb within the scope of its subcategorisation frames. This is consistent with Jackendoff's proposal that the sister represents an inherent semantic property of the verb. Two, Selkirk's own analysis of the verbal compound tree eater, with tree representing the object/Theme. Three, Selkirk's reference to verbal compound identity (ibid:24)

"Only compounds in which a non-head satisfies an argument of the deverbal head constituent will be termed verbal compounds."

One of the problems for the conclusion arrived at for thematic argument assignment is that it conflicts with Selkirk's claim on the predictability of a verbal reading for verbs which take obligatory objects. For example, devour takes an obligatory object in syntax. Therefore, when it functions as part of a compound head, its non-head will always have a Theme assignment. This is in contrast to eat which has an optional object function and, therefore, the Theme assignment is not predictable. However, there are examples which suggest that the hypothesis for the obligatory object is unfounded. For example, buy requires an obligatory syntactic object in phrase structure, e.g. *He buys v. He buys books. Hence, the compound London buyer should have a verbal reading 'one who buys London'. but the locative reading is a more likely interpretation, e.g. 'buyer from/in London'. Further, if the claim for obligatory object is dropped there is no reason why devour should not behave like eat in functioning as part of a non-verbal compound. This, in fact, is a characteristic of devour which Selkirk uses to contrast the with eat. On the assumptions formulated above no distinction arises for the two verbs and subsequent investigations support these findings.

A second problem on the conclusions for thematic argument assignment is that the status of the optional argument is left undetermined but appears to relate to non-verbal compounds. Under Selkirk's condition of the first order projection, the argument of the verbal compound must fall within the scope of the lexical verb's meaning. Therefore, on semantic criteria, the locative interpretation for a non-verbal compound correlates with an assignment for an optional argument. However, there appear to be constraints on the allocation of thematic arguments that help clarify the confusion.

This brings me to a more specific criticism of Selkirk's handling of thematic argument assignment. Underlying the framework is the hypothesis that individual semantic arguments do not have a direct correlation with particular grammatical functions, implying that a word exhibiting a grammatical structure may have more than one thematic argument assignment. This situation has already been undermined by the discussion of the above paragraphs. However, the hypothesis is found to correspond to Jackendoff's claims (1972:30-31) that individual words may simultaneously exhibit more than one thematic relation in sentence structure:

- (32)(a) John stayed in the room.
- (b) John stayed angry.
- (c) Herman kept the book
- (d) The book belongs to Herman.
- (e) Max owns the book.
- (f) Max knows the answer.

John is both Theme and Agent in (32)(a & b) and the NP in first order projection is a theme of location. In (32)(a) the location is physical and in (32)(b) abstract. In (32)(c) Herman is the Agent of the verb kept, and book the object. In (32)(c,d,e & f) the relation of Agent is assigned to Herman and Max, whilst book and answer carry the argument structure of both Theme and location.

Under the first order projection, each of the nouns that

are sisters to the verbs in (32) above may function as non-heads of verbal compounds. However, (32)(a,b & d) fail to undergo compounding at all and only some morphologically well formed compounds are acceptable for the other sentential combinations, e.g. *book kept, * answer known v. book keeping, book owner. Moreover, of the acceptable compounds, the non-heads of keep and own have two argument assignments, i.e. Theme and location. The reasons for the failure of (32)(a,b & d) to undergo compounding will be discussed later, but it is noted here that the grammar is unable to predict this non-occurrence. Secondly, the thematic relation between the verb and its object for (32)(c,e & f) is both Theme and location. Hence, when the verb functions as part of a compound there are two possible assignments. But the grammar gives no criterion for the selection of either for a preferred reading of the verbal compound.

One of the reasons that the verbs of (32) fail to undergo compounding is the constraint imposed on the underlying structure by the Thematic Hierarchy Condition (ibid:43). Under this condition the object of the passive sentence must carry the thematic argument which is higher in the hierarchy than the derived subject. This means the derived object never carries a Theme argument in a well formed passive sentence. Hence, -en derivatives as heads of compounds would not have a Theme reading in Selkirk's grammar. However, consider what happens if the sentences of (32) undergo the passive rule. All will be ill-formed except for (32)(c,e & f) where the derived objects could carry a Theme assignment.

In connection with the last three examples, the original definition for the semantic relation of Theme (ibid:29) is given in terms of verbs of motion,

"With verbs of motion, the Theme is defined as the NP undergoing the motion."

But keep, own and know are not verbs of motion. They have stative meanings and convey some state relating to their subjects. Hence, the NP affected by the state is the subject of the sentence, i.e. Herman and Max. Therefore, keep, own and know are similar to belong

and stay in taking Thematic subjects and follow the pattern of not forming adjectival compounds.

With regard to the semantic structure of verbs, Selkirk's grammar does not discriminate between active and stative verbs as bases for word-forms and has already been criticised for the emphasis on syntactic detail. But there is another issue relating to meaning that has a bearing on the non-occurrence of these verbs in compound structure. The stative meaning of this subset of verbs is not derived. Moreover, except for answer and know, they are verbs of incomplete predication requiring an obligatory syntactic entity whose referent completes the verb's meaning.

Thus this subset of verbs resembles dynamic verbs like devour in syntactic behaviour. But certain distinctions prevail (Huddleston 1984). Syntactically, where the verbs take adjective phrases these function as complements rather than objects, e.g.

- (33)(a) Sue loves Pete.
- (b) Sue is fond of Pete.
- (c) John stays angry.
- (d) *Sue loves fond of Pete.

(33)(b) contrasts with (33)(a) because it contains a copula followed by an adjectival phrase. (33)(a) comprises a transitive verb plus an object. The object cannot be substituted by an adjective phrase as in (33)(b) because it would result in an ungrammatical construction, e.g. (33)(d). Since (33)(c) is well formed it must be similar to (33)(b).

However, the categorical differences between the adjective phrase and the object for the above sentences also signal a difference of semantic function, with the noun having a referring function and the adjective a describing one. Thus in (33)(a) the two nouns refer to particular entities but in (33)(b & c) the adjective combines with the verb to complete the verb's meaning and describe the subject. Contrast stay = 'stay' with stay angry = 'remains angry'.

In Selkirk's grammar the object has a referring function because there is a direct correlation between the meaning of the word and its role as object. That is to say, the meaning of the word is not an instance of some general concept inherited by its head verb. Secondly, the meaning of the non-head is independent of the meaning of the verb which dominates it. Therefore, the dominated object can move into non-head position. In contrast, to move the complement of the verb of incomplete predication would affect the meaning of the verb rendering it semantically unacceptable.

Similar patterns of behaviour are observed for the verbs of incomplete predication where they occur with prepositional phrases, e.g.

- (34)(a) The party is at 8 o'clock.
 (b) John is in the kitchen.
 (c) John stayed in the kitchen.
 (d) She went into the lounge.

The prepositional phrases above satisfy the criterion of obligatoriness for complements and, as such, offer a semantic constraint to support the already observed syntactic condition on the general occurrence of prepositions in compound structure. Namely, if the preposition is part of a complement of a stative verb, it cannot function as non-head of a verbal compound. Likewise, if the stative verb takes an obligatory prepositional complement, e.g. belong to, it cannot function as head of a compound noun.

Finally, the verbs keep, own and know are also identified as verbs of incomplete predication. Unlike the verbs considered so far, they permit a noun phrase as a complement, e.g.

- (35)(a) Herman kept the book.
 (b) *Herman kept.
 (c) Max owns the book.
 (d) *Max owns.
 (e) Max knows the answer.
 (f) Max knows.

and require an obligatory syntactic unit to form a well formed structure. However, the criterion of obligatoriness is not a necessary condition. Hence, the well formedness of (35)(f). But it is assumed that what Max knows could be pragmatically inferred elsewhere in a context in which (35)(f) could occur.

Returning now to the earlier problem concerning the seeming ad hocness of stative verbs in (32) to function as derivational heads of compounds, these verbs exhibit the following patterns of behaviour. When the passive transformation rule applies the object of an active sentence becomes the subject of the passive sentence, e.g.

(36) Sue loves Pete ----> Pete is loved by Sue

But the complements of verbs of incomplete predication fail to undergo movement into subject position:

(37)(a) John stayed in the room ----> *The room is stayed in by John
 (b) John stayed angry ----> *Angry is stayed by John
 (c) The book belong to Herman --> *Herman is belonged to by the
 book

except in the case of the verbs taking NP complements:

(38)(a) The book is kept by Herman.
 (b) The book is owned by Max.
 (c) The answer is known by Max.

One of the features of transformations is that they are meaning preserving. Hence, in an active sentence where the verb refers to an event, e.g. (36), the dynamic reading is retained by the passive form. For example, compare the following examples taken from Huddleston (1984:322):

- (39)(a) The vase was broken by Kim.
 (b) The vase was already broken.

(39)(a) is transformationally derived, with the nouns vase and Kim identifying particular entities which are related to each other by the event denoted by the verb, i.e. the event of 'break'. Where the transformed verb derives from a dynamic one, it is called an 'actional passive'. In contrast, (39)(b) is not a passive transform.

It contains the copula verb be and an adjective. The presence of the adverb already indicates that the event has taken place.

Therefore, broken refers to the state of the vase, i.e. the result of the event of breaking. Hence, the participle form of (39)(a) has undergone conversion to an adjective as found in (39)(b). This latter type of structure is called a 'statal passive'.

On this evidence, the exceptions in (38) above are ambiguous between a statal and actional passive interpretation. However, under Selkirk's analysis where morphological and semantic compositionality simultaneously correspond with each other, the only interpretation available is the actional passive one. The question arises as to whether this is a correct evaluation for verbal compounding. The dilemma is resolved by closer examination of the semantic structure.

In (38) the verbs know, own, and keep seem to undergo the passive rule. But since the original meanings of the verbs are stative, the actional passive reading is unavailable. Therefore, on semantic criteria, the examples of (38) have similar meanings to the statal passive of (39)(b). As a result, there is no evidence that these three verbs have undergone the passive rule and their pattern of behaviour is similar to the verbs stay and belong which never occur in an actional passive construction:

- (40)(a) *He is stayed/was stayed.
 (b) *He is belonged/was belonged.

Yet both sets of verbs have a morphological -en form which occurs with the perfect construction:

- (41)(a) He has stayed angry/in the room for some time.
- (b) The book has belonged to Herman for some time.
- (c) Herman has kept the book for some time.
- (d) Max has owned the book for some time.
- (e) Max has known the answer for some time.

If the examples of (41) are compared with (42) below where the verb has a dynamic reading, it is noted that the perfect construction focusses on the beginning of the activity denoted by the verb:

- (42)(a) John has worked in Britain for ten years.
- (b) John worked in Britain for ten years.

The meanings of both the sentences in (42) involve a period of time, but the difference in emphasis on points relating to the period shifts the focus of inferred meaning. The inclusion of reference to the past in combination with the present activity of (42)(a) implies that the point at which John started working is relevant to sentence meaning. Whereas (42)(b) focusses on the importance of a period of time in the past that John has already worked. The examples of (41) also refer to some point in the past at which the state referred to by the verb began, but they contrast with (42)(b) because it cannot be inferred that the situation is completed. Hence, the perfect construction imposes a reading whereby some aspect of the state is given relevant focus; namely the situation of owning, or keeping, etc. may be interpreted in terms of the inception to the prevailing state.

Therefore, although the verbs in (41) have stative meanings, the perfect construction imposes an interpretation that is not accessible to the passive, i.e. a dynamic feature is inferred as part of the verb's meaning. In this respect, the perfect construction captures an aspect of verb meaning which is analogous to the actional passive

construction, which makes it acceptable for exploitation by the compounding rules.

To recap. A semantic approach to lexical behaviour is able to explain the non-occurrence of certain stative verbs as heads of verbal compounds. But a syntactic analysis is unable to reveal the constraint on stative verbs because they share syntactic patterns of behaviour with dynamic verbs. Both types of verb will undergo inflectional and derivational affix rules, and occur in sentences where the surface representation is superficially similar, e.g. compare know the answer with wash the car. However, compounding entails the inclusion of two lexical items with independent referential status, i.e. the semantic structure of one constituent word is not shared by the other constituent. Also, where examples of normally stative verbs, e.g. (38) above, are found within the structure of a compound, it is claimed that a dynamic reading has been imposed on the stative one. For example, the perfect construction demonstrates that a passive reading given to a stative -en verb form may be interpreted as the inception to a state rather than the result of an activity.

In this way, the interpretation of a perfect verb phrase may acquire a dynamic reading. The identity of a subset of normally stative verbs functioning within a compound structure means that this subset will also be subject to the Thematic Hierarchy Condition, e.g. property in property owner must be the Theme and object of own.

In sum. It would appear that the assumption on active verb input to the compounding rules implied by the word structure grammar is justified. But, on the above arguments, the verb bases may include some stative verbs where a dynamic reading may be inferred. Also, discussion on the perfect construction suggests

that the meaning of the derived -en form is not an actional passive equivalent. Namely, the -en word as head of a verbal compound may have the stative passive reading as a derivative of an active verb base. I shall return to this in a moment. In order to provide a descriptively adequate account to include the above findings, the grammar would have to incorporate some mechanism to assist the hearer to infer a dynamic reading for the -en form as head of a verbal compound where the normally expected reading of the verb is stative. However, this would entail an account of shared information between the speaker and hearer as part of a performative act, and this falls outside the scope of the grammar's underlying lexicalist hypothesis.

It has been argued that an analysis of syntactic data concerning compounding that does not take into account the semantic structure of verbal bases is misleading. The verbs of incomplete predication share a good deal of similarity with the active verb.

The object of the active verb and the complement of the stative verb fall within the domination of the meaning of the verb, although there are degrees of domination by the latter which contribute to the possibility of compounding occurring. The verbs stay and belong, for example, are similar to the copula verb be because all three verbs take complements which describe some property of the subject.

But the verb be is semantically empty and shares its meaning with that of its complement. Although the verbs stay and belong are not semantically empty, the meaning of the verb phrase in which they occur is only partially complete if the complement is absent. With these verbs, there is a disjunction between the syntactic composition of the verb and its meaning. Syntactically, two words denote the verb's meaning. Therefore, the verb and its complement combine to represent a nucleus (Tesnière 1969) with one meaning. If these copulative verbs undergo derivation to function as a noun or adjective head of a compound, the dependent complements would have to move

into modifier position in accordance with the language specific principle of word order for English. But the syntactic movement would produce a morphological structure that no longer represents the semantic content of the head word because there is an initial disjunction between the morphological structure of the verb base and its meaning.

There are possible counter-examples to the semantic constraint on incomplete predication which, when examined closer, show that two criteria must be present for the verbs to function as part of the compound, e.g. good looking, sweet smelling, etc. Equivalent sentential structures demonstrate that the adjectives good and sweet behave in a similar way to angry:

- (43)(a) She looks good.
 (b) The rose smells sweet.

Both words meet the criteria for complements in completing the semantic structure of the respective verbs look and smell. But, unlike angry which relates directly back to the subject, good and sweet function adverbially in specifying the meaning of the verb (which denotes a state ascribed to the subject). Hence, the word forms have the capacity to function in more than one word class, e.g. good child, sweet tooth as adjectives, or as adverbs, e.g. good enough, whistled low and sweet. In addition, their behaviour contrasts with angry which must undergo suffixation to function as an adverb, e.g. angrily. This suggests that, in addition to the feature dynamic, the whole verb phrase must undergo conversion in order for it to function as a well formed compounded structure.

The discussion on verbs of incomplete predication arises from the observation on the descriptive inadequacy of the grammar to detail thematic argument assignment to grammatical functions. But the conclusions on their non-occurrence in compounds affects the findings for thematic argument distribution to guarantee a verbal reading, e.g. the inherent properties of location for the verb stay. With the non-occurrence of these verbs, the alternative implication identified within Selkirk's grammar, i.e. that the Theme argument structure only applies to verbal compounds, is endorsed. But from this endorsement follows a distinction on thematic argument assignment between two sets of verbal compound types. Namely, the verbal compound manifests a Theme argument and a second (newly identified) subset of compounds comprises other thematic argument assignments. However, given the condition of the first order projection, the status of the grammatical arguments for the subset is clarified because their thematic arguments fall within the domination of the overt verb's meaning. As a consequence, it is established that no optional arguments are exploited by compounds.

These findings contradict Selkirk's claim that all compounds whose non-head constituent is an argument of its deverbal head are verbal compounds because the second subset as defined above contrasts with verbal and non-verbal compounds (ibid:23). They are semantically closer to verbal compounds but syntactically more like non-verbal compounds. According to Selkirk, non-verbal compounds exhibit such a wide range of semantic relations that her grammar only offers a syntactic classification of the word-type. But, given the above findings, I suggest that the subset of verbal compounds exhibiting thematic arguments provides a key to the analysis of the non-verbal compound types referred to by Selkirk, e.g. root compounds.

With the morphological rules being the same for verbal and non-verbal compounds, the presence of semantic properties for the individual lexical heads plays an important role in differentiating

the generative path for these two types of compound. However, it is unclear from the proposed percolation procedure at what stage in derivation the head of the non-verbal compound no longer inherits verbal properties, cf. tree eater. This is relevant to the notion of compositionality. If the head of the verbal compound inherits verbal properties, the compound procedure remains semantically transparent; whereas failure to inherit semantic properties of the verb would generate non-compositional meaning.

It has been assumed here that Selkirk has followed Jackendoff's hypothesis for thematic structure. Hence, speakers infer a non-verbal reading when an appropriate semantic property is not present in the verb's lexical entry. For example, if eat was a verb of location one of its thematic arguments would include the theme of location. As it is not, no verbal reading involving a locative theme, e.g. 'in trees', can be invoked. But, if the semantic relation of location can be given to a compound by a device for non-verbal compounding, the question arises as to the significance of introducing the notion of thematic argument structure to differentiate between verbal and non-verbal compounds.

I suggest that one answer is to sustain the claim that the head of the verbal compound need not be decomposed on the grounds that the percolation principle will sanction a well formed semantic interpretation. However, in order to provide an explanation of competence in differentiating between verbal and non-verbal readings, a semantic criterion is needed to guarantee non-decomposition. Hence, the use of thematic argument structure. But the notion of direct correlation between form and meaning is upheld by the framework. Therefore, the grammar is similar to Roeper and Siegel's view of semantic transparency and subject to the same criticisms concerning non-verbal compounds, e.g. the semantically transparent reading for root compounds like tea cup.

In addition to the above criticisms, there is a lack of clarity surrounding the effect of affixation on the inheritance of semantic properties for the compound. In Roeper and Siegel's analysis only a limited number of affixes are associated with compositional readings for compound meanings, but Selkirk's word structure grammar suggests that any word comprising an affix and a verb as its sister may undergo verbal compounding.

I refer to the description of words derived with the -able suffix. It is claimed that this suffix follows a similar pattern of behaviour to the -en suffix, which in the form of an adjunction rule has already been found to be inadequate. For example:

- (44)(a) The teacher trains the children.
- (b) The children were trained by teachers
- (c) The trained children.
- (d) The children are trainable by teachers.
- (e) The trainable children.

(44)(b) is a passive form of (44)(a) and under the percolation principle the meaning assigned to the -en form of the verb is also attributed to the adjective of (44)(c). On analogy with (44)(b & c), (44)(d) is given the interpretation 'can be trained' and assigned to (44)(e).

The analogy is not semantically accurate, however. (44)(b) is an actional passive and contrasts with (44)(c) where the adjective refers to a state resulting from the action of 'train'. Therefore, the reading involving ability to be trained cannot be inferred from (44)(c), although the latter does entail the concept that the children underwent training. By comparison, (44)(d) comprises a copula plus an adjective which has been derived directly from a verb root train. As adjectives, both trained and trainable refer to states of affairs obtaining for their subjects but there is an emphasis on different aspects of the concept 'train'. The suffix -able invokes a semantic property for the meaning of the verb which leads the speaker to infer a potential ability of the subject. The concept of having undergone the activity of 'training', however, cannot be inferred. Consequently, a similar pattern of syntactic behaviour does not

always lend itself to predictable semantic results.

However, the above analogy is applied to the compound teacher trainable which is identified as a verbal compound, i.e. the non-head is sister to the verb. It is noted that the scope of verbal compounding in Selkirk's grammar extends beyond that of Roeper and Siegel's framework, which does not include the above as a semantically compositional compound. Roeper and Siegel also claim that the -able affix rule deletes the agent frame, making the verb intransitive. Hence, the role of teacher in the above example would not be that of sister to the verb under the latter analysis.

The effects of intransitivity are not considered within Selkirk's framework because it is assumed that the demoted subject moves within the verb's domination once the passive -en suffix rule applies. However, contrary to this latter view, I suggest that examples like teacher trainable belong to that subset of verbal compounds identified in the above discussion which exhibits a thematic argument of manner, e.g. 'trainable as a teacher'. In Selkirk's grammar the transference of the subject into the scope of the verb's meaning contradicts the no-subject principle but this implication is overlooked, Although it seems to be accepted that the words carrying an original thematic argument move out of the domination of the verb's meaning.

Apart from the evidence already examined, Bresnan (1982:22-30) claims that the adjectival -en forms are conversions from the verb's participle form. She argues that, in addition, to deverbal adjectives associated with underlying passive structures, there exist adjectival derivations that function as part of the perfect construction:

fallen leaf	:	leaf that has fallen
drifted snow	:	snow that has drifted
stuck window	:	window that has stuck
split wood	:	wood that has split

In the above examples a Theme argument is assigned to the subject of the NP. Since an equivalent active structure provides no original subject source to move into object position for the passive -en suffix rule, these verbs could not function as heads of verbal compounds,

_____ falls the leaf
 _____ drifts the snow
 _____ splits the wood

However, if the similarity between the behaviour of the passive and perfect constructions is captured by a conversion rule, examples of verbs like those above may function as compound heads. The original thematic argument assignment would remain unaltered and be inherited directly by the zero derived adjective.

One argument against this analysis is that many perfect constructions have equivalent passive representations, e.g.

(45) a leaf that has fallen: a leaf is fallen

and, therefore, the evidence is an ad hoc method of supporting thematic argument structure assignment (for further discussion see Levin & Rappaport: Linguistic Inquiry Vol.17 No.4 1986:623-63). But Bresnan's claim supports the findings on the discussion for compounding so far, such that derivation need not include a direct correlation between morphological and semantic compositionality. Secondly, a conversion rule not only has the advantage of capturing similarities in the behaviour of the passive and perfect constructions, but also enables a more realistic assessment of thematic argument assignment to be made. However, the rule still fails to account for the dynamic feature associated with the -en adjective as head of the compound.

Another advantage of the conversion rule is that it accounts for the allomorphic variations of participle forms (Bresnan (ibid) citing Lieber (1979)), e.g. split, stuck. Under the principles of compound procedure for Selkirk's grammar, examples like this would not occur as heads of verbal compounds because the suffix rules predict frame adjustment. It is a shortcoming of this framework that it is weighted towards the syntactic behaviour of words rather than a consideration of the semantic properties of the word bases.

Where examination of these properties does occur, inconsistencies are found with relation to the percolation principle.

For example, in her discussion of the shift in semantic perspective for the adjectives trained and trainable, Selkirk suggests the inclusion of the feature 'ability' for the -able derivative.

However, the lexical entries for affixes have no semantic content; with the result that the suffix has no semantic property that can percolate upwards to the mother node once the rule has applied.

This property would have to be part of the semantic structure for the base's meaning, e.g. train. Following the analysis proposed the semantic aspect of ability is assigned to the passive reading only. If the property of ability is a feature of the base or the passive participle, the framework would still not differentiate between the stative readings for the -en and -able derived word. Contrast inhabitable island with inhabited island where the former refers to a characteristic of the island that it is fit for habitation, whilst the latter refers to an existing state.

The problem with Selkirk's framework is that the role of the word functioning in pre-head position is understood in literal terms to represent the object of the action denoted by the verb. In this connection, her analysis is similar to Roeper and Siegel's view of affixation as one which affects frame adjustment. But if the nature of the semantic properties for the base form are not also taken into consideration, the effect of derivation and thematic assignment cannot be fully evaluated.

Let us take another example. Parental refusal is predicted to be well formed under the compound rewrite rules. In addition, the verb root of the compound head yields to the principle of lexical functional grammar that ensures a verbal reading, i.e. refuse takes an optional grammatical function of object:

- (46)(a) He refused
- (b) He refused the offer
- (c) They refuse the parents the right to vote.

(d) ?They refuse the vote to the parents.

But, although the meaning of parental refusal is semantically transparent, i.e. 'refusal by parent(s)' and exhibits an agentive relation between the head and non-head, the meaning could not be generated by the procedure proposed by the grammar. The -al derivation is a noun whose meaning is not compositionally derived in the same manner as that for an -ing nominalisation. In other words, this is a similar situation to the one noted for the -en passive rule where a simple adjunction rule does not account for the generation of meaning.

Consider first the pattern of behaviour for the verb refuse and its ability to undergo compounding. Although refused and refusing are morphologically well formed and contrast with the non-existent word refuser, the latter three derivatives do not usually function as heads of verbal compounds:

- (47)(a) *offer refused.
- (b) *vote refusing
- (c) *parent refuser

One explanation for this might be sought in the claim that verbs taking double objects do not generally undergo compounding because (46)(c) demonstrates that refuse may take two objects.

But another explanation is one involving the semantic properties of the verb itself and the role of the affix. The ad hoc behaviour of refuse in undergoing derivation and compounding is characteristic of the subset of verbs with normally stative meanings. As indicated earlier stative verbs do not assign an agent theme to their subjects. Therefore, the unacceptability of *refuser is explained as a conflict of property inheritance. Traditionally, the -er suffix is recognised as referring to an agent of the action denoted by the verb to which it attaches. Hence, when the -er suffix juxtaposes to the stative verb a contradiction in semantic property inheritance occurs and generates an ill formed output.

In contrast to the function of the -er suffix, the -en suffix focusses on an end point of the verb's meaning; whilst the -ing suffix imposes a durative concept on the meaning of the base to which it attaches. Therefore, if the -ing suffix occurs with a stative verb like refuse, the state is understood as continuous and not dynamic (i.e. not an activity). Where refusing may be interpreted dynamically is in the progressive form, e.g.

(48) Pat is refusing to go to the meeting this evening.

However, in (48) the meaning of the verb phrase of which refusing is a part is noticeably marked as being an observation on the subject's behaviour. Further, it may be inferred that the observed behaviour has some relevance to the situation in which the sentence is uttered. In sum, the suffixes -en and -ing do not generally alter the meaning of the verb root to which they attach.

Coupled with the effects of affixation is the distribution of thematic arguments for the unmarked verb root. Since refuse has a thematic subject, there is no grammatical function of object with an argument structure of Theme. Secondly, an object falling within the first order projection, e.g. parents in (46)(c), could not be moved into the non-head position because it is an indirect object. Sentences with double objects generally place the indirect object (or second object) before the direct object. Refuse is also one of a small number of verbs which do not allow movement of the indirect object into a prepositional phrase. Hence, the ? of (46)(d) to indicate that the structure is semantically acceptable but syntactically ill formed.

To conclude. Whilst the syntactic behaviour of the verb refuse is similar to that for an active verb which takes an object, its non-occurrence as head of a verbal compound is explained by the blocking of the indirect object. It is a shortcoming of Selkirk's grammar that the semantic properties of different types of verbs are not investigated. As a result, the framework fails to show syntactico-

semantic constraints of this kind.

Having established that refuse will not function as a verb root to the head of a verbal compound, I now turn attention to the effect of the -al suffix on the verb. Refusal is a noun whose meaning refers to an act or deed. I suggest, therefore, that the function of the suffix is to focus on an end point of a state of affairs denoted by the verb, such that the situation is conceptualised as complete. In this respect, there is a closeness in meaning between the -al word form and the passive refused. However, no dynamic feature is present in the meaning of the underlying root, therefore it may be the concept of the end point that forces an action interpretation or some pragmatic relevance, e.g. (48). This in turn leads to an interpretation of the derivative refusal as a specific reading of an act. An inherently dynamic verb, e.g. arrive, generates a similar semantic output, e.g. 'arrival'.

The differences in the derivative paths of words like refusal and those envisaged for the heads of verbal compounds in word structure grammar, e.g. eater in tree eater, is one involving gerundive and derived nominals (Chomsky 1970). Gerundive nominals only take verbal modification: whilst derived nominals behave like nouns and may occur with determiners, a plural suffix or a prepositional phrase. Compare refusal which is a derived nominal with the gerund watching:

*quite refusal	quietly watching
*highly refusal	his watching
*his refusing	
the refusals	*the watchings
John's refusal	*John's watching
the refusal of the offer	?the watching of T.V.
the refusal by the parents	*the watching by parents

It is a shortcoming of Selkirk's framework that this aspect of the nature of affixes is not taken up and explored, especially in connection with thematic argument structure. As demonstrated with parental refusal, the derived nominal head shares a semantic relation with its non-head that is similar to the agentive theme but this cannot be identified as a verbal compound because parent must also carry the grammatical function of subject and a Theme relation. This then violates the no-subject constraint. One implication of the identity of an agentive relation is that verb frames are not deleted under the process of derivation. But this is rejected because parents is not a complement of the verb. Another implication is that derived nominals enter into semantic relations with their non-head that are sanctioned by the verb but not dominated by its meaning, i.e. the grammatical function of the non-head constituent of a non-verbal compound is that of an adjunct. On the other hand, the nominalisation of sentences suggests that thematic argument assignment carries over, e.g.

- (49)(a) The offer is refused
- (b) The refusal of the offer.

(49)(b) is a nominalisation of (49)(a). When compared for thematic structure assignment, the allocation of Theme and location for offer carries over from (49)(a) to (49)(b).

Still on the discussion of affixes, Selkirk identifies two subclasses of affixes. Those that occur word internally to the compound, e.g. -ing in bird watching, and those which will attach to the compound as a single word, e.g. headmaster + ship. The former are classified as Class I affixes and the latter as Class II. Some affixes, however, fall into both classes. Un- is an example of the latter because it appears outside the compound, e.g.

[un [self sufficient]] and occurs prior to suffixation by -ity, e.g. [[un [grammatical]] + ity]. This latter example is given a Class I analysis because the prefix un- only attaches to adjectives, not

nouns. Class I affixes are distinguished from Class II affixes on two criteria. Class I affixes are non-neutral with regard to stress and they attach to roots. Class II affixes are stress neutral and attach to words.

Selkirk's hypothesis regarding Class II affixes is subject to criticism because her investigation of these is limited to their behaviour with simple word bases and words generated by the compound rewrite rules. However, there is a group of compounds, i.e. synthetic compounds, which are characterised by Class II affixes. Synthetic compounds are semantically and morphologically compositional, but they are described as phrasal word groups which have undergone suffixation, e.g. `[[three][legg]]ed` : 'having three legs'.

The above subset of compounds are problematic because their inclusion into the grammar would contradict her claim for lexical rules. According to Selkirk, word formation and sentence construction are subject to two different sets of rules which operate within the confines of individual grammatical components. To include synthetic compounds into the lexicon would concede to a set of phrase structure rules as part of lexical procedure. On the other hand, failure to consider this subset of words as the output of Class II affixation rules undermines the claims for universality of the compound rules, and the language-specific constraints on word formation once lexical insertion has taken place.

For example, Marchand (1969) states that synthetic compounds have limited productivity for English. But Botha (1984) observes that they are highly productive in Afrikaans, e.g. dik lippig (thick lipped), vyf weekliks (five weekly). Failure to evaluate the productive output of Class II affixes would suggest that (a) the fully productive lexical processes are governed by the adjunction rules involving Class I affixes only, and (b) synthetic compounding is not a rule

governed procedure. It would also mean that the sister category would have to be marked as a verb. Many of the affixes involved attach to different categorical sisters, e.g. -er suffix attaches to the nominal phrase all dayer. Therefore, to ensure a thematic argument assignment for the verbal compound with a Class I suffix, the affix must co-occur with a verbal base. In addition, a non-compositional meaning would also be assigned to a verbal base of a derivative with a Class I suffix. But a semantically compositional output is not affected by the classification of the suffix or its base. Hence, sequencing in the application of the affix rules would fail to differentiate synthetic compounds from verbal and non-verbal compounds.

Indeed, Selkirk puts forward the advantage for her theory that categorical status is given importance over that of rule sequencing on the grounds that Class I and Class II affixes alike attach to word bases. But to offset this claim, each lexical entry for an affix participating in the compound procedure is given a property stipulating the sister category. As argued in the above paragraph, without verbal identity no thematic assignment can be inherited by the compound. On this basis, the grammar requires more than one lexical entry for individual suffixes. For example, one lexical entry is required for the agentive suffix and another for the comparative -er suffix (for further discussion on comparatives see Bresnan 1979:284-307). As a result the grammar bears a close resemblance to Roeper and Siegel's framework.

Whilst in agreement with Selkirk that a categorical approach is favoured over a morphological decompositional one, the arguments on categorical distribution overshadow semantic considerations which affect the resulting output for meaning. For example, arguing against Allen's rule-sequencing hypothesis that affixation precedes compounding, Selkirk claims that the un-prefix is a Class I and II prefix. The non-occurrence of Class II examples, e.g. * [un [colourblind]] is explained semantically because un- attaches to degree adjectives.

Therefore, the un- prefix occurs in environments similar to modifiers of degree adjectives, e.g. unthoughtful : very thoughtful (Selkirk 1982:108). By analogy, untopheavy is an example of Class II prefixation because very topheavy is well formed. By the same token, the prefix ex- is subcategorised for nouns. Hence, it may affix to Redcoat as a single word, i.e. Class II affixation, but not internally because Red is an adjective, e.g. *ex-Red. But on this argument ex-man made is also well formed because the prefix ex- can attach to the internal noun as a Class I affix and then be inherited by the compound as a whole under percolation. However, the example is semantically unacceptable for the same reasons proposed for the prefix un-. Namely, there is a semantic constraint on the prefix ex- such that it only occurs with words denoting a job or official position, e.g. ex-president, ex-actor, ex-policeman.

It is likely that there are many affixes that are restricted in this way and that restrictions on categorical behaviour are accidental. For example, Selkirk claims that runawayhood is an acceptable compound structure taking Class II affixation and supports the claim with categorical evidence. The suffix -hood can co-occur with runaway as its word base because it is subcategorised for nouns. Hence, it cannot attach to the internal preposition as a Class I suffix. However, sit in is also a well formed compound noun, but it fails to take the suffix -hood. The reason for this is again a semantic constraint, i.e. the suffix is restricted to occur with nouns denoting either person, sex, condition, rank or quality (SOED 1973:981). Sit in is a nominalisation referring to an action. Hence, its inherent semantic properties prevent it from co-occurring with the suffix -hood. I would suggest that runawayhood is acceptable because the base runaway is a noun referring to a type of person and can be interpreted to mean a condition relating to this type of person.

The above observations are an extension to other criticisms on the issue of Class I affixes for verbal compounding, e.g. parental refusal. Combined the evidence suggests that, whilst morphological

structure reflects semantic content, it cannot predict it.

There is one final area of concern relating to the affix rules and this is the distinction between inflectional and derivational suffixes. Selkirk's word structure grammar claims that affixation is a procedure of simple adjunction to a base and this is a typical pattern of both types of affix. Traditionally, derivation contrasts with inflection because the former procedure may change the category of the base word and, thus, alter the meaning of the word in line with its derived category; whilst inflection is a non-category changing procedure and may not change the meaning of the base word, although greater specificity is given to the concept to which the inflected word refers.

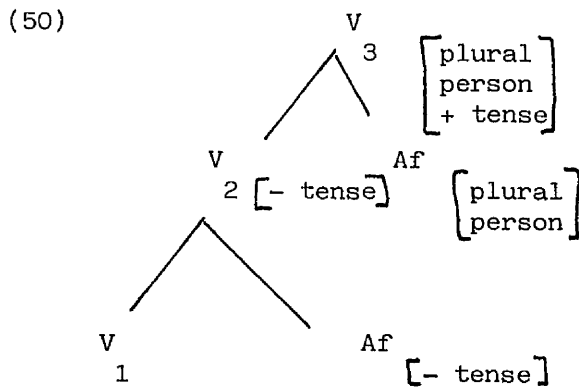
Therefore, following the traditional view, if derivation has successfully applied prior to or during compounding, the meaning of the compound should be inherited from the head word. This is the procedure envisaged for non-verbal compounds where the derived categorical role of the head is taken as the starting point for the allocation of a grammatical relation for its non-head. In contrast, the procedure for verbal compounding is overshadowed by the identification of thematic arguments, such that the effect of affixation on the distribution of inherent semantic properties of the head's meaning is sidestepped.

It is generally recognised that compounding does not usually incorporate the procedure for inflectional affixation. Therefore, it would seem that reference to the non-category changing elements of language is unnecessary. However, the different procedures for the two affix types are handled in Selkirk's grammar by the lexical component and, since thematic argument structure is invoked for sentence and word formation, the semantic differences for these two procedures do not become apparent (see above discussion on adjectival passives). Additionally, Selkirk foresees the theoretical situation that, if all affixes have head status, a conflict could arise in the matching of inherited properties. More specifically, the conflict would arise

in relation to inflectional affixes. To avoid this hypothetical possibility no head status is given to inflectional affixes, and the percolation principle is revised to allow for this. I shall return to this issue in more detail.

A third problem relates directly to inflection and compounding. In spite of the generalisation that inflectional affixes are not found as part of the internal structure of compound words, there are exceptions. The plural suffix *-s* sometimes occurs on the first member if it is a noun, e.g. sales assistant, arms race, etc. Additionally, certain inflectional suffixes are associated with the property of tense, but this property is not usually connected with a semantic feature of compound meaning.

I now return to the hypothetical situation of conflict in property matching. Selkirk's argument against head status for inflectional affixes is presented on the following grounds.



If the affix of V_1 in (50) is inflectional and has no tense property under the definition of percolation for properties of heads, the dominating node (V_2) will also be unmarked for tense. On the second cycle, the inflectional properties of the suffix co-occurring with V_2 will also be allowed to percolate upwards due to the inheritance principle. Note, however, that the node dominated by V_3 has a different marking for tense. Hence, there is now a conflict between the properties available at the second stage of affixation and those properties

assigned to V_3 .

To resolve this dilemma, Selkirk proposes a revision of the percolation principle which allows the properties of non-heads to percolate upwards, such that a 'summing up' (Selkirk 1982:76) is made of the inherited features for the dominating node. There are several loopholes in this proposal. First, V_3 could not inherit the feature [+ tense] through percolation because there is no head marked with this feature below the dominating node from which it can be inherited. Therefore, the conflict does not arise and the revised principle is not called for. What is required is a further mechanism to introduce the property of tense.

Second, if the lexical rules do not assign the conflicting tense property, the latter must be acquired by other rules. In this theory, the alternative to lexical rules are syntactic rules, which, it is stressed, behave differently. As the theory focusses only on lexical procedure a solution to the hypothetical problem falls beyond the scope of the analysis because the acquisition of the property for V_3 would have to be treated as some abstract sentential rule. In contrast to the above claims, Selkirk suggests in a separate discussion on the inflection of number for the noun the possibility of a pragmatic approach to explain the latter acquisition by the compound.

In connection with compounding, tense is not an overtly marked compositional feature. Wherever tense applies, it suggests a temporary or changing state of affairs; whereas one of the characteristics of compound meaning is that of permanency (e.g. Allen 1979, Downing 1975). In other words, tense is not a prerogative of the suffixes which attach to the internal verb bases of compounds.

The earlier discussion of the adjectival passive demonstrates that the role of suffixation is to alter the point of view on the semantic structure and is typical of morphological and zero derivation alike.

For example, tense refers to the semantic property of time and is marked on the auxiliary verb co-occurring with the participle verb. This is seen by the similarity in behaviour of the present participle form with the -en participle form:

- (51)(a) Mary is working at the bank
 (b) Mary has been working at the bank for five years
 (c) Yesterday, Mary was working at the bank
 (d) Mary will be working at the bank on Thursday

(51)(a) refers to the activity of Mary's working at the present time, i.e. now. This is indicated by the presence of is. Hence, part of the lexical entry for the verb form is will contain a property of time which is now. The present tense form of the verb be is irregular and, therefore, would not acquire an inherited property of tense by the lexical affix rules of the grammar. We can think of a state of affairs like the activity of work in (51)(a) for which there is a time scale, i.e. $t \dots t_i$, with t standing for some unspecified inception point. Somewhere on this scale will be the point t_n which is 'now' and may be represented by the word form is.

The presence of the verb have in the present tense form has is also marked for the tense property in (51)(b) and also refers to 'now'. However, another point of time is also referred to by the prepositional phrase for five years, i.e. t_{n-1} . Since the verb and the phrase are juxtaposed, it can be inferred that the time that Mary's working started is t_{n-1} and is still continuing. Hence, (51)(b) includes a reference to a time scale $t \dots t_i$ for the state of affairs of Mary's working on which two points of time are identified. One is t_n which is the state of affairs now and the second is t_{n-1} which the prepositional phrase specifies as the starting point.

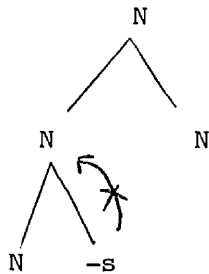
In (51)(c) the auxiliary is marked for past tense, i.e. t_{n-1} on the time scale but which can be inferred as the immediate past because of the presence of the adverb yesterday. Finally, (51)(d) contains the future tense form of the verb to be to indicate a time t_{n+1} for the activity of work. Hence, it is seen that the meaning of the participle form is always a continuous state of affairs. But the different aspects of this state are invoked for each sentence depending on the tense marking for the auxiliary verb.

With compounded words there is no overt morphological representation equivalent to the auxiliary role. The meaning of the derived head is similar to that of the main verb's function in the above sentences. I suggest that any association linking the participle meaning with the property of time is inferred from what is known about the distributional possibilities of the sentential form. This is one explanation for the variability between underlying paraphrases of compound meaning and the semantic structure of the compound itself. In view of the above findings, I do not agree with Selkirk's suggestion that a hypothetical situation may arise where tense is overtly marked for English compounds. Possible counter-examples to this conclusion are has been or human being. But since no thematic argument structure can be assigned to the relation between the constituents of these compounds, they would be classified as non-verbal compounds. This takes the examples beyond the framework of the grammar despite the fact that the heads of both words have undergone lexical affix rules.

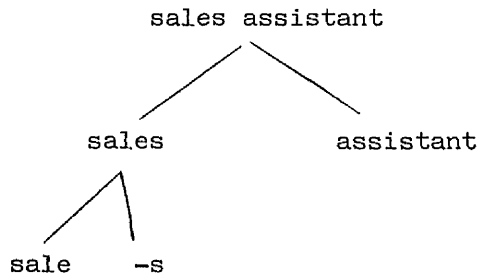
Another problem regarding the association of inflectional affixation with compounding is the plural suffix -s. Selkirk states that where the feature of plurality is marked on first members of compounds, it is not characteristic of the compound as a whole, e.g. sales assistant is a singular noun. Nonetheless, a plural interpretation is given to the meaning of these compounds. For example, programs coordinator contrasts with program coordinator because the meaning of the former entails more than one program, whilst the latter is understood to mean only one. As the grammar does not allow inflectional

suffixes to function as heads, the property of number as a feature of the inflected word cannot percolate upwards, e.g.

(52) (a)



(b) Example:



Thus Selkirk (1982:52) proposes that the presence of the suffix has a pragmatic function of 'imposing the plural interpretation of the non-head, in the interest of avoiding ambiguity.'

There are several unsatisfactory aspects to the above hypothesis for word internal plurality. One, no explanation is given on how a pragmatic function might be included into the framework but, if it is included, it would have to be exploited after compounding has taken place because of the existence of the alternative non-plural non-head combination. It also introduces the notion of a separate mental apparatus to operate in connection with semantically compositional structure of compounds.

Two, in anticipation of a hypothetical situation for tense mentioned earlier, Selkirk revises the percolation principle to allow for a 'summing up' of inherited properties. Because inflectional affixes do not have head status, these properties could not percolate upwards to the dominating node under the original principle. But with the relaxation of the constraint the property of number associated with the plural suffix could be inherited by the inflected word and in turn, the compound. Therefore, the pragmatic function is not required. Unfortunately, the procedure under which the revised percolation procedure could operate conflicts with the non-decompositional approach of the framework, because compound and derivation operate

simultaneously. Usually, inflected words are not stored in the lexicon (apart from exceptions like trousers, etc.), therefore the plural suffix rule would have to apply immediately prior to or at the same time as compounding. This would not only complicate compounding procedure more but it also introduces into the analysis another issue; namely, the speaker's consideration of semantic data over the syntax. In this connection, Selkirk's grammar has emphasised the syntactic function of words as a means of predicting compound meaning.

Three, the problem of explaining word internal plurality originates because the framework arbitrarily distinguishes between inflectional and derivational suffixes as heads on the evidence of syntactic behaviour. But the role of head for the affix does not predict consistent semantic behaviour. As explained previously with derivational suffixes, some affixes have a definite correlation with specific semantic properties, e.g. the -er suffix with agent, the plural suffix with number; whilst the function of other affixes is to focus on aspects of lexical meaning, e.g. the -en suffix with completion, or the suffix -ity with the characteristic feature of quality (Aronoff 1976). Thus the similarity for semantic behaviour for derivational and inflectional affixes is greater than their dissimilarity for category assignment. Therefore, the allocation of head status to derivational affixes is a consequence of the grammatical framework and the desire to reinforce the hypothesis on percolation.

To recap. In the above paragraphs I have discussed the issue of inflection and its relevance to compounding, especially with regard to the properties of tense and number. Since the affixation rules of Selkirk's theory contribute in part to the compound procedure, it is felt necessary to consider the theoretical significance of these two properties.

The conclusions reached in my discussion are that tense is not a property of the affixes that undergo compounding. Therefore, the property presents no obstacle to the proficiency of the percolation principle originally proposed. However, the property of number does present a problem. Within a theory which advocates that inflectional affixes are not given head status, this property is not allowed to percolate upwards. Selkirk anticipates her discussion of the hypothetical situation for inflectional suffixes when she discusses the possibility of a pragmatic analysis for such cases, but she fails to exploit the independently motivated revision of the percolation principle for word internal plurality. The revised percolation principle is not found to offer a satisfactory solution, however, for reasons of complexity and speaker competence.

In conclusion, it is my opinion that the focus on verbal compounds and the use of Lexical Functional Grammar obscures significant issues for word formation. It is argued that productivity is identifiable if a verbal relation can be established. But speakers interpret noun phrase meaning where the word forms do not necessarily have verbal bases. Also speakers are able to assign compositional readings to some non-verbal compounds. Selkirk's own example of the meaning for the non-verbal compound tree eater is one, others include root compounds with semantically transparent readings, e.g. tea cup, etc. Evidence suggests that if compositionality is characterised by the identity of thematic relations, the latter is only a partial contribution to the comprehension of meaning and that closer investigation of the inherent semantic properties of individual words is required in order to explain the syntactic behaviour of morphological elements.

2.5. Summary

Selkirk's theory of word structure makes specific claims

that can be divided into two kinds: those concerning linguistic competence in general and those related to the framework as a mental apparatus for word formation.

In connection with claims about competence, Selkirk argues that her theory is a more realistic representation of speaker knowledge for compounding and word formation procedures. She claims the scope of her grammar explains ability of a universal nature, e.g. combinatory categorical possibilities, as well as language specific properties, e.g. by word insertion to the rules of lexical items from the individual languages concerned. However, as some compounds are not accounted for in English, a failing to which Selkirk herself admits, the framework falls short of its objectives.

Two possible causes are identified for these inadequacies. One is the violation of the principle of headedness, i.e. the dominating mother node must have a category node one stage higher in the grammar than its dominated head. I have argued that the compounds with a verb as non-head contain a category which is higher than its dominating node and that this constitutes a violation of the headedness principle. Two, a compositional analysis is misguidedly imposed on semantically non-compositional compounds, e.g. underdog. It is considered that both causes are motivated by the working hypothesis of the framework, i.e. that verbal interpretations are generated within the principles of lexical functional grammar.

Another criticism is made of the claim that the grammar accounts for a wider range of data than a lexical transformational approach. Theoretically, it is assumed that all compounds with a verbal derivative as head may be assigned a compositional meaning. An investigation of the inheritance procedure for verbal derivatives, however, demonstrates that not all of them retain their semantically compositional makeup. Following Selkirk's lexical procedure, the

assignment of thematic relations, for example, is restricted to gerundive nominals. Hence, this claim is only substantiated in terms of the morphological structure of complex word forms. Like Roeper and Siegel's framework, Selkirk's grammar can only explain the generation of those compounds where there is a transparent functional relation indicated by the occurrence of the suffix with a verbal root.

In Selkirk's theory there is also an emphasis on the compositional character of verbal compounds. Hence, a predictable relation between form and meaning should be apparent. However, when compared with Roeper and Siegel's framework, it is again noted that the grammar is descriptively inadequate. I refer to the discussion on adjectival passives as heads of compounds and those verbs with stative meanings that cannot undergo verbal compounding.

A second advantage put forward in support of her theory is that the grammar defines the boundary between the lexical and grammatical components of the language, as characterised by the different types of rules for each. Since the rules of each component are different, it is claimed that independent investigations are made of the distributional patterns of behaviour for compounded constituents to those of sentential structures. Yet, at the same time, the framework is said to generate inflectional, derivational and compounded words using the same rule format.

In defence of the above observations, the lexical rules explain the morphological similarity between verbal and non-verbal compounds. But, because both compound types are generated by the same categorical rules, it is necessary to incorporate another grammatical theory into the framework to explain the differences in the derivation of semantic structure for words, i.e. Bresnan's Lexical Functional Grammar. The introduction of the latter, however, conflicts with

Selkirk's claim because the rules for the identity of grammatical functions are incorporated into the lexicon. Further, principles for the interpretation of sentential form, e.g. thematic structure assignment, are also transferred into the lexicon. The inclusion of both of these features of syntax implies a good deal of similarity between the lexical and sentential production of semantic structure for some word-forms. Thus, inherent to the theory, there is an underlying conceptual framework which is similar for phrase structure and verbal compounds. On the other hand, the inclusion of Lexical Functional Grammar suggests that more than one mental apparatus is needed to supplement the rewrite rules. But Selkirk herself adds to the number of possible different devices used by speakers in the generation of word meaning by her reference to exocentric compounds.

Further, Selkirk fails to pursue an investigation of her sources for thematic assignment. Hence, no evaluation is made of the effect of the principles surrounding thematic assignment in terms of her own theory. This contributes to the lack of explanatory adequacy in the framework. Too much concern is given to the lexical and morphological evidence of word behaviour and not enough to the inherent semantic features. Albeit, the grammar is a syntactic description of competence for compounding but a realistic account cannot divorce these two aspects of word formation without loss of cohesion.

Additional remarks are made on the analysis proposed for affix behaviour and the effects on word meaning. Morphologically, inflectional and derivational procedures for affixation are similar, but semantically, the effect on the inheritance of properties is different. To overcome this disjunction, Selkirk assigns head status to derivational affixes only. Hence, under the definition of the percolation principle, no inflectional properties may be inherited by the dominating node. The principle is revised to permit the

percolation of non head lexical properties in the event of a hypothetical situation where syntactic representation identifies the existence of tense, but lexical constraints deny its existence. The revision is an unsatisfactory solution, however, proposed to give feasibility for pragmatic interpretation of compounds with internal inflectional properties. Compare, for example, the above discussion on tense and number.

In Selkirk's theory derivational affixes are given lexical entries and subcategorised for the type of categories with which they co-occur. This, it is claimed, guarantees the distributional constraints on the type of bases to which affixes attach. However, it is pointed out that the inherent semantic properties of the word to which the affix attaches, whether represented by a single word or a compounded one, prevents some co-occurrence possibilities.

It is unfortunate, in my opinion, that the most significant proposal in Selkirk's grammar, i.e. word structures are conditioned by the properties of words themselves, is overshadowed by a framework which emphasises the functional characteristics of words as independent lexical items.

3. Conclusions regarding Syntax

The comparison of the two frameworks shows that the main areas of concern for compounding are:

- (a) the scope of productivity.
- (b) the need to establish the nature of the formal rules that link the morphological representations with appropriate semantic structure.
- (c) the number and type of semantic relations inherited by the compound as part of the word's meaning.

With regard to the scope of productivity, Roeper and Siegel's attitude to compounding is one which views the procedure as having equal generative power to that for sentence creativity. The creative characteristic is apparent from the recognition that at any stage in the procedure, the rules may generate possible words. That is to say, at some point in the generative procedure the product may be well-formed but non-existent as a stored entity. In addition, the co-occurrence of the compound's constituents is sanctioned by a lexical affix rule which carries grammatical information. The grammatical information corresponds to the sentential behaviour of two words as part of a larger structure. The repeated similarities observed between sentences and compound word patterns, as exemplified by the lexical transformational rules and the Variable Deletion Rule, imply that in its most fully productive capacity, compounding is a creative method of word formation.

Selkirk's theory treats compounding differently in that the output of the procedure is the product of lexical adjunction rules measured in terms of their grammatical functions. On the surface, this suggests that word formation and sentence construction display different degrees of productivity. However, closer examination of the framework indicates that productivity is interpreted in a similar manner to that of Roeper and Siegel. Namely, the compound procedure is productive when the presence of a morphological representation predicts an expected grammatical function relation between the two internal constituents, and the functional relation is linked to a

thematic structure. Since a grammatical functional structure is characteristic of verbal behaviour, a productive compounding procedure is one that generates verbal compounds. Paradoxically, the identification of the grammatical functional structure is equivalent to the identification of sentence orientated data. Therefore, Selkirk's grammar inherently implies that word formation has the same creative power as sentence formation.

Consequently, it is noted that both frameworks associate the formation of verbal compounds with that of a highly productive apparatus. Both theories hypothesise that the similarity observed between the semantic properties for verbal compounds and phrases is characteristic of predictable relations between the morphological and semantic compositionality of words. Given the high ratio between form and meaning resulting in a predictable output, the rules are said to be productive. But these rules do not account for all examples of verbal compounds. Some morphologically compositional word forms are semantically deviant and some semantically well formed verbal compounds are morphologically unacceptable. Roeper and Siegel argue that interference from other levels of language is the cause of these irregularities, whilst Selkirk suggests that the grammatical constraints imposed by lexical affix rules alter the subcategorisation frames of lexical items, thus changing the semantic property content of words.

Whatever the reason, it is established that variable degrees of predictable regularity exist in the relations holding between form and meaning. However, it is stressed here that productivity should not be confused with creativity. Often the strong resemblance between semantic relations shared by words in sentences and those of word constituents are taken to indicate a creative method for forming new structures. Namely, a parallel is drawn with the premise for sentence creativity where a finite set of rules generates an infinite number of structures. However, unlike sentence production

which contrasts with idioms as the only alternative utterance form, rule governed procedures for coining new words are one of a number of methods for word formation. Other methods include borrowing from another language, assigning new meaning to existing morphological form or re-introducing 'unproductive' rules.

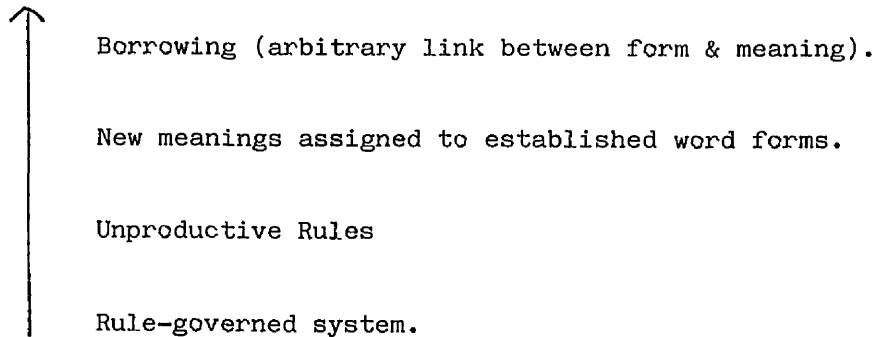
All of the above mentioned methods for word formation are the efforts of the speaker's ability for creative innovation.

By taking what is already available and known, speakers recycle the linguistic elements, exploiting their properties for further use.

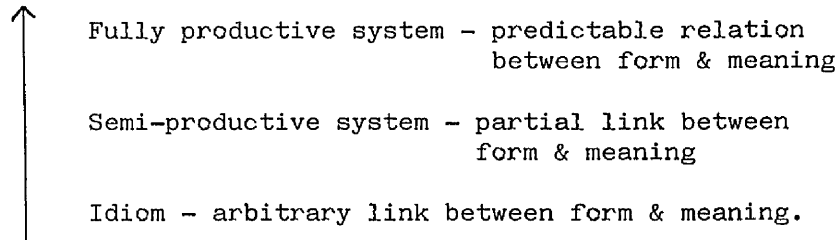
Hence, compounding by rule governed procedure is productive because it exploits known phenomena. It is, therefore, a process using predetermined data. The properties of particular relevance to the compound's meaning conform to a limited number of concepts which speakers accept as part of a generally agreed system (as implied by Selkirk's use of a set of thematic relations).

With this perspective of word formation, compounding becomes part of a gradient of creativity. For example:

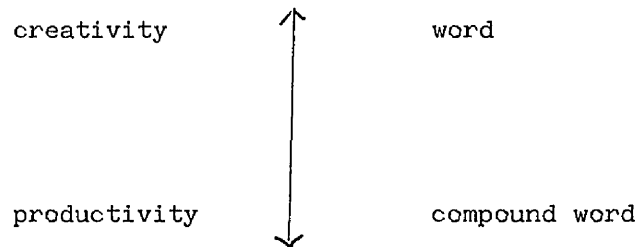
(53)(a) Creativity scale for word formation:



(b) Productivity scale for word formation:



(c) Combined Scales:



At one end of the gradient is the method of borrowing because form and meaning have an arbitrary link. Borrowing can be equated with the practice of assigning new meanings to already existing words, or with the use of idioms on the productivity gradient

But the innovative method of borrowing contrasts with that method which exploits the stored material of the speaker's own language because the formal structure of the loan word does not follow the morphological patterns of the host language.

Next on the creativity gradient are the 'unproductive' rules. On analogy with a system of generally agreed relations, the use of these rules suggests that the regularity which they formalise is one again exploited within the language. Since the distributional occurrence of words to which these rules have applied is less frequent than those having undergone the productive rule procedure, they appear to be less regular. Hence, these rules fall between the innovation

of borrowing and a rule-governed system. Finally, at the other end of the gradient, there is the systematic procedure which predicts regularity in the association between form and meaning. Thus, the verbal compound's meaning is understood from the relation between its constituents.

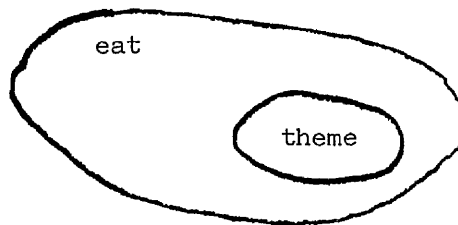
The latter rules are different from those of 'unproductive' rules because their application is more widespread. Lack of frequency is sometimes dictated by fashionable trends or the nature of the socio-cultural events of the time. For example, the suffixes *-ation* and *-ism* enjoy considerable popular use with the frequent appearance of such words as Thatcherism and privatisation. Whereas the concept of diminutive size does not predominate within the English culture at the present time. Hence, the suffix *-let* has less frequency of occurrence, e.g. notelet.

Both theories posit that verbal compounds are the most productive output of the rule governed system within the lexicon, but disagree on the parameters of the output. Selkirk's framework implies a wider scope than the lexical transformational theory because all verb derivatives exhibiting transitive roots may function as heads of verbal compounds. Whilst lack of investigation in the behaviour of the suffix rules undermines the premise of transitivity, a significant factor is noted when Selkirk's application of Lexical Functional Grammar is compared with Bresnan's approach: namely, the nature of semantic properties belonging to the root to which the affix applies is found to affect the type of features inherited by the resulting derivative.

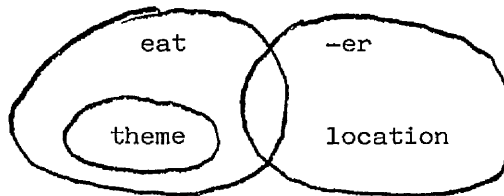
Compare the two interpretations identified for tree eater. These alternative readings are possible because grammar invokes two functional roles for the head of the compound. But there is an overlap in the stored semantic content of eater.

Following Selkirk's procedure, if the head is identified as a noun, a reading equivalent to a locative phrase is attributed to the relation it holds with the non-head. If the head is treated procedurally, a thematic relation is assigned to the non-head. Hence, the morphological form eater is linked to two semantic relations, i.e. location and theme. The latter relation falls within a set of inherent semantic properties, e.g.

(54)(a)

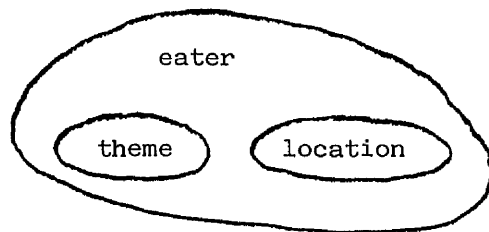


(b)



to give:

(c)



Hence, (54) (c) shows a speaker's knowledge of the word eater to include information concerning inherent and inherited features

on which a judgement is made according to the word's linguistic context. In other words, the presence of the two features of theme and location predict either one of them being the acceptable reading for the relation between eater as a head word and its dependent non-head. This means that the semantic properties themselves provide constraints on the meanings attributed to words.

Selkirk takes up the issue of constraints on derivational output and links it, as do Roeper and Siegel, with suffixation rules. However, (54)(c) demonstrates that both semantic relations, though of a different nature, may be inferred as part of the meaning of the word eater. It suggests that different semantic properties of nouns and verbs may act as constraints on the well formedness of words. This means, as has already been suggested by linguists (including Hudson (1976)) that complex word structure is the product of predictable constraints imposed by the properties of words themselves. Moreover, (54)(a) which is based on my interpretation of Jackendoff and Gruber as Selkirk's sources, shows that properties of simple words also act as well formedness constraints. Therefore, if the emphasis for procedural rules of word formation is shifted from the formal structural description of morphological patterns to one of semantic content, it should be possible to establish which inherent properties of nouns are exploited to generate the meanings of root compounds and synthetic compounds.

In the following Chapter, I shall argue that all compounded words are generated from a set of lexical relations, and that the well formedness of the compound's morphological and semantic representation is conditioned by the semantic properties of the lexical items involved. By adopting an approach to word formation like this, the notion of full productivity can be extended to apply to all subsets of compounds. Deviancy in the output of property constraints is the result of interference in the behaviour patterns of properties from the levels of language. As has already been pointed out in an earlier chapter, a lexical item is identified as a discrete entity in terms of the set of properties drawn from

all levels of language which comprise it. Hence, any deviancy in the behaviour of a particular property, e.g. as the result of lexicalisation, will affect the well formedness of the word.

4. A Discussion

I think Selkirk's premise for semantic compositionality is misconceived for two reasons. First, thematic argument structures are only identifiable if the lexical item is a gerundive word. Secondly, these semantic properties are generated by a systematic procedure that links semantic compositionality with morphological compositionality.

If recognition of full productivity is dependent on the identity of a link between the compositionality of form and meaning, the framework is unable to explain the occurrence of zero derivations, e.g. comb (N) and comb (V); or monomorphemic words like thief which do not share a morphological similarity with the root from which they derive (see P. 183 on the test of semantic content).

In addition to the problems of morphological identity, there is the difficulty of establishing the direction of derivation. The adjunction rules for both of the above mentioned frameworks suggest that all derivations are generated from a base lexical item to which the properties added by the adjunction process contribute

in altering the meaning. However, a grammatical analysis recognising the interference of other factors with the output of generative procedure, needs some criterial method of assessment that is not syntactically orientated. Marchand (1969) observes that a syntagmatic analysis of derivation procedure must take into account the content of meaning and certain semantic patterns of words in order to establish the root on which the new word is formed.

This has already been made evident with the discussion of Bresnan's example for passivised adjectives and the investigation of verbs with stative meanings. Other examples include simple words whose categories share the same morphological forms, e.g. father as a noun and a verb. The verb is identified as a derivative of the noun, because the meaning of the verb contains the meaning of the noun, i.e. 'to act the father', rather than vice versa. In contrast, the noun television has the verbal derivation televise, with the meaning 'put on television'. Morphologically, the noun has the appearance of being derived from the verb, e.g. televise + ion, and under a grammatical theory advocating word adjunction rules, the procedure of the derivation path would be represented as V ----> N. Compare the latter again with the noun composition, which is an example of a V ----> N movement consistent with an increase in the morphological make up of the word structure because the noun has the reading 'the manner in which a thing is composed'.

The criterion of content for the compositional example, thief = 'one who steals', reveals that the noun is related to the verb steal. The adjunction rule procedure would not be able to capture this relation, because it requires the syntactic presence of the appropriate agentive suffix -er. Therefore, no semantic link can be established between steal (V) and thief (N), and, in turn, no thematic argument structure may be assigned to the lexical noun. However, this is not representative of examples where a

compositional reading of a compound noun containing the monomorphemic noun occurs. For example, jewel thief - 'one who steals jewels'.

To add to the complexity of semantic inheritance patterns, there are words comprising more than one constituent, e.g. run away (V) which then undergo zero derivation, e.g. runaway (N). I have already criticised Selkirk's account of this construction as a base form for further adjunction rules. Her account, however, assumes that the word is a component of two constituents, whereas Marchand (with whom I agree) describes the entity as a single word whose morphological identity consists of two words, i.e. a phrasal verb. The difference in classificatory identity implies a different semantic structure for the phrasal verb and provides a comparison analogous with the patterns of meaning that differentiate zero derivations. For example, compare the two nouns cheat and cheater. The former has the compositional reading of 'one who cheats'; whereas the latter has an interpretation of 'one who succeeds by cheating' (Marchand 1969). In other words, it is the morphologically non-compositional word form cheat that has the compositionally semantic reading and the morphologically compositional representation cheater that has the non-verbal interpretation.

The criterion of semantic content shows that derivational output is not simply a matter of direct correlation between form and meaning during the generative procedure. The hypothesis of direct correlation between the products of morphological rules predicts well formed complex words for a small subset only. This is emphasised by Roeper and Siegel's analysis of three compound affix rules: and we should be guided by the restriction as an insight into the type of semantic relations holding between words generally, whether compositional or non-compositional.

If the balance is to be redressed, the premise of compositionality for word structure must be modified to allow for

a more representative description of speaker competence. Where it refers to well formed output or products of rules, productivity encompasses not only affixation but also zero derivation, and the possibility of a one to many link between morphological form and semantic properties. This is not a new concept of word formation rules, but it is one which is often overlooked for the compounding procedure in favour of the compositionality hypothesis. Allen (1979) for example, notes the variable interpretations given to non-verbal compounds which contain semantic relations that can be hierarchically listed according to the most likely meaning that the speaker associates with the morphological representation. Gleitman and Gleitman (1966) in a report of their findings for a survey on compound meaning carried out amongst native speakers also observe considerable variation in underlying structures for individual word-forms.

In accepting the premise for general semantic links, another observation made by Allen (*ibid*) that non-verbal compounds are never ill formed is explained. The latter may be linked to more than one semantic structure but the non-head of the verbal compound must meet the requirements of being a sister to the verb base. However, the latter constraint is a hypothesis of the grammatical frameworks that have been examined rather than general evidence of words as a whole. There have been other analyses (for example, Lees 1966/70) which encompass the notion of a verbal relation between morphologically simple and complex nouns. These add support to the suggestion that the concepts of verbal structure most closely represent the speaker's comprehension of the relations between entities existing in real world situations. Therefore, I surmise that the morphological representation of the verbal compound is a window onto the semantic relations for other types. As a result, thematic argument structure is considered to be the most easily accessible representation of an organised network of mental knowledge; and this network represents a speaker's ability to exploit the semantic properties as stored information for the purposes of naming.

Arguments in support of the above claim will be developed further in the following chapter on Word Grammar. This grammar offers a more flexible framework with regard to semantic compositionality for morphologically simple and complex words. In adopting this framework it will be shown that the distributional patterns of verbs, nouns and adjectives reflect an aspect of the semantic network that underly the morphological representations of verbal and non-verbal compounds.

It is suggested that compositionality is not characterised by a restrictive system of the lexicalist grammar. The variability of meaning observed for non-verbal compounds indicates that the presence of more than one type of semantic property of the head's lexical entry is available for exploitation, and this suggests that morphological and semantic information cross refer. However, I have suggested that semantic properties are relations which the constituents may enter into with a covert structure represented by the verb. In other words, given the knowledge of distributional patterns of nouns and adjectives, speakers invoke some sort of verbal relation. In support of this assumption, it is noted that speakers do not always require to identify an overt verb for the interpretation of noun phrases. Yet these are generated by a system of rules, which implies that instances of non-verbal compounds may also be generated in a systematic way. Evidence to this effect has already been hinted at by the subdivision within the class of verbal compounds identified by Selkirk.


In order to establish the nature of these semantic relations it will be necessary to adopt an approach to lexical knowledge which accepts more than one type of semantic property as part of the word's lexical entry. In this respect I agree with Jackendoff (1972), who states that the lexical entry for a word includes the following types of semantic properties: thematic relations, model structure, focus and presupposition, and co-referentiality. In my opinion, all of these properties are exploited for the purposes of compounding and may have productive results consistent with those claimed for thematic structure. For example, one of the processes of model structure is negation. Internal negation is a feature found in compounding, e.g. [[non-transformational][grammar]] v. [non [London bus]]. It will be seen in Chapter IV that the concept is also covert in some examples.

As the grammatical frameworks of Selkirk and Roeper and Siegel have already demonstrated the similarities between VPs and verbal compounds, to extend these similarities to NPs adds support to the claim that lexical relations predict non-verbal readings, and thus offers a possible method of investigation for root compounds. Therefore, I propose to show the similarities in the patterns of behaviour noticed for head/non-head occurrences in VPs and NPs.

In doing so, I hope to establish the nature of the association between form and meaning as well as some insight into the scope of productivity for lexical rules.

When Selkirk's hypothesis for verbal compounds is compared to the claims for phrase construction, it is noticed that the minimal structural description to generate a relation is two words. I shall accept for the present the proposal that the minimal requirement to generate a semantic relation is two words, and the syntactic relation between the latter is such that one functions as head and the other as its non-head or modifier. Since the modifier's presence is conditional on the properties of its head, I consider the relationship to be a functional one displaying the modifier's dependence on the head for its existence. Semantically, this is interpreted to be a case of attribution because the modifier represents some property stored in the lexical entry of its head, i.e. an attribute of the lexical item. The type of relationship between two words that I am referring to is a dependency relation (Tesnière 1969).

Tesnière suggests that sentence structure may be built up by a collection of dependent-head constructions, with the result that the meaning of the sentence is an accumulation of their relations, e.g.

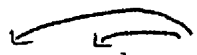


 (55) John likes apples

In (55) John and likes, and likes and apples both represent dependent-head combinations, with likes as the head of each pair. John and likes has a functional relation with John as the subject of likes.

Likes and apples represent another combination where apples is the complement of likes. There is no direct relation between John and apples except through their individual relations with the verb like. Therefore, no dependent-head relation exists between John and apples in the syntax. Nonetheless, the meaning of (55) is seen as an accumulation of semantic relations between the pairs of modifiers and their heads. For example, the referent of John is the Theme or experiencer of 'likes' and the location of the verb's meaning focusses on the phenomenon 'apples'.

Similar patterns of dependent-head relations are observed in the syntactic structure of NPs:

(56)  large red apples

In (56) both large and red modify the head noun apples, but large and apples enjoy a different relation from that of red and apples. Large denotes the size of the apples, and red denotes the colour. Note also that large and red only have an association with each other through the shared head because they both denote properties of the lexical entry for apples. Hence, no relation of modification exists between large and red, i.e. the former does not modify the latter or vice versa.

The substitution of apples by the compound toffee apples in (57) demonstrates that in sentential structure the latter functions as a single word, e.g.

(57)  John likes large red toffee apples

Again, the pattern of the object NP is one of a head toffee apples plus two dependents, large and red. But the compound itself exhibits a dependency structure too, existing word internally, e.g.

(58) toffee apple

The previously mentioned frameworks have concentrated on the grammatical relations for head-dependent combinations containing a verb, but the regularity in dependency patterns for the noun suggests that the grammatical relations of both categories might be exploited for word formation (bearing in mind that the semantic relations will differ).

It is stressed here that the word order for the compound is similar to that of the NP, with the modifier preceding its head. In this respect the verbal compound contrasts with its phrasal equivalents. But I consider there are two reasons for the modifier-head sequence of word structure: (a) individual words conform to language specific conditions such that modifiers are positioned in relation to their heads (Greenberg 1966) and (b) the latter condition is purposeful in indicating the modifier's semantic role in the larger structure.

All adjectives that precede their heads are instances of properties belonging to the lexical entry of the word which they modify (see (56)). But these properties seem to indicate a relatively permanent state of affairs concerning the referent of the noun in the situation identified by the utterance. For example, a red apple is an apple which has a condition of 'redness' that is typical of an apple. This structure compares with a PP which modifies a head noun and yet follows it in word order, e.g. (an apple) with red peel.

The inference here is that the condition of the apple is atypical and relevant only to the state of affairs referred to at the time of the utterance, i.e. there is a sense of impermanency to the state of affairs.

By comparison, the role of the pre-nominal modifier contrasts with that of a post-nominal modifier in indicating certain expectations of the entity referred to by the head. These expectations correspond to characteristics noted by Downing (1975) that compound meaning usually exhibits an aspect of permanency. I suggest that the notion of permanency is characterised by the typicality of the entity referred to as a member of a species.

If compounds follow the pattern of NPs with the non-head acting as a pre-nominal modifier, how can the speaker identify the intended meaning for the surface representation of either constituent given that the stress patterns would only differentiate the syntactic structure? Consider the example typical French house, which is the focus of the controversial Hudson-Dahl debate (1981). I do not intend to examine the debate here because its central argument is one concerning the merits of constituency versus dependency grammar. But the different meanings that are assigned to this example demonstrate the problem:

- (59)(a) [typical [French [house]]]
 (b) [typical [French house]]

(59)(a) is an NP containing two modifying adjectives, i.e. typical and French, plus a head noun house. (59)(b) is an NP containing an adjective, i.e. typical, and a compound, i.e. French house, as the head noun. The NP of (59)(a) refers to a house which is one of many built according to a style that is typical of France, i.e. the phrase has a locative meaning. The compound noun in (59)(b) refers to the typicality of the house's design being French, i.e. the phrase refers to a typical house of French design.

Since the non-heads of (59) have modifying roles and both NPs contain similar morphological and semantic information, the differences in inferred meaning must follow for reasons beyond those of the linguistic items themselves. In my view, the reasons are functional. Under normal conditions, the speaker expects the

NP to refer to some particular entity identified by the head noun with the modifying adjective identifying a property of that entity. In contrast, the compound's head refers to a class or species of the entity it denotes. Consequently, the compound's non-head describes some property of the species. By definition, a species is a number of entities that may be grouped together because each individual shares some characteristic shape or form. Since the dominating concept of a species is its physical structure, the role of the modifier can be expected to identify some property of physical appearance, e.g. design. Hence, the different roles of the non-head for the phrase and the compound are determined by the function of their heads. This also offers an explanation for the differences in assertion for the sentence and the compound referred to in Chapter II. If the NP refers to a specific entity it is possible to assert some information about it. But the compound constituents do not identify specific entities, making it difficult to establish definite information for its referent.

It is noted that an NP may have generic reference, e.g.

(60) I would like to live in a French house

But on such occasions that this occurs, the speaker would understand the shift in referential meaning from a specific to a generic reading by the context in which a sentence like the above would be uttered, e.g. a comparison of preferences for inhabiting typical dwellings of different countries. In instances like the above, the marked reading for the phrase does not conform to the norm of the specific-generic division for phrases and compound words, but this does not rule it out as an impossibility.

Previous approaches to the analysis of compound nouns have implicitly included the above premises by positing that (1)

the meaning of the compound is attributed to be that of the semantic relation holding between the individual constituents, rather than the referential properties of the internal lexical items; and (2) in classifying the compound, by definition of the second internal constituent's role as head, to be a specific instance of the latter (e.g. Allen's (1979) IS A Condition, or Selkirk's (1982) Right-Hand Head Rule Revised). But the issue has not been consciously identified as a contributory factor to speaker knowledge in exploiting referential meaning for the compound. The main reason against its inclusion into a framework of grammatical competence for compounding is that assertion is a part of a speaker's knowledge of performance. Other factors of this kind include the acceptance that the compound is used to name a concept stored within the speaker's mind and one which is salient to the individual to justify classification. The hearer, therefore, does not have first hand experience of the concept referred to.

In view of the contrast in specific-generic reference for the head of the phrase and the compound, I shall distinguish between the modifying roles of their respective dependents. The role of the phrasal non-head which identifies a property of a specific entity will be called an attributive function. The role of the compound's non-head is to identify a semantic attribute of the species of an entity referred to by the internal head, i.e. that which identifies a feature of the head's referent by virtue of its relationship to it. Therefore, the modifying dependent's function will be called an attribute function. Hence, the dependency relation between a modifier and its head for the compound noun structure is:



To conclude. I have argued that the sequence of word order for compound words is relevant to identifying the nature of the semantic content. Furthermore, inferences may be made about the importance of individual properties contributing to word meaning, according to the degree of referential specificity of the internal

head. Namely, the function of the non-head of a compounded word is to identify a state of affairs that is not specific to an individual referent denoted by the head, but typical of the species or class to which the internal word refers.

4.1 Towards an Alternative Analysis

Roeper and Siegel's analysis of compounding does not pursue the question of relevance for word order but recognises the necessity for a lexical device to ensure correct sequencing, i.e. the compound movement rule. This is a feature of the lexicon which is denied to Selkirk because her theory rejects the transformational approach. The context free rewrite rules make it necessary for her to introduce a categorical grammar which itself needs supplementing with the principle of headedness to guarantee correct word order. If the rules and principles incorporated into a grammatical theory are reflective of speaker competence, presumably speakers also know of the purpose for their existence. However, the motivation beyond that of justifying the proposed framework is not considered by her lexical grammar.

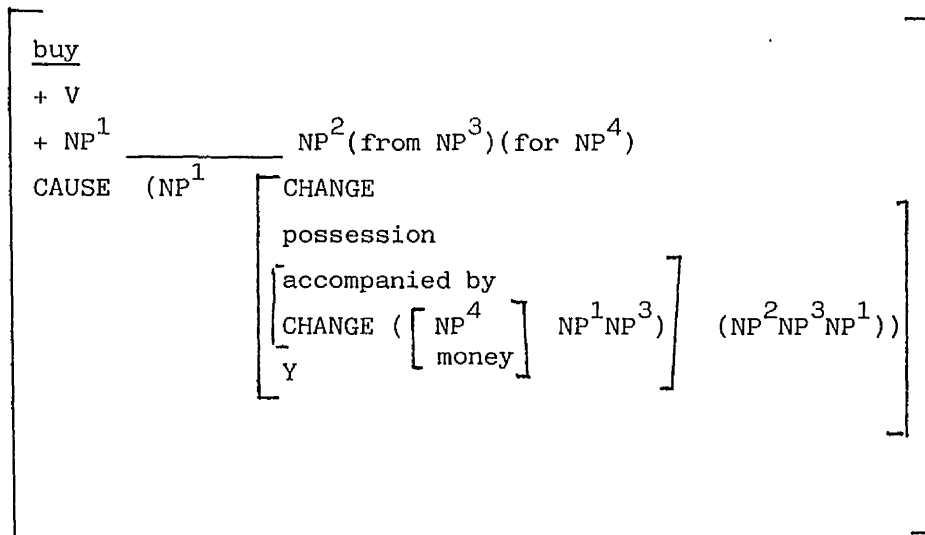
For example, the condition on verbal sisters in phrase structure is transferred into the lexicon and all non-head sisters of the compound with verbal derivative heads occur in first position within the word. Yet in phrase structure, all sisters to the verb (except the subject) occur in post verbal position but no explanation is given for the sequence change in the lexicon. Further, the principle of headedness fails to provide an answer for the change in word order constituents for the compound word. It simply reaffirms the status of the compound's internal constituents with that of the status for the dominating node by matching the category labels. Thus, the principle is a syntactic device of convenience.

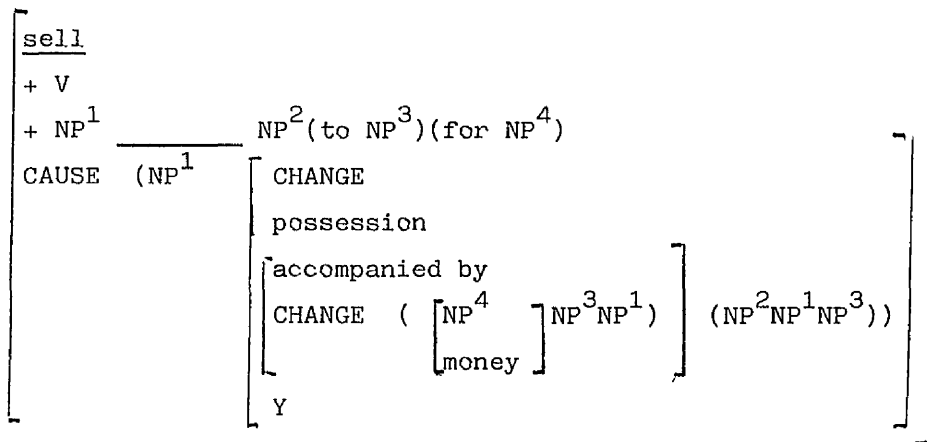
In this section, I wish to examine the nature of the links between syntactic and semantic data and the number of links available

for compounding. The type of data concerning word order is of a somewhat general kind, whereas the identity of properties like 'design' are specific to the individual lexical items contained with the compound. Whilst comprehension of what is being referred to is made easier by the syntactic context in which a word occurs (e.g. design is a feature usually associated with an object rather than an event), I have also argued that semantic properties are not exclusive to individual categories, viz. steal (V) and thief (N). There is, therefore, a need to establish the parameters of the different types of properties.

To this end, I refer to Jackendoff's list of four different types of semantic properties, and his remarks on thematic relations. These, Jackendoff claims, are subfunctions of yet more general properties and, where the former are linked to a particular category, the latter are primitive semantic concepts shared by the majority of lexical items. For example, (ibid:38) he gives the following description of the lexical entries for the items buy and sell; both of which refer to different aspects of a single event, i.e. a transaction, and share many properties relating to the latter:

Lexical entry for buy



Lexical entry for sell

The semantic properties shared by the lexical items buy and sell are CAUSE and CHANGE. These two properties are also found as entries for other lexical items, e.g. kill: 'cause to die'. Hence, they have a wide distribution pattern typical of general concepts.

In addition, Jackendoff points out that in order to understand an event denoted by a lexical item containing these properties, speakers must know that something causes the event to happen and that the cause subsequently leads to a change. In the case of buy and sell the change is one of ownership. Moreover, knowledge of these functions leads to the identity of thematic structure. Thus, the general concepts determine the thematic relations. In other words, the thematic relations are subfunctions of the primitive concepts. Therefore, we can say that the thematic relations of the individual verbs buy and sell exemplify specific occurrences of the functions CAUSE and CHANGE. The agent of buy causes something to be purchased for money. Hence, the object bought changes ownership from the person selling it to the buyer. Similarly, the agent of sell causes something to happen, i.e. something to be sold, which results in the change of ownership from agent to recipient.

General functions are usually associated with other .

functions of the same degree of generality, which are called arguments. CAUSE, for example, has two arguments associated with it, i.e. an individual and an event. CHANGE has an individual, an initial state and a final state. Since each general function or concept is linked together with other general functions, the speaker's stored knowledge is conceived as a large network of semantic functions and their arguments. The thematic relations of individual lexical items are then defined as more specific representations of the arguments. Hence, in the sentence

(61) John bought Mary a present.

the argument of CAUSE as a general property of bought is agent and represented by the lexical item John. As John is the subject of the verb, the grammatical relation reflects the argument structure of a subfunction of the general concept of CAUSE.

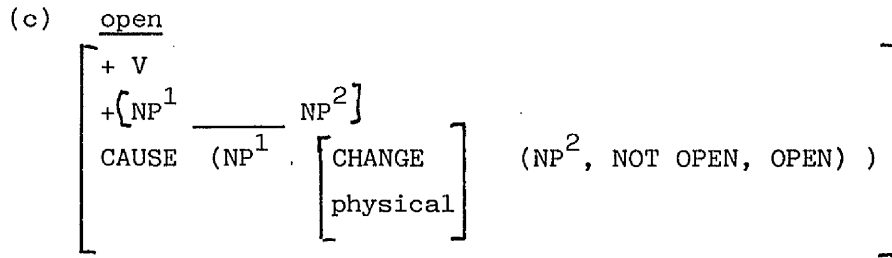
One of the advantages of a framework which has a more general level of knowledge independently stored from the properties of lexical entries is that a wide body of information is covertly available to the speaker in respect of specific lexical items, although not necessarily represented syntactically. For example, the word open may function as an adjective, a transitive or an intransitive verb. Hence, the morphological form of open represents three lexical items:

(a) open

$$\left[\begin{array}{l} + A \\ + [NP^1 \text{ be } \text{---}] \\ \text{OPEN } (NP^1) \end{array} \right]$$

(b) open

$$\left[\begin{array}{l} + V \\ + NP^1 \\ \left[\begin{array}{l} \text{CHANGE} \\ \text{physical} \end{array} \right] \text{---} (NP^1, \text{NOT OPEN, OPEN}) \end{array} \right]$$



According to Jackendoff, these items are linked to the network of semantic functions by a rule which projects the grammatical functions represented in each lexical entry on to the semantic network shared by all three. For example:

(62) Charlie (didn't) open a pistachio nut
 CAUSE (CHARLIE [CHANGE
 physical state] A PISTACHIO NUT, NOT OPEN, OPEN))

where NP¹ is substituted for the individual and agent of CHANGE by Charlie and NP² as the Theme by a pistachio nut. Thus, whilst the lexical entry contains information relating to the syntactic behaviour of the word and its modifiers, it also contains information which predetermines the word's grammatical functions.

In principle, Jackendoff's description of thematic relations as subfunctions of general semantic functions correlates with Selkirk's principle of inherited semantic properties, but her restricted focus on the subfunctions implies that all semantic properties share an equal degree of generality. Further, these properties are specific to individual categories. In contrast, Jackendoff's approach demonstrates that more general concepts control the pattern of thematic structure. In addition, it explains that separate but lexically related words, e.g. derivations, may share the same semantic network.

From the above description of the relationship between thematic structure and syntactic representation a clearer picture emerges. With thematic argument structure being a more specific subfunction of general concepts, it is also that part of semantic structure that most closely resembles sentence structure and it is this resemblance which is taken up and exploited by Selkirk by the introduction of Lexical Functional Grammar. But the approach is an oversimplification of the situation because, under Jackendoff's analysis, nouns can also be seen to share the same semantic network identified for verbs. For example, the following list of nouns shows that their meanings share the general function of CAUSE:

- (62)(a) customer : agent who causes something to be purchased.
- (b) salesman : agent who causes something to be sold.
- (c) sale : an event which causes something to be sold.
- (d) tide : the movement of water which causes the amount of water to rise or fall.
- (e) party : an event which causes something to be celebrated.
- (f) cowardice : a feeling which causes a change in attitude to one of fear.
- (g) thief : an agent who causes a change of a state of possession.

In addition, it is possible to isolate out semantic properties which are predominately inherited by nouns. POSSESSOR, for example, is a general concept shared by many lexical items associated with words denoting containers, e.g. box, cup, jug, flask, bottle, etc. In turn, if any of these words occur in compounds, the property of POSSESSOR as part of the word's lexical entry contributes to the meaning of the compound, constraining the occurrence of acceptable modifiers as subfunctions of arguments to POSSESSOR. For example, matchbox inherits the general function of POSSESSOR as part of the lexical entry for box with match denoting a possible example of the object possessed.

The general concept of POSSESSOR has an argument link with the function POSSESS, which itself is inherited by different lexical items, e.g. the verbs contain, own, belong, etc. Therefore, the network of independent semantic functions underlying specific words may act as a linking device across different categories. As a consequence, a possible explanation for the previous sentential analyses of compounds is provided. If a speaker's knowledge of the network contains information of the distributional links between nouns and verbs, and these links are shared by more than one lexical item, then more than one interpretation can be assigned to the relationship between the compound's constituents.

A grammatical framework of interconnected semantic properties as seen above enables a description to be made of the relatedness of lexically independent words. Therefore, I shall follow Jackendoff's hypothesis which claims that lexical items exemplify arguments of more general semantic functions. In order to encompass nouns as well as verbs, it will be necessary to explore beyond the semantic functions of verbs to identify the nature of constraints on shared properties of individual lexical items. I believe these constraints to be semantic properties of the individual word.

In following this kind of approach, the overlap between the semantic functions for nouns and verbs will become apparent. It will also be seen that the procedure of inheritance generally recognised for the generation of verbal compounds applies to the formation of non-verbal compounds, with the result that the subfunctions exemplified by the dependent lexical items will reflect thematic structure, co-reference, modal structure, focus and presupposition. This means that the organisation of the semantic structure for verbal and non-verbal compounds will follow a similar pattern. The difference in semantic output, however, will be the result of constraints on the subfunctions.

Hence, the nature of the semantic rules will correspond to projection rules because word properties will be linked

to the functional arguments of the network underlying the meaning of the compound.

In order to demonstrate the similarities between meanings of nouns and verbs, a framework is needed which allows access to the network of general semantic functions. In other words, the grammatical theory should contain the working hypothesis that speaker competence contains an hierarchy of semantic properties which are both general and specific. In addition, the grammar must provide a framework for the autonomous generation of grammatical and semantic functions. Further, if the semantic functions are characteristic of lexical items which are represented by words in syntactic structure and the well-formedness of all grammatical structures is conditional on the presence of semantic properties of words, the framework should also advocate the word as the central unit of grammar.

For these reasons, I shall adopt the framework of Word Grammar. This framework represents speaker competence as a network of hierarchically stored knowledge, linking general and specific information together along similar lines to those described by Jackendoff. Further, it claims that the basic unit of grammar is the word and that all larger structures are determined by the properties of individual words. Therefore, the lexical properties of the compound's constituents will ensure the well-formedness of morphological form and the meaning of the compound as a single word.

So far the discussion has not considered the effects of affixation on the inheritance of properties. Unlike Roeper and Siegel and Selkirk, I do not consider the function of the affix to be that of deleting information contained within the lexical entry of the compound's head word. I suggest that its role is to draw attention to a particular property as an argument of the general semantic function for the base's lexical entry, so that the argument

is given priority over other possible arguments when interpreting the meaning of the derived word.

My reasons for taking this point of view follow from the hypothesis propounded by Jackendoff and Hudson. . . . First, general semantic functions, e.g. CAUSE, are independent of the lexical entry, which makes the functions they are linked to, e.g. individual, independent. Second, general semantic functions are simultaneously linked to more than one other function. Therefore, a greater number of semantic properties are potentially available in the underlying network and these can be exploited in determining lexical meaning. For example, the -er suffix of writer is linked to the semantic property 'agent' as an argument or subfunction of individual for the event denoted by the verbal base write. Other possible arguments such as what was written, e.g. a letter or novel, remain covertly stored in the network but unexploited by the syntax.

Likewise, a word like woven has a similar network of underlying linked concepts and allows for the implication that some agency wove the carpet in the meaning of woven carpet. However, the -en suffix contrasts with the -er suffix in focussing on the completion or final point of the action denoted by the verb. This is a general concept of the action rather than an argument or subfunction of an event. Therefore, a distinction exists in the role played by the two affixes, namely in the focus on types of semantic properties. But it is noted here that the affix does not delete information from the underlying network, rather it gives priority to particular properties inherited by the lexical items.

Another characteristic of derivational affixes discussed by Selkirk is their status as heads. Recall that derivational suffixes are given head status because they determine the categorical function of the new word form. Therefore, they have the power of governing the occurrences of word roots to which they affix. Furthermore,

they contrast with non-category changing inflectional suffixes. But what does this mean in terms of semantic functions, especially when affixation does not result in the deletion of properties?

An advantage of an hierarchical network underlying lexical entries is that the effects of inflection and derivational affixes can be explained in terms of general and specific subfunctions of the semantic properties. Derivational affixes focus on some property stored higher in the semantic network that is inherited by the meaning of the individual lexical item of which it is a part. By contrast, the inflectional affix is used by speakers to exploit the already inherited semantic properties of the lexical item within the temporary context of an utterance.

In Selkirk's theory the differences between inflectional and derivational affixes leads to the revision of the percolation principle and an unsatisfactory explanation of behaviour patterns for inflectional affixes. The two types of affixes are also differentiated on the status of headedness but this distinction contributes little to an understanding of the effects on semantic properties. For example, both types of affix are characteristic of word types and there are few exceptions to this general pattern, viz. the category changing prefixes *en-*, i.e. N \rightarrow V, e.g. enslave, or the prefix *a-*, i.e. V \rightarrow Adj, e.g. asleep. Further, heads as syntactic units can often function independently in different contexts but this feature is usually denied to both types of affixes, e.g. *He is -ing the birds.

Yet another characteristic of head status is that it determines the semantic content of the lexical item. In Selkirk's theory, this is reinterpreted to include linguistic elements that have the power to alter semantic content. However, I have already

stated that the properties identified by derivational affixes are examples of arguments linked to semantic functions. In order to establish the arguments, the function must first be identified and this is the property of the lexical item which contains the function as a general entry. Once identified the functional links can be established and the relevant argument specified. The role of the suffix is redundant, however, without the prior identity of the semantic function. Hence, its role is subservient to the base word containing the general concept. Similarly, Selkirk argues that the role of the affix is to alter part of the content of the lexical entry for the word to which it attaches. Hence, prior to alteration the content of the lexical entry must first be identified. In my opinion, therefore, the role of the derivational suffix in Selkirk's grammar is also subservient to that of the base to which it attaches.

There remains one final feature of head status which motivates Selkirk to apply the term to suffixes as part of the second constituent of the compound. This characteristic is the category label assigned to the suffix and its relation with the categorical status of the compound as a whole. The percolation principle allows the compound node to inherit the properties of the suffix. But the implication of this procedure is that suffixation and compounding are simultaneous operations. This implication contradicts the general claim that the compound's head is a derived word because the latter is an instance of derivation preceding compounding. Hence, the compound inherits the features of the complex word and not a combination of root-plus-suffix for the head.

I propose, therefore, to follow Hudson's approach to compounding, which treats derived words and compound words as particular types of words. Thus speakers store as part of their lexicon simple, complex and compound word forms. Speaker competence also encompasses recognition of possible word forms because part of native speakers' ability to form new words involves the recognition of analogous forms.

The methods of creative innovation are examples of one way in which this ability is used.

5. Summary

In the previous section the scope of productivity is interpreted to refer to all word properties that exhibit a regular pattern of interaction and are used in the generation of new words. The properties are semantic but vary in degrees of generality. The most general properties, i.e. functions, act as well formedness conditions on the more specific properties of lexical items. Since the general functions are not tied to words, they may be inherited by nouns and verbs alike. Hence, a similar apparatus is envisaged for the generation of verbal compounds and non-verbal compounds.

This apparatus is conceived of as a network of hierarchical concepts.

And the role of affixes is one of specifying different arguments of functions as more specific properties inherited from the network by individual lexical items.

Since this view of word formation differs from the two frameworks examined earlier and takes the word and its properties as the central element of the grammar, the framework of Word Grammar is to be adopted in the analysis of constraints on property inheritance. Word Grammar claims that the properties of words act as well formedness conditions on larger structures. Therefore, in order to establish the conditions on the well formedness of compounds, it is necessary to identify and investigate the type of semantic properties involved.

CHAPTER IV

Word Grammar - An Analysis of Compound Nouns

1. Introduction

In the previous chapter, two lexical approaches to compounding were examined, their shortcomings identified and a conclusion drawn, with regard to the problem areas for this phenomenon. In this chapter, I propose to analyse compounding using the framework of Word Grammar, as an alternative theory which provides an adequate description of this method of word formation.

I shall begin with a brief examination of the compound as a word and Word Grammar's description of the issues for morphological representation of such words. I will then discuss the major area of concern for this phenomenon; the semantic properties of compound words.

Following this analysis, I shall present my findings on the adequacy of Word Grammar to explain compounding within the working hypothesis of its framework. The working hypothesis is that all linguistic structures can be accounted for in terms of word properties. This means that word properties condition the syntactic environment of the individual word. In this connection, the compound word functions as a single word and does, therefore, condition its syntactic environment. The concern of this chapter, however, is not to examine the behaviour of the compound as a single word (although this may have some bearing on the behaviour of exocentric compounds), but to investigate the behaviour of the words which comprise the compound. Compound nouns are classified into two semantic sets: (1) verbal compounds, which comprise a Theme argument and (2) non-verbal compounds, which contain other thematic relations.

1.1. The Compound as a Word

One of the difficulties in establishing the identity of the compound as a word is that its surface representation does not conform to typical word structure (see Hudson 1984:90). And whilst it is acknowledged that many compound nouns exhibit primary-tertiary stress, there is no overall regularity in the stress pattern (Gimson 1970:230-2). But this is a natural consequence of the word sharing many features with the phrase. For example:

- (1) The criminal lawyer handed over the case to his partner.

Criminal lawyer in (1) above may be given a phrasal interpretation, e.g. (2)(a), or a word interpretation, e.g. (2)(b):

- (2)(a) lawyer who is a criminal.
 (b) lawyer who deals with cases of crime.

Substitution as a test of lexical identity shows that the compound can be replaced by other words:

- (3) tea cup }
 food }
 put } near the plate
 very }

However, since the constituent comprises words, these too may be substituted in the same way that words may be replaced in phrases:

- (4) parental refusal }
 student refusal } of the idea
 student approval }
 committee approval }

Syntactic dependency also fails to establish word structure identity. The compound word behaves like a single word because it can function as head of a word string and, therefore, it sanctions its pre- and post-dependents.

- (5)(a) [birdwatching] in the jungle.
- (b) very old [shoe lace].

(5)(a & b) show that the type of dependents are consistent with those of the compound's word class, the noun.

But syntactic dependency is also an intra-word phenomenon, where the head provides a link between the first constituent and the entities of larger structures, e.g.

- (6)(a) match box (b) bird watching
- (c) electrical engineer (d) music centre

Hence:

- (7) The contractual lawyer presented the bill to the employers.

In (7) lawyer links its dependent contractual to the rest of the sentence. Since lawyer is a noun the compound contractual lawyer can occur in subject position and, as dependent of lawyer, the adjective contractual precedes its head.

However, headship does not apply in the case of the exocentric compound, e.g. redcap, where traditionally no internal head is identified because the meaning of the compound is not an instance of the meaning of its internal second member. But it might be claimed that syntactic dependency is exhibited by these compound types in spite of the fact that there is no semantic correlate to this dependency that indicates the identity of the compound's referent. In isolation this claim would achieve nothing in terms of descriptive adequacy for a theory of competence because it would not be possible to explain the discrepancy between the referent of the compound's head and that of the compound itself. But, given the mentalistic claim that all structure is sanctioned by the same principles of

organisation, an argument may be justified. All constituent structure comprises instances of head-modifier combinations which are a representation of the principles of organisation, therefore on analogy with endocentric compounds, exocentric examples exhibit syntactic dependency. Semantically, a propositional structure is generated by the meanings of the constituents but the relevant link between the proposition and the referent of the compound is not established. This link would have to be inferred from pragmatic information.

Word Grammar allows an approach of this kind to be made to the exocentric compound because syntactic and semantic data are organised autonomously. Hence, an appropriate semantic structure may be matched to syntactic dependency, although failure to establish the relevance of this semantic structure with the concept named may follow. In my view, this represents a more satisfactory description of the constituent relationships that also agrees with tacit knowledge of the exocentric compound. Speakers are capable of working out the meaning of the morphological structure redcap as 'cap which is red', without necessarily assigning it to some area of cognition. Since the meanings of individual lexical items in Word Grammar are instances of more general concepts of knowledge, the link between the propositional content of the compound and the word's referential meaning will be computed in terms of the semantic network to which it is a key. This issue will be taken up and discussed further in a later section but it is noted here that a consistent analysis of syntactic structure is given to endocentric and exocentric compounds using Word Grammar.

One of the problems of adopting this kind of approach to head-modifier relations is that syntactic dependency does not differentiate between the word and the phrase. For example, contractual lawyer in (7) above is assumed to be an endocentric compound but the categorical combination of adjective plus noun is similar to that found within noun phrases, viz. blue eyes. Therefore, we need to establish the criteria for distinguishing the compound word from the phrase which on the evidence of our two examples would appear to be semantic.

Levi (1978) observes that there is certain syntactic evidence for nouns that does not apply to compounded constituency structures. The motivation for her claim is the classification of structures comprising an adjective and a noun which, although bearing close resemblance to the phrase, meet the criteria for compounded words, e.g. electrical engineer. If Levi's claims are valid, the syntactic criteria should enable a distinction to be made between the word and the phrase, and the phrase and the compound word. However, it will be noted that Levi's syntactic criteria set out below are based on semantic evidence. That is to say, the semantic relationships of the individual lexical items within the compound structure govern the well formedness of the syntactic structure.

The first of the criteria is that of non-predication, i.e. the meanings of complex nominals are non-predicating, e.g.

- (8)(a) electrical engineer ≠ engineer who is electrical
 (b) logical fallacy ≠ fallacy which is logical

The phrasal interpretations given to (8)(a & b) above do not represent the meanings of the compounded words to the left of ≠ because they are predicating structures. It is recalled that predicating structures (see Chapter II) generate propositions concerning definite knowledge about an individual entity by identifying the semantic relationship between the lexical items in which the meaning of the dependent is a feature of the head's meaning. In contrast, non-predicating structures refer to independent concepts that enter into a relationship of 'cognitive proximity'. Hence, Levi's criterion of non-predication supports Downing's observations that the relation between constituents of a compound structure is one of individual participation within a given context. As a consequence, the referents of constituents for the compound are not asserting some known information about the entity denoted by the compound's head. Thus, the interpretation of the compound in (8)(a) is ill formed because the meaning of electrical does not refer to some feature of the referent of engineer. Similarly, (8)(b) is ill formed because the meaning of the compound is 'fallacy of logic'.

The second criterion is that whilst a compound noun may be modified, the modification cannot be intensified. Compare

- (9)(a) young criminal lawyer
- (b) very criminal lawyer

(9)(b) can only receive a phrasal interpretation, i.e. 'lawyer who is very criminal (in behaviour)'. By convention, compounding is a device for naming some type of concrete or abstract entity. It does not provide a description and, therefore, the proposition referred to by the compound may not be measured. Since the adjective criminal is being measured in (9)(b), it must be referring to some characteristic of the head noun lawyer, i.e. behaviour. That is to say (9)(b) has a predicating structure and the function of the intensifier very is only indirectly dependent on the head noun, via the latter's own dependent.

A third criterion is the inseparability of the compound's internal constituents:

- (10) lunar project but *lunar recent project.

The reason for this is that the concept denoted by the compound's referent is atomic. Recall that the referent of this word-type is an argument that constitutes the 'missing link' and as such it is a companion of a general model, e.g. purpose, location, etc. In this respect, the compound functions as a single entity, whose meaning is a proposition comprising the referents of its two constituents.

Another criterion is the ability of the noun to combine with a determiner to form a noun phrase. According to Word grammar, the noun functions as a dependent of the determiner. Therefore, since the compound noun is a noun it may also occur as dependent of the determiner:

- (11)(a) the matchbox
- (b) the large matchbox
-

In view of the determiner's role within the noun phrase, the definition of the latter given in Chapter II should be modified to 'the noun phrase is defined as the determiner and all its dependents'. This means that, where the phrase acts as a single unit, it may combine with the determiner in a dependency link, e.g.

- (12)(a) The boil in the bag is ready.
 (b) The boil in the bag meal is ready.

In (12)(b) boil in the bag is not a dependent of the determiner but of the noun meal, which, in turn, is a dependent of the. But in (12)(a) the phrase is a dependent of the noun phrase head, i.e. the. This is understood by invoking the convention on definiteness (ibid: 182-4): nouns are semantically neutral in terms of definiteness until the speaker indicates with the use of the determiner that the noun's referent is known to speaker and hearer alike. The presence of meal is not necessary to (12)(a) because there is a mutual understanding between speaker and hearer as to what is being referred to. In (12)(b) the presence of meal suggests that there is another type of meal in addition to that being prepared and it is not yet ready. It is often the case that, where the noun's referent is known to be understood and retrievable, it may be omitted. Hence, the phrase itself refers to an argument of the understood referent's model, i.e. manner (which is 'boil-in-the-bag'). In consequence, a similarity exists between the analysis of the phrase as a single unit and coordinate structures, e.g.

- (13) He is happy and in a good mood.

where both conjuncts instantiate a more general functional attribute of the model, i.e. a direct object that comprises an adjective and a prepositional phrase. In the case of the phrase, however, only the

attribute is instantiated by more than one word. Thus, rather than being a factor of criterial difference, the determiner shows the similarity between words and phrases, inasmuch as a phrase may function as a word. But, in such cases, the constituent structure is linked to a single argument which is entailed within its meaning.

The issue relating to co-ordinate structures is also presented as criterial evidence for words like corporate lawyer and domestic animals. Since different categorical entities may conjoin as members of a dependent, their more general model is shared, e.g.

- (14)(a) corporate and divorce lawyers
- (b) domestic and farm animals

Levi's claim is that the shared model of the conjuncts for (14)(a & b) is the noun. With Word Grammar's analysis, a noun counterpart for the dependent is indicated by the second conjunct. But lexical adjectives also have counterparts which are entities denoted by nouns.

Since this is characteristic of structures that constitute phrases and word-structure, a parallel is drawn between the two on the grounds that the common factor for the two is the word.

Finally, individual constituents of compounds do not have anaphoric independence. So pronouns cannot refer to the internal words.

- (15) *divorce_i lawyers also do it_i .

The pronoun it in (15) does not refer back to divorce or lawyers. There is no co-referentiality between it and lawyers because the lexical pronoun requires a counterpart that has an inanimate referent. However, divorce (which meets this condition) cannot function as the pronoun's counterpart because its referent is not an instance of the argument instantiated by the compound's referent. This follows from the criterion of inseparability mentioned above and accounts for the lack of the availability of a counterpart to the pronoun.

To sum up. Of the six criteria presented above, those of co-ordination, co-occurrence with the determiner and inability

to take intensifiers demonstrate the similarity for the behaviour of the noun as part of word and sentence structure. In contrast, inseparability, non-predication and lack of anaphoric independence account for differences between the word and the sentence. Anaphoric independence, however, follows from the notion of inseparability and demonstrates that individual word meanings may be instantiated by more than one word form. Hence, inseparability is a feature of word meaning shared by the compound and explains its identity as a word. This leaves non-predication, which is a semantic feature, as the criterial difference between the identity of the compound word and the word.

2. Morpho-Syntactic Considerations

A lexical compound noun, e.g. matchbox, is an instance of both a word and a noun:

word-matchbox is (a word)
word-matchbox is (a noun)

The brackets indicate that the entity is a feature of the instance. Its regular patterns of behaviour as a single word are sanctioned under the Selective Inheritance Principle by the general properties of these two models.

A particular type of event, the word has an internal structure comprising at least one part. These parts may be either a word (otherwise called a root) or an affix. The latter may be divided into prefixes and suffixes, which conceptually parallel the beginning and end of an event, e.g.

part of word is (a word)
 prefix of word is a first-part of word
 suffix of word is a last-part of word.

The compound noun deviates from its word model inasmuch as its composition is defined by a minimum of two parts, which are words (as opposed to affixes).

compound word has two parts
 part of compound word is (a word)

These are propositions relating to the compound word itself and override the compositional entry for its word model. Hence, the well-formedness of the lexeme matchbox is ratified by the automatic inheritance of the proposition relating to the compound word's internal structure, e.g.

word-matchbox is(a compound word)
 Parts of word-matchbox are(a word-match and word-box)

The propositions of the word model also endorse other types of compound noun whose constituents have a morphological form comprising a root and an affix, i.e.

part of word is an affix
 last part of word of compound word is (a suffix)
 last part of word-farmer is (-er suffix)

But, unlike Selkirk's theory, Word Grammar does not assign head status to affixes because they are shared by different word-classes, e.g. booking (N) v booking (V); closed (V) v excited (Adj.). By treating the affix as part of a word, the Grammar is able to capture this generalisation for affix sharing, even where root classification differs, e.g. writer v villager. With the acceptability of individual affixes dependent on the functional role of the word of which it is a part, the affix's presence is sanctioned in the same way as dependents of word classes, i.e.

parts of noun is (a noun + an affix)
 (noun affix) is a suffix -er

or

parts of noun is (a verb + an affix)
 (noun affix) is a suffix -er

Subsequently, by the principle for inheritance, the internal composition engineer of electrical engineer is ratified by the word's noun model. As an instance of a noun model, the internal structure of our example matchbox is sanctioned by the Selective Inheritance Principle, because it contains a word which is a noun, i.e.

compound noun is (a noun)
 part of compound noun is (a noun)

and the inheritance of word-part which is a noun endorses the internal dependents' categories as consistent with its word-class.

Under the principle of dependency, one of the compound's constituents must function as head and the word-pairs must follow the adjacency principle to guarantee well-formedness. In cases where the first word-part is an adjective and the second a noun, e.g. electrical engineer, the direction of dependency is observed, because one type of word-class that is companion to a noun is an adjective, i.e.

dependent of noun is an adjective

Therefore, the adjacent pairs of the compound noun are endorsed by automatic inheritance of a proposition relating to the pre-dependent of a noun model, i.e.

first part of compound noun is (an adjective)

But for root compounds like matchbox the syntactic evidence alone is insufficient data to determine directionality, i.e. noun + noun.


Under normal circumstances syntactic information would not be processed independently of other available information about the lexical items. However, the semantic criteria for compound nouns demonstrate that root compounds conform to dependency structure with the second member as head.

An adjacent noun phrase word-pair has a predicative relation e.g. blue eyes means 'eyes which are blue'. Therefore, any phrase exhibiting a dependent noun + noun word-pair will contrast with a compound noun in instantiating a predicative relation, but the latter will indicate the directionality because the dependent will represent part of the semantic structure of its head. A word-pair which is traditionally recognised to fall between the status of a phrase and a compound is a street name, e.g. Powis Street. Being phrasal, it has a predicative relation, i.e. 'Street whose name is Powis, from which the head-modifier relation can be identified and, hence, the direction of dependency. Since the differentiability criteria between the phrase and the compound are semantic, the syntactic structure for the latter is similar to that of the former. Hence, the direction of dependency for root compounds is noun + noun, i.e.

first part of compound noun is (a noun)

Following from this, the modifying role of a pre-dependent within a noun phrase and a compound noun can be defined. Within the phrase, the pre-dependent functions attributively. Hence, the word-pair instantiates a predicative relation, whereas with the compound the word-pair instantiates a non-predicative relation, i.e. the pre-dependent functions as an attribute.

Since the head of the compound noun's constituency, which comprises an attribute, e.g. match in (16)

(16)  large matchbox

deviates from the structure it can enter into as head of a noun phrase, viz. large in (16), one of the entries for the compound noun model will be the proposition.

second noun of compound noun is head

Hence, the intra-word dependency relation of matchbox is sanctioned by the proposition relating to its compound noun model, and differentiated from sentential structure by the entry for its composition which specifies only two words.

There is one other dependent of the noun which functions in first constituent position of the compound, i.e. the preposition. The verb as an intra-word dependent is discounted, because it only functions as a head. Where it is found in examples like pickpocket, cutthroat etc. the verb retains its headship, because the constituent is a lexicalised phrase. These examples are, to use Botha's term, 'syntagmas', but their compositional identity corresponds to that of compounds and they function as a noun.

The adverb is a second intra-word dependent that is rejected. It does not occur as part of a compound noun for the following reasons. Usually the noun model does not sanction an adverb as one of its dependents. Exceptions, such as downstairs (adv) in

(17) the room downstairs

are ratified by the general word model, because semantically (17) differs from

(18) the downstairs room

In (17) the speaker is codifying two separate properties, i.e.

(19) I have a room and it is situated downstairs.

The adverb's role is to supply additional information about the situation of ownership. In contrast, downstairs in (18) is descriptive, i.e. the word instantiates some proposition which identifies the room by its location. Further, it is noted in the previous chapter that a seemingly adverbial dependent contained within a compound has an equivalent adjectival form, e.g. well wisher v well man, suggesting that there is a parallel modifying function for the adverb as a dependent of the verb and the adjective as modifier of the compound's head.

It is also suggested in Chapter III that prepositions in first member position would have to be assigned a metaphoric rather than a literal interpretation, given the nature of the assumptions for the lexical framework. However, a metaphoric approach would not explain the literal reading for examples like afterthought, undertow, etc. Using Word Grammar's lexicalist approach, the preposition's function as part of the compound is to instantiate an argument of the model for the internal head's referent, i.e. a class or species of entity. At this level of generality, the arguments are the concepts of a state of affairs, i.e. location, e.g. in, on, under, at, etc; possession, e.g. of, with, etc; time, e.g. at, by, on; purpose, e.g. for, etc.

It is observed that many prepositions are instances of more than one atomic concept, e.g. at instantiates (i) location and (ii) time,

(20) He arrived at₁ the station at₂ seven o'clock.

such that additional linguistic or pragmatic information is needed to identify the most appropriate referent. For the compound, this is possible once the model to the internal head's referent is identified.

Whilst the preposition as dependent of the noun is sanctioned by the category model of its head, its position within the compound is deviant. The reason for this deviancy is a condition of its role as an attribute (see next section). However, since this condition is typical of the compound noun and not its model the noun, the former requires a propositional entry to ratify specific lexical instantiations, e.g. afterthought, i.e.

first word of compound noun is(a preposition)

To sum up. The compound noun has the following propositions which override those of its models; the word, noun and compound word:

first part of compound noun is(a noun)
first part of compound noun is(an adjective)
first part of compound noun is(a preposition)

3. Headship within the Compound Noun

In the two theories discussed in Chapter III the identity of the head of the compound noun as its second member has presented problems with regard to compound-types other than the verbal compound; such that the exocentric compound is usually considered to fall outside the scope of the rules. Also unaccounted for are backformations, e.g. windowshopping (N) ----> windowshop (V); and compound words of the type verb + noun, e.g. rattlesnake, scrubwoman, etc.; together with an unexplained re-ordering of head-dependent structure for the constituents of non-verbal compounds.

Using Word Grammar, the problems above are explained within the principles of organisation for the linguistic network, which includes the pragmatic constraint for compounding. Since these deviant word-forms are accepted within the framework as lexical items sanctioned by the grammar, the change in word order for intra-word dependency follows naturally from knowledge of categorical behaviour. Moreover, their deviancy provides insight into the similarities of all compound word types, i.e. exocentric and endocentric compound words, including verbal compounds, non-verbal compounds, and root compounds.

3.1. Exocentric Compounds

Selkirk's framework explicitly identifies the syntactic head of a compound with a rule, whereas Roeper and Siegel's theory only implies headship for the verb in the format of their compounding rules. However, both frameworks claim a predictable relation between form and meaning, which thus excludes exocentric compounding. But, if syntactic and semantic processes operate automatically, a rule of syntactic occurrence need not affect morphological and semantic structure on a one to one basis.

nomously ?

Word Grammar claims that the morphological structure of a word may comprise a word or more than one word plus word parts, any of which may exhibit some degree of deviancy from the model. The compositional deviancy of morphological structure may be the result of different factors from those which affect semantic composition, which in turn are not subject to the adjacency principle of syntactic dependency. For example, some exocentric compounds are the result of diachronic reduction, e.g. grey (time) lag (goose), (see next section, on backformations). Others are a combination of reduction and phonological lexicalisation, e.g. yellow hammer (from 'hamma' = 'feather'). Yet others are phrasal combinations re-applied in different cognitive domains, e.g. white elephant, which according to the Shorter Oxford English Dictionary were gifts from the King of Siam, who found them useless and expensive objects.

Into this category of word-types also fall examples like pickpocket and cutthroat, which Selkirk argues are not subject to the compounding rules of her grammar. Nonetheless, using Word Grammar, these word-forms must be formed by using the general syntactic principles for word-structure. The question arises whether the first part of this word-type is a noun or a verb. If it is a noun, it may be an intra-word dependent, in which case its occurrence is sanctioned by the model for the compound noun under the principle of selective inheritance. As such, a consistent approach is possible for this type of verb + noun combination and endocentric compounds like rattlesnake and scrubwoman as noun + noun structures.

By Marchand's criterion of semantic content, the morphological forms rattle and scrub may be nouns derived from the verb. Compare, for instance;

- (21)(a) The baby's rattle v the train rattled along the rails-
 (b) She gave the child a good scrub v she scrubbed the child.

However, the lexical compounds rattlesnake and scrubwoman are semantically different from the exocentric compound because the properties of their internal heads match those of their models, i.e. animal and person respectively. On the other hand, if the exocentric compound pickpocket has a first part which is a verb, it is head of the word-structure because the verb never functions as a dependent. In this case, it is a word-string with a head-dependency structure that could have undergone zero derivation to function as a noun. This could be explained by the word's semantic structure, because the phrase and the compound will have different propositional content.

To return to the issue of syntactic headship for typical exocentric compounds, it is argued that an entry of the compound word model, which identifies the head of a compound noun as its second member, need not directly affect the semantic structure of its lexical instance. It is, in fact, noticeable in many of the above examples that the syntactic dependency relations themselves follow dependency-head direction and conform to the principles of adjacency.

As a consequence, applying this proposition to exocentric compounds, the word-classes of the internal constituents are sanctioned because their parts conform to appropriate category labelling for the compound noun parts, e.g. red (Adj) + cap (N); after (Prep) + thought (N). The semantic deviancy must then be accounted for in terms of the interpretative processes of the semantic network.

It also follows that a systematic correlation between form and meaning, as advocated by the previous theories, need not be a criterion for productivity of compounds. As pointed out earlier as one of the shortcomings of Roeper and Siegel's framework, the one-to-one correlation is not without exceptions, even with endocentric compounds, e.g. early riser.

Adopting this type of approach to exocentric compounds seems to me to correspond more readily to intuitive knowledge of these word-types. It is also more representative of speaker competence, inasmuch as it shows that exocentric compounds are subject to the same systematic principles of the language network.

3.2. Backformations

Both Selkirk and Roeper and Siegel avoid an account of backformations on the grounds that they are not generated by the rules proposed in the grammar. This presents an anomaly because many backformations derive from non-verbal compounds, e.g. babysit ←---- babysitting, which have been generated by the compound rules. This suggests that deletion of the affix is a process that merits differentiating between these two endocentric compound types.

Another problem relating to backformations and non-verbal compounds alike, for which no satisfactory explanation is given, is the change in word order for the compound word. That is to say, if the dependent of a verb usually follows its head, its position within the word is deviant if it retains the status of a verb dependent. The two issues, however, are not unconnected. First, although reduced compound forms may be the result of diachronic change, this phenomenon is part of speaker competence, and, in the case of backformations, does not affect judgement on the compound's acceptability as a word of the language. It is still sanctioned by the principles of the grammar. Secondly, being part of the grammatical network, a comparison with its counterpart the non-verbal compound provides insight into the shared network of the noun and the verb.

With regard to deletion, it is recognised that whilst

backformations are the result of diachronic deletion, the process of reduction need not affect the inheritance of the derived propositions for the compound's meaning. As part of the reduction process, words may lose letters, affixes or even words but the morphological deletion need not automatically affect semantic content in a similar way.

Rufener (1971) points out that larger structures containing compound words may undergo reduction to produce idiomatic compounds, e.g. grey time lag goose ---> grey lag. In cases like this, the original internal head of the structure is lost and, therefore, the identity of the situational context in which the word is used (indicated by the deictic function of the head's referent) is no longer recoverable, e.g. goose refers to an entity which is a bird. Such examples contrast with the non-reduced forms, e.g. white elephant, which are simply transferred across contextual situations; and the internal head loses its deictic function with the result that the compound is given an idiomatic interpretation. However, it is not always the head or the link with the context of use that is lost. For example, nuclear weapon disarmament. The meaning of this latter example remains relatively transparent after reduction of its morphological structure because the meaning of weapon can be inferred from the meaning of disarmament.

In each of the above examples a head-dependent relation is maintained between the remaining constituents, and this relationship is assigned a semantic proposition as part of the meaning of the construction. This suggests that as long as some semantic relation may be established or identified between the meanings of constituent pairs, the syntactic structure will be tolerated. Moreover, speakers will attempt to recover a proposition in spite of morphological deletion

The daily occurrence of synchronic deletion, e.g. he's, you'll, provides evidence in support of this observation.

The above mentioned examples suggest that deviancy in morphological representation is recognised and accepted as long as a semantic relation can be identified between the constituents. Deviance is tolerated to the degree that syntactic dependency must

conform to the principles of organisation. Hence, the acceptability of grey lag is due to the fact that a proposition may be constructed which conforms to a typical adjective plus noun construction. Similarly, nuclear is an adjective that may modify the noun disarmament or weapon.

Or personal pronouns always function as dependents of a verb. Therefore, if a suitable dependency link is established according to syntactic rules of occurrence, speakers will try to infer some semantic relation between the constituents.

The claim that syntactic deviancy is tolerated in this way is supported by evidence from Fleischman (1976) who observes that identification of loan words is measured by their ability to integrate into the system of the host language. Hence, depending on the similarity between the network for the loan word and the grammatical system into which it must fit, the word will be more or less deviant within the total network. If the deviancy is marked, then its status as a loan word is recognised. For example, lobster newburg or heir apparent are two compounds whose dependency sequence is deviant relative to that of typical English nouns. They will, therefore, have a propositional entry for their lexical model identifying the deviancy, with the result that it will override the proposition of the compound noun model for English. As such, the two examples are anglicised

words, whose head-modifier word order is sanctioned by the adjacency principle of some other language, i.e. French. If this fact is known to speakers, the type of entry for the lexical word will be one identifying them as instances of French compound nouns, e.g.

word-lobster newburg is an imitation French word.
 word-lobster newburg is (a compound noun)
 head of French compound noun is first word
 head of word-lobster newburg is word-lobster

The acceptability of loan compound words into English shows that although syntactic deviancy occurs a sanctioned semantic relation exists between the constituents. From the semantic point of view, the inclusion of a proposition that is part of the meaning of a loan word suggests that concepts may be shared across cultures despite the sustained deviancy in morphological structure.

By definition, back formations are already fully integrated because they have been generated by the same rules as their underived equivalent. Hence, they do not fall outside the scope of the grammar. And since they are not idiomatic, their acceptance as verbs suggests similar principles involved to the compounding of verbs. Moreover, it is noted that whilst the head of a backformation changes categorically, the derived proposition of the compound's referent is the same for the compound verb and the non-verbal compound. This implies that the noun and verb heads of their respective compound forms share the same semantic network and are subject to the same principles of compounding that allow the inheritance of the same derived proposition for the backformation and the non-verbal compound.

The second problem is deviant direction for the dependency structure of the compound. Roeper and Siegel's solution is a movement rule in the final stage of compound procedure. But the proposal implies that the compound is a stylistic variant of the sentence, with no significance attached to the change in word sequence. Moreover, the movement rule operates on the assumption that a particular sentential structure underlies the compound's meaning. If there is some pseudo-structure that can be reconstructed, the evidence of a variety of alternative interpretations for a single representation suggests that the counterpart is of a somewhat more general nature.

Selkirk's account is less straightforward. Although the rewrite rules suggest the correct sequence for the compound, they operate on lexical insertion with a rule to identify the head that applies sententially and to word-structure. By itself this rule fails to explain why the verb's dependent sister moves into pre-nominal position. It could be presupposed that movement is automatic, with the change in category labelling brought about by affixation. But the derivational affix does not directly govern the verb's sister because as a head the affix's root is its dependent.

Even allowing for the revision of the rule for headship to permit some non-head properties to percolate upwards, the deviant word order is still unexplained because similar patterns of inheritance apply sententially. We are, therefore, forced to return to the identity of categories for the rewrite rules and the assumption that lexical insertion entails word sequencing.

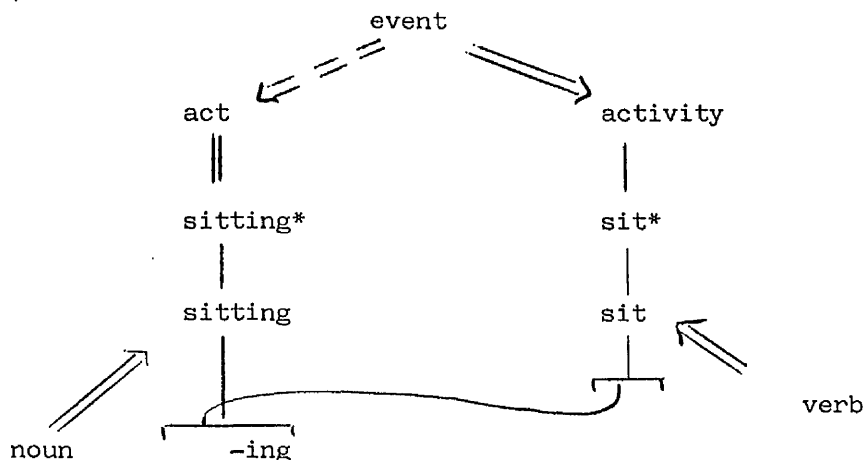
Returning to the criterion of attributive function for the compound's internal dependent, the word order for non-verbal compounds is accounted for by the proposition of the compound noun model, which under the Selective Inheritance Principle sanctions the occurrence of a noun in pre-head position. For the compound verb, i.e. the backformation, well formedness of the original coinage is similarly predicted because it instantiates a noun prior to reduction.

By comparison, compound verbs tend to exhibit combinations of verb plus preposition, e.g. runaway; or preposition plus verb, e.g. undertake; or adverb plus verb, e.g. gladhand. However, it is noted that with the latter two examples, the dependent category has taken up a pre-head position, suggesting that the compound verb model has two specific entries, one for the preposition and the other for the adverb, to occur in pre-head position. These entries override the more general one of the verb that sanctions the normal position of the dependent to follow its head. This being the case, there is an analogy with compound nouns from which it may be assumed that where this occurs, the first member of the compound verb has the role of attribute. Hence, even if no examples of noun plus verb are generated, except by backformation procedure, a precedent exists for the compound verb model and may account for the acceptance of the reduced forms.

The claim that the referent of the head of a backformation and a non-verbal compound share the same semantic network is demonstrated by a closer investigation of the meanings of the internal lexical heads for both constructions. Despite the non-compositional interpretation given to the non-verbal compound noun, the meaning

of its head may be semantically transparent. For example, the referent of the head of babysitting (compound noun) is sitting (noun) and the latter instantiates an act of 'sitting'. The head of the compound verb babysit is sit which instantiates an activity 'sit'. The referents of the two lexical items sitting and sit instantiate different aspects of a more general dynamic concept, i.e. an event. The difference between the referent of the noun and that of the verb is one involving focus on the meaning of the general concept. With the noun, the concept is perceived as a single whole*, whereas the verb signifies it as a whole that lasts through time. The contrast might be described in terms of a painting, with the noun referring to the picture as a whole and the verb to the conception of the entity as a series of brush strokes. Since the activity of painting necessarily precedes the production of the painting as an entity, the concept denoted by the noun is perceived as an instance of the concept referred to by the verb. Hence, our example sitting has a meaning which is an instance of a more general concept, i.e. an event, that is also a model for the verb's referent. Consequently, the meanings of the two compounds babysitting and babysit share the same semantic network, e.g.

(22)

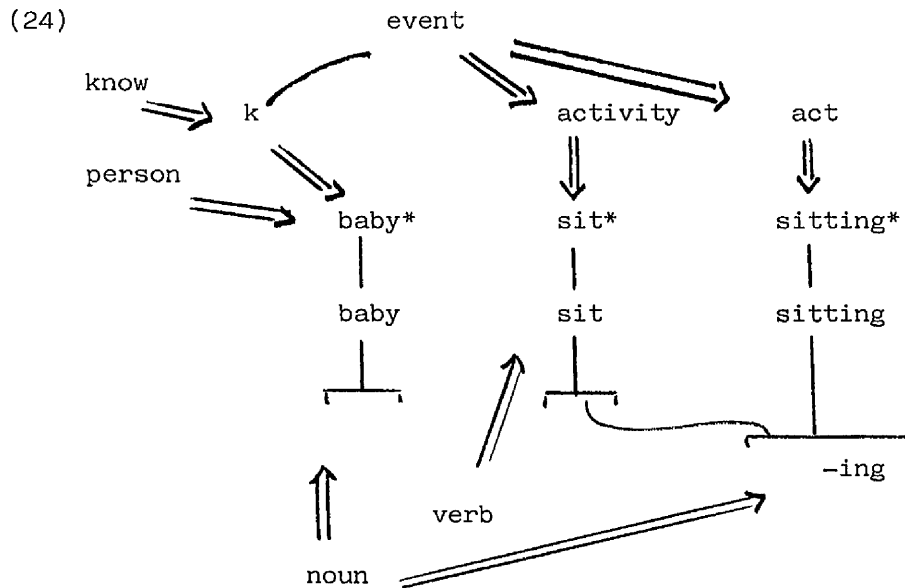


However, using Marchand's criterion of semantic content, it is revealed that the meaning of the noun sitting is synchronically derived from the meaning of the participial verb form sitting, e.g.

- (23)(a) the sitting for the painting lasted three hours = the act of sitting lasted three hours.
- (b) he was sitting in the waiting room for three hours = he was engaged in the action to sit for three hours.
- (c) she sits in the green chair = her usual activity is to sit in the green chair.

Sitting in (23)(a) is a nominalisation of the participle form sitting, as found in (23)(b), which, in turn, is an inflectional form of the root sit, as in (23)(c). Together the three referents of the lexical items sitting(N), sitting(V) and sit(V) identify three different aspects of the same conceptual model, but derivationally the instantiation link between the meanings of the noun sitting and the verb sit has a mediating concept of an action 'sitting'. This will be discussed further in the next section on the inheritance of properties within the instantiation network of particular models.

To return to our two examples, the semantic frame for the compound noun and its backform has now been identified as that of a dynamic model to which the individual heads of the compounds are linked. Since it is known that the referent of each head's dependent falls within the parameter of this semantic frame, the relation between the head and its dependent may be established because the dependent will instantiate some argument of the event 'sit' that is inherited by the referent of the compound's internal head. The network is diagrammatically represented as follows:



One of the consequences of the inheritance procedure described above is that the heads of verbal and non-verbal compounds, which have the same morphological representation, will be linked to the same semantic frame. Following from this, the differences in meaning for the two compound types may be explained in terms of the derived propositions that make up the speaker's knowledge of the semantic network. Since, by definition, the instance deviates from its model in the number of its propositions, the presence of the affix must also contribute to the identity of the arguments inherited as part of the propositions for the instance. This is discussed further in the next section.

To conclude. On the evidence of the arguments presented above, Word Grammar's framework enables a credible explanation to be given for what has otherwise been considered unaccountable data by the lexicalist approach. Backformations and reduced phrasal constructions are subject to the same principles of organisation. Moreover, with the inclusion of pragmatic principles for compounding into the grammar, it is shown that nominal and verbal compounds are linked to the same semantic network. Further

in adopting the view that the role of the intra-word dependent is that of an attribute, the shared semantic content of backformations and non-verbal compounds is explained.

3.3. Verbal Compounds: Affixation

In Roeper and Siegel's theory of compounding, two major stages affecting the semantic structure of compounds are identified; i.e. affixation and the identity of an appropriate grammatical relation between the constituents to generate semantic content for the word. In Selkirk's grammar, these stages are collapsed together to occur simultaneously. But the framework of Word Grammar is that of a surface grammar and, therefore, contrasts with these two theories in not applying sequential rules for the production of compound words. Nonetheless, affixation and grammatical relations are two facts that make up part of a speaker's network of propositions about compound nouns and their meanings. For example, the morphological deviation between the non-verbal compound and its backform signals a different referential focus in meaning.

In the lexicalist theories, the suffixes -ing, -en and -er characterise the verbal and non-verbal compound and are exploited for their functional role in assigning appropriate grammatical relations between the verb and its sister. If the function of grammatical assignment is not exploited the compound is attributed with a non-verbal reading. The referent of the suffix, however, remains semantically empty, cf. Selkirk's grammar, except in terms of its syntactic function.

One of the reasons that no referent is assigned to the suffix is probably due to the difficulties envisaged by Aronoff (1976). Although affixes can be categorised as belonging to different word-classes, their meanings vary according to the root to which they attach, e.g. re = 'back' in receive or 'again' in rewrite; un = 'reverse'

in untie and 'not' in unknown; -er = 'agent' in writer and 'degree' in larger. As such, it seems that the meaning of the lexical root is the controlling factor for their meaning; and subsequently there is no shared semantic property between the derivations.

Owing to the autonomy of syntax in Word Grammar, word-forms and parts of words are not tied to individual concepts of the semantic hierarchy. Therefore, morphological representations of functional concepts can cross-refer to different semantic concepts. The result is that the grammar can generalise where lexemes share the same concept referred to by the affix. Hence, it is possible to show that the head of the verbal compound or non-verbal compound refers to the same semantic entity.

The suffixes which are part of the composition of the compound head share their morphological form with other categories. For example, -ing and -en suffixes are part of a verb or an adjective; and the -er suffix is part of an adverb or adjective. These category parts are not included here, except where reference to their contribution in codifying semantic structure is relevant to the discussion (see section 3.2.). In all instances of derived words which are heads of compounds, the counterpart is a dynamic verb model

activity is dynamic

3.3.1. The -er Noun Suffix

This suffix is usually associated with the concept 'agent'. Jackendoff's (1972:32) definition of an agent is the entity which is the motivator of the activity. Hence, the relation between the word and its word part for the -er noun is one where the suffix refers

to an agent argument of the activity model.

activity has an agent

However, Jackendoff's observations are made in connection with dependency relations for the utterance. With regard to word-structure, part of speaker knowledge is that the constituents of the word refer to a class of entities rather than a specific activity. Therefore, the range of activities codified for a counterpart verb of an -er noun is understood to be its actions, i.e.

parameter of knowledge is range
 activity has range
 range is action

The companion argument of an agent which is equivalent to that of the action model is an actor (Hudson, 1984:159).

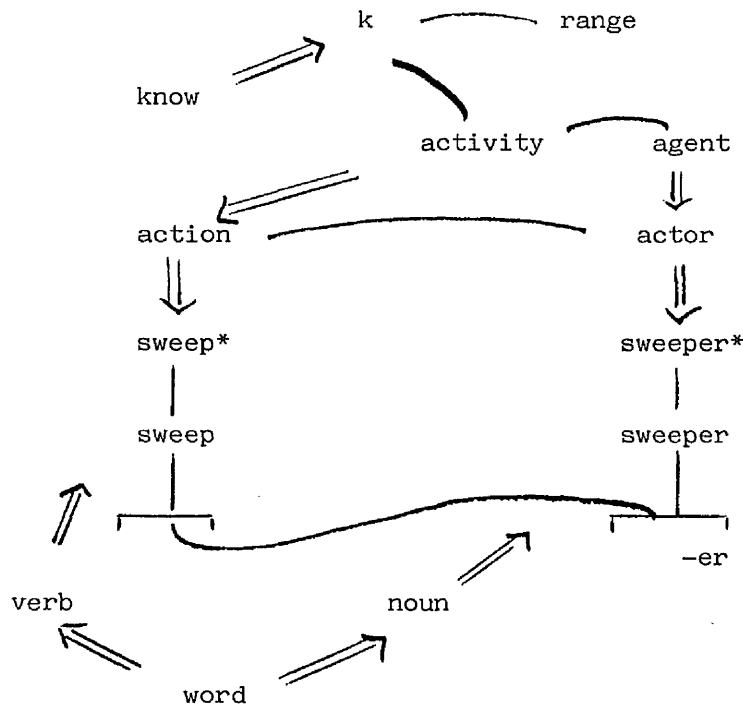
action has actor

Given the known propositions of the general model and those relating to the compound noun, the derived propositions invoked by the presence of the -er suffix and inherited by the -er noun under the Selective Inheritance Principle is

referent of -er noun is actor of counterpart verb

The instantiation network for the lexeme sweeper is:

(25)



The -er noun's referent is ambiguous between an animate or inanimate entity. According to Jackendoff (ibid:32), animacy is a syntactic feature (i.e. of the word-class) disambiguated during the utterance-event, but closely associated with an agent rather than a Theme.

For example, in the syntax, agentive noun phrases can be identified by juxtaposing them with purposive constructions:

- (26)(a) I took the book from Bill in order to read it.
 (b)*This rock deliberately rolled down the hill.

In (26)(a) John is the agent because the sentence is well formed with the phrase in order to. In contrast, (26)(b) is unacceptable because the meaning of the adverb conflicts with the noun rock. Consequently, Jackendoff claims that the noun rock is assigned to the Theme relation as an inanimate subject.

There are, however, two observations to be made on this analysis. First, the definition for the agentive subject includes reference to a dynamic verb, with the agent as motivator of the activity.

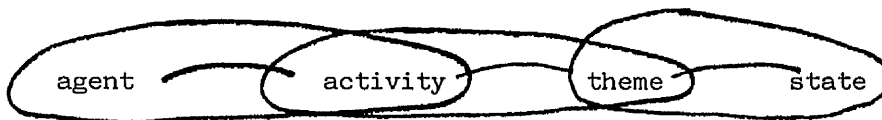
Yet stative verbs exhibit the same in/animate distinction for their subjects, e.g.

- (27)(a) John stayed in the library in order to finish the book.
 (b) The rock was deliberately placed on the hill.

Secondly, agent is a function of the subject but in/animate nouns function in subject and object position, e.g.

- (28)(a) Someone placed the rock on the hill.
 (b) The mother washed the child.

Therefore, whilst agreeing with Jackendoff that the feature of animacy is a characteristic of the word-class of lexical items, i.e. the noun, the in/animate noun functions in subject and object position. Also, agent and Theme are functions that the noun enters into with the verb but this function depends on the type of verb involved; i.e. dynamic or stative. The overlap in semantic roles for the grammatical functions of subject and object are as follows:



Given the distributional patterns of nouns, the difference between the inanimate and animate noun functioning as agent of an active verb will be indicated by the use of instrument to refer to an inanimate entity and actor to refer to an animate entity. I shall continue to use the term Theme to refer to an entity affected by the verb, which may be animate or inanimate.

The above discussion on the animacy of subjects of dynamic verbs is relevant to the type of cognitive model which the noun's referent instantiates. If the noun is animate, it is an instance of a person; and, if it is inanimate, the referent of the noun identifies some physical object (see (29) below). However, a person may also be the actor of the event, in which case the latter will be instantiated by the referent of the same word. Compare:

- (29)(a) The performer forgot his lines.
 (b) The hammer sometimes misses.

The subject of (29)(a) is both person and actor and instantiated by the animate noun performer. In (29)(b) the subject is a physical object and an instrument used by some covert agent. That is to say, the fact that the hammer sometimes misses is due to the control of an unspecified actor which is not the syntactic subject of (29)(b). Hence, the functional concepts instantiated by the subjects of (29)(a & b) are differentiated by the models to which they are linked on the instantiation hierarchy. Transferring these distinctions into propositions for word structure, the entries for the meanings of the -er noun as an instance of a person or physical object respectively are:

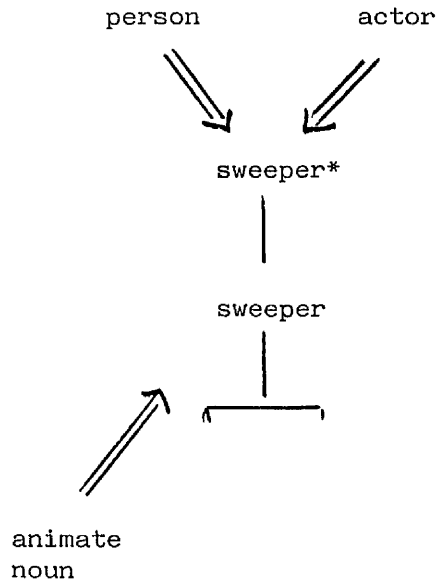
referent of -er noun is person
 referent of -er noun is physical object

To this we can add the following operating instructions which identify the thematic concepts that the -er noun may instantiate:

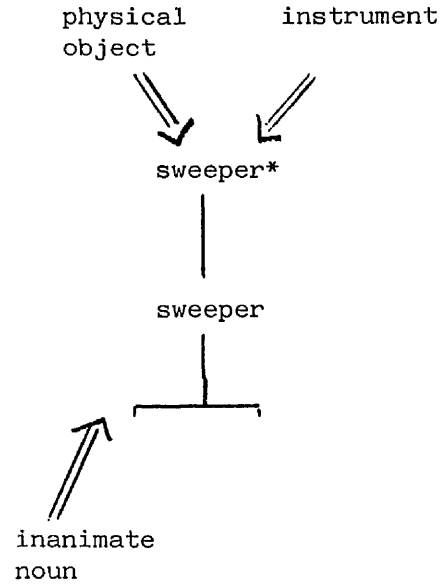
If [-er noun is animate] then referent of ditto is actor
 If [-er noun is inanimate] then referent of ditto is instrument

Hence, there are two possible interpretations for the lexical item sweeper:

(30)(a)



(b)



To conclude. The propositional entries referred to in this section are:

activity has range
 activity has an agent
 range is action
 action has actor

referent of [-er noun which is animate] is an actor
 referent of [-er noun which is inanimate] is an instrument
 referent of -er noun is person
 referent of -er noun is physical object

-er noun is animate or inanimate
 -er noun has counterpart which is a dynamic verb
 referent of counterpart dynamic verb is activity

Example: word-sweeper is (animate noun)
 parts of word-sweeper is (word sweep + er suffix)
 -er noun has counterpart which is a dynamic verb
 counterpart of word-sweeper is word-sweep
 referent of counterpart word-sweep is an activity which
 has range
 range is action which has actor
 if [-er noun is animate] then referent of ditto is actor
 referent of word-sweeper is actor of referent of counterpart
 word-sweep
 referent of word-sweeper is person
 If [-er noun is inanimate] then referent of ditto is
 instrument
 word-sweeper is (inanimate noun)
 referent of word-sweeper is instrument of referent of
 counterpart word-sweep
 referent of word-sweeper is physical object

3.3.2. The -ing Noun Suffix

Included in the meaning of an -ing noun is the meaning
 of a participle verb, e.g.

(31) Swimming is my favourite sport.

where swimming* (N) = act of swimming* (V)

As noted in the previous chapter, the meaning of the
 -ing participle verb does not refer to time, nor focus on a beginning
 or end of an activity. It does, however, contain a concept of change
 that is inherent to a dynamic situation, i.e. part of the meaning of the
 participle is not a final state. This concept is one of duration.
 In addition, the -ing participle verb is an instance of a dynamic model,
 e.g. swimming*(V) = activity of swim* (V), i.e. it is an action.
 Therefore, two models are identified for the -ing verb: action and
 duration.

In support of this argument, Ljung's investigations of the progressive, which comprises an auxiliary and an -ing participle verb, claims that this is an interpretative device to indicate a speaker's point of view of an observed event. That is to say, the activity is seen as a whole rather than with any focus on part of its internal structure, e.g.

- (32)(a) John is writing a letter.
- (b) Mary is being angry.
- (c) John writes a letter.

Both (32)(a)&(b) have dynamic interpretations as events and contrast with (32)(c) which is a factual statement. In addition, Ljung also claims that an identifying characteristic of the progressive is that the subject carries out some sort of action (Ljung, 1980:71). Hence, (32)(a)-(b) contrast with

- (33)(a) The stone moved through the air; it was falling.
- (b) John moved through the air; he was falling.

In (33)(a), the subject is inanimate and therefore cannot carry out the action; whilst in (33)(b), although the subject is animate, it is affected by a process. Hence, according to Ljung, (33)(a)&(b) are not interpretative.

Given that the root of falling is an activity verb, it includes the dynamic feature as part of its meaning. Therefore, both (33)(a)&(b) exhibit dynamicity, irrespective of the in/animate-ness of the subject. This being so, the intuitive passiveness of the meaning of the past continuous tense for (33)(a)&(b), together with the dynamicity of (32)(b) must still be explained.

First, the verb in (32)(b) is be angry, part of which, i.e. angry, has a dynamic feature because it is an adjective of emotion. Therefore, included in the meaning of the verb phrase as a whole

is a dynamic property. It is this property that may be exploited under the Selective Inheritance Principle, where it is known that the entity refers to an event, rather than a description of a state of affairs.

Secondly, the meaning of the verb phrase in (33)(a)&(b) as a whole is stative, but part of the verb phrase contains a counterpart which has the dynamic feature, i.e. the root fall. Whilst this property is covertly available as part of the meaning of falling, the latter's meaning refers to a durative action. Therefore, the inheritance of the duration feature for the participle verb codified by the -ing suffix overrides that of the dynamic feature, because this is a more specific proposition of the instance.

Thus, whilst dynamicity can be exploited as a property of the -ing verb model, priority is given to the feature of duration for the meaning of the more specific lexical entity falling, with the result that its meaning may be interpreted as stative. When falling is combined with the verb to be which is linked to a state model in the semantic network, the verb phrase's meaning is not dynamic, although the feature is included as part of its instantiation hierarchy. Therefore, through the process of inclusion of semantic properties by the automatic inheritance of general properties for the instance, the two aspects of semantic focus by the passive and progressive constructions are explained.

I turn now to the -ing noun. By applying the semantic criterion of content once more, but this time to gerundive nouns, it is found that the participle verb's meaning is included within the meaning of the -ing noun, e.g.

- (34)(a) Working makes you tired.
- (b) I hate flying.

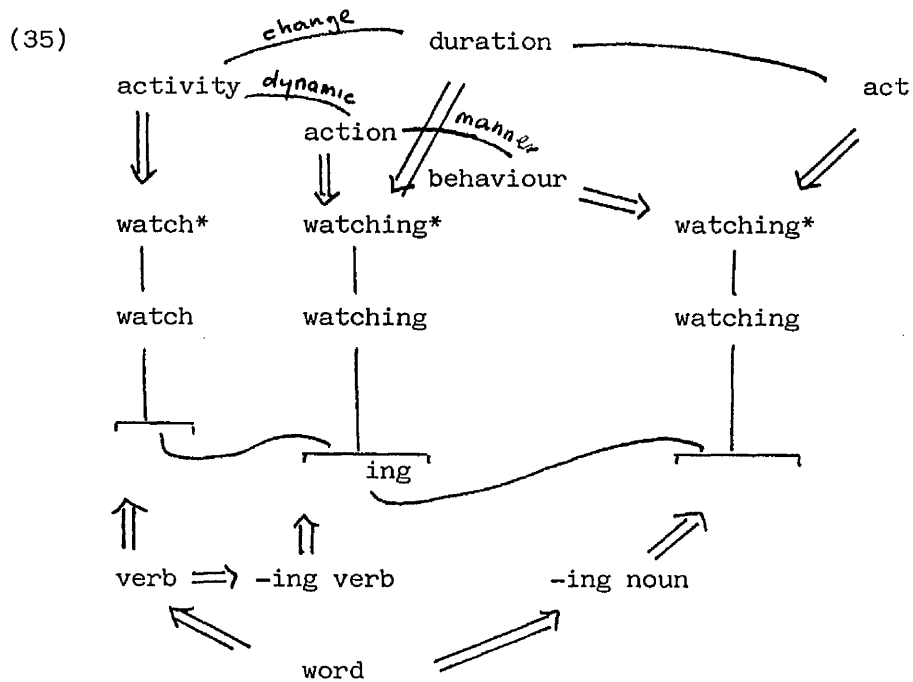
In (33)(a) working refers to the act of 'working' (V) and in (33)(b) the reference is to the act of 'flying' (V). Hence, the counterpart of the -ing noun is the participle -ing verb. This being the case, the presence of the suffix once more invokes the concept of duration, but in connection with a more specific model of a dynamic event, i.e. an act. Therefore, we can establish the derived proposition for the -ing noun's meaning as

referent of -ing noun is an act.

The specific type of act denoted by an -ing noun is identified in connection with the manner of the action model, i.e. behaviour. Therefore, a second model of the lexeme's referent will be behaviour, i.e.

referent of -ing noun is behaviour

The instantiation network is visually shown thus:



With the inheritance of duration as part of the meaning of the -ing participle, the agent argument of the activity model is overridden. Subsequently, the -ing noun does not inherit a proposition containing an agent. Hence, the ability of the -ing word to function without the overt presence of an agent, e.g. travelling and waiting in

- (36)(a) He's interested in travelling.
 (b) I'm tired of waiting.

However, an agent role is covertly present within the meaning of the lexeme. This is accounted for by the action model, which has an agentive argument inherited from the activity model. In turn, the agentive argument is inherited by the behaviour model of the -ing lexeme through inclusion. But, since this argument is a companion of a companion, it is only indirectly connected with the lexeme's meaning. As a distant relation, the agentive argument remains a latent feature of the noun's meaning and this probably explains the intuitive knowledge that the concept is closely connected with behaviour.

Returning to Ljung's hypothesis on the progressive, it is claimed that actions are recognisable patterns of behaviour codified by the language to describe the agent's movements during an event. Therefore, part of an event includes the manner in which the action is performed, i.e. behaviour. The entity which codifies behaviour and inherits the meaning of the action model is an -ing adjective. For example,

- (37)(a) a working wife = a wife who is working.
 (b) a flying object = an object which is flying.

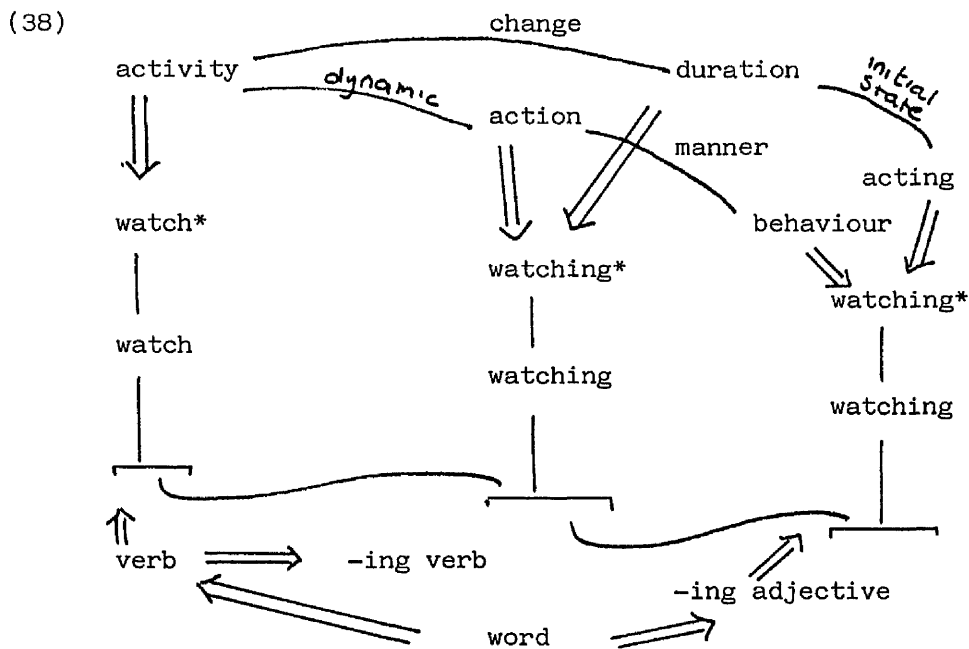
In (37)(a) the wife is described in terms of the manner of behaviour, as is the entity in (37)(b). Therefore, the relation between the -ing adjective and its model is formulated by the derived proposition

referent of -ing adjective is behaviour

which is a specific instance of the companion relation

action has manner

One of the functions of an adjective is that it describes some quality or permanent feature of its head, i.e. a state. Hence, one of its models is also a state. It contrasts with the behaviour model in not having a dynamic property. As noted earlier, arguments of change (as instantiated by duration) are initial and final state. Since duration is not marked for final state, the initial state is identified as an argument of duration that is instantiated by the -ing adjective. Because this is not an inactive state and it still entails movement, the model of the -ing adjective is acting. The instantiation network for the -ing adjective is given below:



Since the agent argument is not part of the meaning of the referents for the -ing noun and -ing adjective, dependents of these word-types cannot instantiate the concept as a property of their heads. However, in the role of modifier, the -ing adjective could instantiate some property of an agent which is its subject (see Hudson, 1984:140,164). The behaviour model has a specific property of movement, which is a companion of agent. Therefore, if some entity possesses the movement property which the -ing adjective may

instantiate, that entity may be identified as its agentive subject, e.g. (37)(a & b) above. In consequence, the notions of act and behaviour are implicit in the meaning of the -ing verb as an instance of a dynamic event. But each of the individual categories of noun and adjective prioritises one of these notions as part of the meaning of individual lexemes. The -ing noun promotes emphasis on the act which entails some form of behaviour, i.e. an action; whereas the adjective focusses on the behavioural aspect of the action.

To conclude. The following propositions are relevant to the above discussion:

dynamic has change
 change is duration
 duration has state
 action has manner
 action has (duration)
 action is behaviour
 duration has an act
 state has duration

referent of -ing verb is an action
 referent of -ing noun is an act
 referent of -ing adjective is behaviour

-ing verb is present participle verb
 -ing noun is abstract noun
 -ing adjective is an adjective
 -ing word has a counterpart
 counterpart of -ing word is a dynamic verb

Example:

word-watch is a dynamic verb
 referent of word-watch is an activity
 word-watching is an -ing verb
 parts of word-watching is (word-watch + -ing suffix)
 counterpart of word-watching is word-watch
 referent of word-watch is an activity
 referent of word-watching is an action of referent of
 counterpart word-watch
 word-watching is an -ing noun
 referent of word-watching is an act of referent of
 counterpart word-watching
 word-watching is an -ing adjective
 referent of word-watching is behaviour of referent of
 counterpart word-watching

.3.3.3. The -en Adjective Suffix

The -en adjective suffix is included here to complete the analysis of verbal compound heads. It is recalled that in the previous chapter the -en verbal compound head is claimed to be a derivative of the past participle verb form, e.g. finished (V) in is finished (VP). Applying the semantic test, the meaning of the -en verb participle is identified as focussing on the completion of the activity of the verb. For example,

(39) The novel was published two weeks ago.

The meaning of published in (39) is the completion of the activity 'publish', whereby the -en verb suffix invokes the end point of the verb's meaning. Hence, the -en word has a companion of change. It is recalled that change has two arguments, i.e. initial and final state, which it will be shown are exploited by the verb phrase containing the -en verb.

The notion of past tense is not characteristic of the -en verb suffix, although completion of an activity may imply that the event in which it occurs may have already taken place. But consider,

- (40)(a) The birds have flown south.
 (b) Now the painting is finished.

(40)(b) may be uttered at the same time as the completion of the painting, in which event there is no concept of past time. In (39) the concept of past activity is indicated by the adverbial phrase two weeks ago and the explicit past tense form of the verb. (40)(a) is an example of a present perfect tense, which is usually used to indicate the relevance of a past event to a present state of affairs. The notion of past time, however, is only inferred. The meaning of the construction itself does not imply the notion that the event

in toto has passed, but only the beginning of it. I shall return to an explanation of this in a short while.

Being the end part of an activity, the completion may be conceptualised as dynamic, indicating that the participle's model is one of activity. Therefore, two models are linked to the participle verb, an action as an instance of a dynamic model, and completion as an end point of change (see Huddleston (1984) on actional/stative passives).

Under the Selective Inheritance Principle, the -en adjective inherits properties of the -en verb's model in the form of propositions containing an argument of these properties. For example, action has an argument of manner which is interpreted as behaviour. Hence, the following proposition identifies a model of the entity

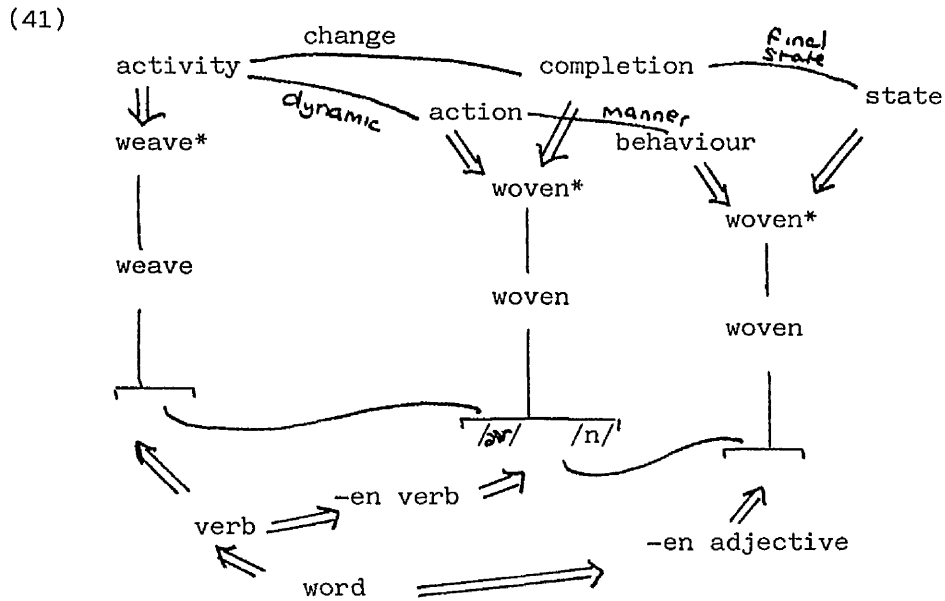
referent of -en adjective is behaviour

An argument of completion is the conceptualisation of the end point as some kind of resultant state, which is itself an instance of the final state argument of the property change. Hence, the referent of the -en adjective, being an instance of a state model, is also sanctioned by the instantiation network, i.e.

referent of an -en adjective is state

Consequently, the -en and the -ing adjective are similar in sharing a state model, but the meaning of an -en adjective contrasts with that of an -ing adjective in the nature of state. The former is an instance of completion and will, therefore, include this property as part of its meaning. The latter is an instance of duration, i.e. its meaning is a continuous state.

The instantiation network is diagrammed as follows:



I now return to the example (40)(a) above to justify the claim that past time is not inherent to the meaning of the -en participle verb. In (39) and (40)(b) the focus is on the completion of the activity. In order to indicate that this is a state that relates to behaviour, the -en participle occurs with the auxiliary have rather than be. Hence, the latter auxiliary establishes a continuous state, thereby indicating that the focus is on the concept of completion. In contrast, when the -en participle verb occurs with the auxiliary have, the notion of experience is entailed in the verb phrase's meaning. For example, compare

- (42)(a) The leaf is fallen.
 (b) The leaf has fallen.

This suggests that the properties of the action model for the -en verb are being exploited. When the participle verb undergoes adjectivalisation enabling the word-form to occur in pre-head position, these differences remain vague, e.g.

- (43) The fallen leaf.

Fallen in (43) may be interpreted as an instance of a state model

(i.e. 'is'), or a behavioural one (i.e. 'has').

Comparing (42)(a)&(b) with (40)(a), the -en verb flown cannot undergo adjectivalisation, e.g.

(44) *The flown birds.

suggesting that the inheritance of the derived proposition for behaviour and the resultant state is blocked.

The reason that behaviour and state cannot be inherited is that they are already part of the lexical verb's meaning, i.e. the typical behaviour of birds is that they fly. Hence, the lexeme's contrastive behaviour to other verbs, like fall, rise etc. The state of behaviour resulting from experience of an action is automatically inherited by the -en adjective as an instance of the -en participle. Where the individual verb's meaning already contains these properties no -en adjective-form exists.

The claim that the inherent property of experiential behaviour for the lexeme flown (V) prevents its function as an adjective seems to be contradicted by the -ing adjective, e.g. flying in (37)(b) of the previous section. But the only reading for (37)(b) is the stative one. Hence, in this case too, there is no behavioural model, because the concept is inherent to the lexeme's meaning.

In connection with the state model of the two word-types, the instantiation path of the -ing adjective differs from that of the -en adjective. The former refers to a continuous state and the latter to a resultant one. As indicated in the previous section, an argument of a continuous state is indirectly linked to an agent

argument as companion of a companion. The resultant state, however, has no property of movement and therefore no agentive subject which may be instantiated by the adjective's head. This means that a resultant state takes a Thematic subject as an argument. One of the deviancies for the lexeme fly as a behavioural verb is that it has an agentive subject. Hence, if the participle underwent -en adjectivalisation, there would be a conflict between the inherent subject role and its derived argument, i.e. Theme, instantiated by some head of the adjective.

One consequence of behaviour being an inherent concept for the lexeme flown is that no concept of resultant state is part of its meaning. Hence, the meaning of the present perfect in (40)(a) does not include this sense of completion. Therefore, the meaning of (40)(a) is interpreted to be 'at some time in the past the birds started the activity of flying south', but with no completion of the activity. This means that the relevance to present time is that the birds are still flying south. Compare (40)(a) with (42)(b), where the activity of fallen is completed.

The second consequence of this analysis is that -en adjectives, as derivations of non-behavioural verbs, retain their link with an agent. Non-behavioural verbs undergo adjectivalisation to an -en word whose referent is an instance of a behaviour model. Part of the meaning of behaviour is an activity which has a propositional link with an agent. For example,

- (45)(a) The driven snow = the snow is driven (by something).
- (b) The fallen leaf = the leaf has fallen (due to something).
- (c) *The slept child = the child is slept (by something/one).
- (d) *The worked men = the men are worked (by something/one).

(45)(a)&(b) are well-formed because the heads function as thematic subjects of the state model for the adjectives, leaving the covert agent argument to account for the behavioural activity being carried out. (45)(c)&(d) are unacceptable because the verbs are behavioural

and take agentive subjects, thus conflicting with the thematic subject required for the state model.

To conclude. The following properties have been discussed:

activity has change
 completion is final state
 action has manner
 manner is behaviour
 referent of -en participle verb is completion and action
 referent of -en adjective is state and behaviour

if [referent of lexical verb] is behaviour, then ditto is not completion

-en participle verb is a verb
 -en adjective is an adjective
 -en participle verb has counterpart which is a dynamic verb
 -en adjective has counterpart which is an -en participle verb

Example: (a)

word-weave is (a verb)
 verb is an activity
 word-woven is an -en participle verb
 parts of word-woven is (word-weave + -en suffix)
 -en participle verb has counterpart
 counterpart of word-woven is word-weave
 referent of word-weave is an activity
 activity has change
 referent of word-woven is completion of referent of counterpart word-weave
 referent of word-woven is an action
 word-woven is an -en adjective
 counterpart of word-woven is word-woven which is an -en participle verb
 completion has state
 referent of word-woven is state and behaviour of referent of counterpart word-woven

Example: (b)

word-flown is an -en participle verb
 parts of word-flown is (word-fly + -en suffix)
 counterpart of word-flown is word-fly which is an activity
 referent of word-fly has behaviour
 referent of word-flown is not completion of referent of counterpart word-fly

3.3.4. Other Suffixes

One of the criticisms of Selkirk's theory is that in sub-dividing the set of compounds comprising a verb into verbal compounds and non-verbal compounds, no account is given of non-verbal compounds which do not contain any suffix other than the three discussed above. Other suffixes include -al, e.g. refusal, and -able e.g. trainable; although others which have been found to function as head of the compound word include -ation, e.g. deportation; -ment, e.g. amusement; -age, e.g. spoilage.

Applying the semantic test to the meanings of all these examples, except trainable, produces a uniform result in each instance referring to an act of the -ing verb model, i.e. an action.

- (46)(a) refusal = act of refusing.
 (b) deportation = act of deporting.
 (c) amusement = act of amusing.
 (d) spoilage = act of spoiling.

The results suggest a similar inheritance procedure to that of the -ing noun in section 3.3.2. But the findings raise the question why these different morphological forms invoke the same instantiation hierarchy.

An explanation is provided by Fleischman (1976) on the suffix -age, which is a borrowing from French. Originally, the introduction of loan suffixes to the language is through acceptance of the word to which they belong. But once the word is established, the suffix is exploited for its own merits; one being the replacement of the -ing noun suffix as a more fashionable method of forming new words.

This explanation is doubly interesting. In the first place, it accounts for the diversity of the examples in (46), which are all latinate word-forms, together with the suffix's behaviour

in attaching to latinate roots. Secondly, it captures a cross-cultural generalisation in the use of both languages to codify the same concepts of a dynamic event.

The -able suffix is slightly different from those mentioned in the above paragraphs. Although Selkirk claims this suffix exhibits a similar pattern to that of the -en adjectival affix, the -able suffix does not share an equivalent inheritance procedure. As a result, the -able suffixed word differs in meaning from the -en passive adjective. For example, compare

- (47)(a) The children are trained (by the teacher).
 (b) The children are trainable.

The -en adjective is derived from a past participle verb form, e.g. trained in (47)(a). But the -able adjective is derived from the verb root, e.g. train + -able as in (47)(b). In consequence, the inheritance of derived propositions for the two complex words differs.

Recall that previously two types of passive interpretations were identified for -en word forms. One is a statal reading that refers to a condition following the completion of an activity. Another interpretation is that which refers to a state on completion of an activity. The meaning of the -en adjective in (47)(a) is ambiguous between these two readings, i.e. a statal/actional passive interpretation. Hence, trained may be assigned a semantic structure of 'condition of complete training' or 'train plus completion'. If the bracketed phrase is exploited, (47)(a) has the latter reading which is a past participle verb form and contrasts with a copula plus adjective construction.

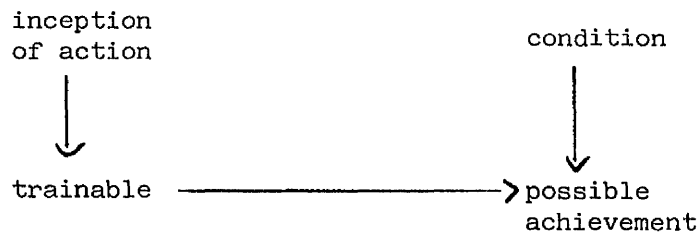
(47)(b) has a copula plus adjective construction but the meaning of the adjective differs from that of the statal reading for (47)(a) because the suffix -able introduces the property of 'potential

achievement', e.g. the possibility that the action 'train' may be achieved. The difference in focus of meaning for the two adjectives trained and trainable is as follows:

(48)(a) the trained children



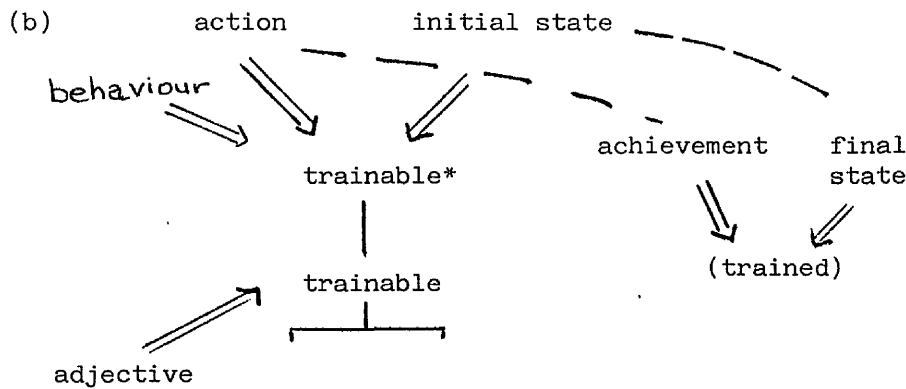
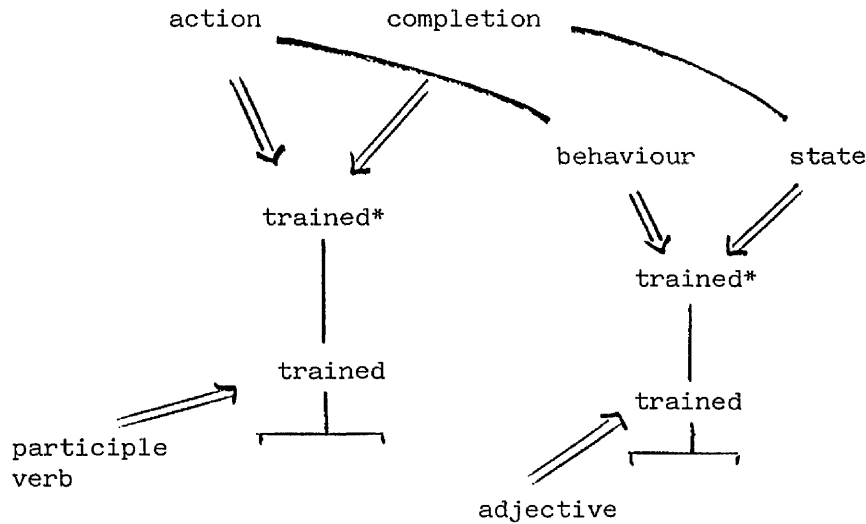
(b) the trainable children



Trained in (48)(a) contrasts with trainable in (48)(b) because the latter shows that at no time is the activity of 'train' achieved or completed. The meaning of trained focusses on the final state whereas the meaning of trainable identifies an initial state.

Using Word Grammar's framework, the inheritance procedure for the two adjectives is diagrammatically set out below:

(49)(a)



Given the difference in inheritance of propositions for the above, a passive reading of trainable as 'can be trained' (where it may be inferred that some state or condition may result) is rejected in favour of an alternative interpretation 'capable of being trained'. The latter is preferred because it permits only the concept of possibility to be inferred as part of the meaning of trainable. The adjective trained, on the other hand, always includes the concept of completion as part of its meaning.

To recap. The mentalistic approach has demonstrated that although the -en and -able suffixes may be linked to the same semantic frame, their functions differ. In the former case, the -en suffix's

role is to focus on a final state of the action denoted by the verb and the -able suffix identifies an initial state. The difference in the type of propositional links identified by the -en word and the -able word suggests that inherited arguments will vary and affect the role of the dependents for the two derived lexical items. This aspect of the inheritance procedure is examined more fully in section 4. Here too the role of teacher in teacher trained and teacher trainable discussed in Chapter III will be established *as that of adjunct*.

3.3.5. Conclusions

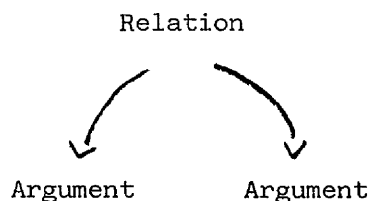
Of the three suffixes which function as parts of head words of verbal and non-verbal compounds, it is noted that the -er suffix differs from the other two in the nature of the semantic concept that it codifies. This suffix refers to an argument of the counterpart model which not only establishes an instantiation network for another model but also represents an instance of a functional concept (as opposed to a structural one). The agent concept is synonymous with the semantic subject of the activity model.

In connection with the claims of the two previous theories regarding the inability of the subject to occur as a constituent of the compound noun, an observation follows from the evidence of the semantic network for the -er noun. This is that whenever the head is an -er noun it represents the subject of the relevant act denoted by the compound's model. Therefore, in contrast to the no-subject claim, subjects do occur word-internally. But since the subject is a particular type of modifier that is not governed

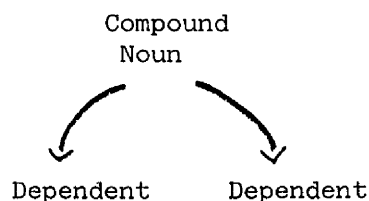
by the verb, the entity does not occur in pre-head position and the first word of a compound will never instantiate an agent argument.

As the -er noun is the lexical head which instantiates the agent, there is a dependency relation between the activity model of the referent of the -er noun. Together with the claim that the meaning of the first word instantiates some argument of the activity model, the referent of the first word is a dependent of the same model. Hence, a situation of semantic dependency exists similar to that claimed in Chapter II for the proposition:

(50)(a)



(b)



Owing to the economy of linguistic context, the compound noun collapses the syntactic head, i.e. the second constituent, together with its semantic head, i.e. the model of the syntactic head's referent. This means the pseudo-head is distinct from the actual head, whose referent functions as an argument of its counterpart. Hence, semantic dependency for the compound noun is shown in (50)(b). The internal dependency relations for the compound noun are mirrored by the internal structure of propositional content as seen in (50)(a). Since this is a situation also claimed for the verb and its dependents, a correlation exists between the compound and the sentence. However, the internal syntactic constituents of the compound noun also enjoy

a dependency relation, which when equated with clausal structure shows that the subject is head and the verb's sister is a dependent of the subject.

It has already been claimed that the clause can be divided into two semantic types: predicating and non-predicating. In addition, this semantic division correlates with a difference in modification for noun phrases and compound nouns, e.g.

- (51)(a) blue eyes : predicative meaning
 (b) fish eating : non-predicative meaning

Therefore, I suggest that the syntactic dependency exhibited by the constituents of the compound noun must be interpreted in connection with the constituent structure under analysis. That is to say the syntactic dependency codifies a relationship that is mediated by the head's semantic model (which is a verbal concept).

Also, it is emphasised that normal dependency direction is reversed within the word structure. This corresponds with the earlier suggestion that change in word order is a signalling device for interpreting the proposition with regard to a different aspect of the same meaning. Despite the reversal of direction, an interrelationship between instantiation and dependency still applies. The suffix, being a part of the word form that instantiates some argument of the word-part's model, must be processed first, before establishing the first word's semantic role as dependent.

The -ing and -en suffixes represent concepts that are directly related to the structure of the (verbal) model as a set, i.e. comprising a number of atomic concepts. For example, duration focusses on the middle part of the activity, and completion on an end point. In contrast to the -er noun, only one instantiation hierarchy is exploited. However, in spite of this limitation on the number of

Amendment:

A more satisfactory explanation of the differences between transparent and non-transparent meanings of the -er word follows naturally from the general principles of Word Grammar itself. The model of the verb go has an argument of location which is normally instantiated syntactically as a prepositional phrase, e.g. 'They go to church'. Under the Selective Inheritance Principle, the inheritance of the locative argument by an action model may be blocked by a specific property. With the -er suffixed word, the non-occurrence of a syntactic modifier to instantiate the locative argument suggests that the action model has a specific entry that overrides the inherited property, i.e. degree of specificity for the action. As a property of the base's meaning for the -er word, degree of specific action is inherited by the referent of the -er word and may be interpreted at this lexical level as 'one who exhibits more movement than usual' on default of a syntactic environment.

Under a similar analysis, the -er suffix of all dayer may be identified as an agentive suffix on analogy with that of villager. Here the -er suffix instantiates an agent argument of an appropriate general model of which the noun to which it is attached is an instance, i.e. time. The specificity in meaning which is a consequence of the instantiation procedure provides the vehicle for exploiting the degree property relative to the most immediate model of the word's referent. In turn, this permits an inferred reading of intensity. ##

propositional links for the -ing noun and adjective and the -en adjective, the structural concepts may be interpreted as dynamic or non-dynamic, in which case the concepts are linked to other semantic networks, e.g. behaviour or state.

In contrast to Selkirk's percolation principle, the inheritance procedure of Word Grammar is able to show the stored semantic properties for derived words, e.g. dynamic as a feature for nouns, verbs and adjectives. Word Grammar can also account for zero derivation and can therefore explain the similarity of behaviour between verbs and nouns as the result of entailed properties, e.g. the meaning of watching (V) is included in the meaning of watching (N).

Deviancy in the inheritance of semantic properties provides an account of non-occurrence of particular lexemic heads, e.g. Roeper and Siegel's problematic verbs drinking and growing, where growing is a behavioural verb. This also explains the behaviour of adjectival passives (Bresnan 1982) and the covert presence of an agent for the adjective, which is not satisfied by the latter's head, e.g. fallen leaf. Hence, laden in snow-laden is acceptable because the counterpart is not a verb of behaviour, i.e. lade = 'load' (V). Cross generalisations about the functions of different categories also enables an explanation to be given for problematic words in Roeper and Siegel like goer, which I suggest are noun + er (Adj) nominalisations and contrast with the -er (N) words of compound nouns. ##

One of the characteristics of adjectives, including comparative adjectives is that they may function as nouns, e.g.

- (51)(a) The brave animal faced the hunter
 (b) The clever student passed the exam
 (c) The brave faced the danger
 (d) The clever pass exams

- (51)(e) The braver of the two faced the danger.
 (f) The cleverer of the two passed the exam.

Similarly, nouns take suffixes that enable them to function as adjectives

- (52)(a) the friend waved.
 (b) the friendly wave.

On the other hand, some nouns derive from verbs and thus have meanings which refer to actions. In this respect, examples are found for go as a noun in colloquial phrases

- (53)(a) Have a go!
 (b) He was more successful on his second go.

As an activity verb go refers to its agent's movements because this concept is inherent in its meaning. It is therefore similar to what has been referred to as behaviour verbs and will not undergo adjectivalisation to codify behaviour nor subsequent modification to express degrees of behaviour. However, as a noun go can undergo adjectival suffixation to denote a comparative adjective and the resulting semantic structure of 'degree (of act) of movement', (which cannot be generated by a process of adverbial suffixation) is generated.

An analogy of this procedure is made with the adjective all dayer, where the -er suffix attaches to the noun day and whose meaning indicates a degree of time covering the whole period of a day. The comparative function of goer as an adjective is blocked, however, because words containing an inherent semantic function of behaviour do not function as adjectives. Therefore, I surmise the word-form undergoes nominalisation similar to that for (51)(e)&(f) to function as a noun. Hence, as a noun it inherits a derived proposition 'one who exhibits more movement than usual'.

In consequence, a comparison is made with the -er noun as head of the compound word. Here, the word-form comprises an agentive suffix and has the meaning 'agent of movement of activity'. ##

Finally, the distinction between the models for the referents of the -er noun and those of the -ing noun and -en adjective provide information about other models of which these words are instances. For the -er noun, knowledge of agents being animate or inanimate means that these entities are also instances of person or physical object. With the -ing noun, unquantified acts contrast with the continuous aspect of the action, which implies that the former may be repetitive. As such, act may be linked to occupation or hobby depending on the nature of activity. For the -ing and -en adjective, the concept of behaviour is a possession of some other concept. As a possession, it is a quality or ability that is a state attributable to the possessor. This information alone, however, is insufficient to distinguish the meaning of a referent for either a verbal or non-verbal compound. Therefore, it is now necessary to consider the dependency relations between the two constituents of the compound.

It is the prerequisite of the presence of the dynamic property as part of the verb root's meaning that determines the well-formedness of an -er word as a constituent of a compound noun. It is a characteristic found not only for the head but also for the dependent, e.g. player-manager. One explanation is that only the dynamic verb is linked to the semantic network containing an agent argument. But another explanation which adds weight to the previous one, may be due to the compound as a device for naming relevant acts. That is to say, that in order to achieve the maximum communication value for the device, in addition to carefully selected constituents, the entities referred to have to be observable. As Ljung points out, statements on what a person thinks or feels can only be interpretative, i.e. the speaker makes a judgement of the state of another person's

mind, on the evidence of what is observed. Therefore, in trying to be as relevant as possible with a naming device like a compound, there is greater certainty that the hearer will infer an appropriate interpretation if the word refers to something tangible. In this connection, dynamic activity is observable.

4. Grammatical Relations

In section 3.3. it is shown that affixation is not a criterion for semantic differences between the verbal compound and the non-verbal compound. Therefore, variation in meaning occurs at what has been identified as a second stage of Roeper and Siegel's compounding procedure, i.e. between the constituents. In such case, a wider scope of the semantic network than has hitherto been considered is needed in order to include the interrelation between thematic structure and the grammatical relations of words.

One of the characteristics of compound meaning is the concept of dynamicity, which contrasts actions with states. In the present theory, this feature is similar to Jackendoff's general concept 'cause', but dynamicity is to be preferred because it is not associated, as cause is, with the concepts of effect and purpose. Examples of utterances are found where the concepts of effect and purpose are absent.

- (54)(a) Mary accompanied Sue on her shopping trip.
- (b) Leaves fall during the Autumn.

(54)(a) does not convey that Mary has an intention to buy something. Similarly, in (54)(b) the effect of trees becoming bare in Autumn, through loss of their leaves, is presupposed from what is known about trees.

The concept dynamic has two semantic arguments, rephrased in Word Grammar's metalanguage as companion roles, which are an individual and an event. In the previous section, the individual is identified, at a more specific level of interpretation, as agent. The level of specificity is the activity model. The relationships between the companion and the model are described thus. The agent is an argument of the activity model, which has an atomic concept, i.e. dynamic. The latter has a companion, which is an individual and which is instantiated by the agent argument. Similarly, at the specific level of state model, the individual argument may be instantiated as Theme. Jackendoff defines Theme as an affected entity. Given that the agent argument differentiates the event model, the latter has two individuals as arguments; a feature which is accounted for by the general concept of change that accompanies events. Change also has an individual as an argument.

In contrast to the simple dichotomy between agent and Theme (as applied by Jackendoff), an agentive subject is already identified as actor or instrument. Likewise, the feature of animacy applies to Theme (i.e. affected). Consequently, animate and inanimate Thematic objects are found to occur with dynamic verbs, e.g.

- (55)(a) John gives the book to Mary.
- (b) Mary hits the ball.
- (c) Sue hit Mary.
- (d) The teacher trains the children.

In order to distinguish between the semantic concepts for animate and inanimate objects, I shall use recipient for the more specific animate Theme and retain the use of affected for an inanimate Theme.

It is noted previously that the agent argument is synonymous with the syntactic subject of a sentence referring to an event. Similarly, the Theme argument is assigned to the object in a typical active sentence. With the utterance referring to a particular

event, the agent and Theme are participants of it (i.e. actants: Tesnière, 1959). But, when language focusses on different aspects of the event, the typical structure is altered to account for the deviancy. For example, if the event is viewed at a point in past time, or the affected entity is prioritised, the subject may be seen as the participant, that is the manner of the event, i.e. codified by the (by + agent) phrase.

In such event, the subject's referent remains a participant of the semantic scene, but its role has changed. However, if this role is relevant to the scene referred to by the lexical verb's meaning, it remains within the lexical verb's government. The status of the subject is similar to that of the dependents, instantiating the roles of location, purpose, Theme, etc., in that its presence is sanctioned by the lexical verb, whose meaning is linked to a specific semantic frame (Fillmore., 1975).

Participants of a semantic scenario contrast with optional arguments which are circumstantial (i.e. 'circostants', Tesnière, 1959).
For example,

- (56)(a) The children are trained by the teacher.
- (b) Recently we ate pizza .
- (c) They ate food in a hurry .
- (d) He shaved in a hurry.

In a hurry in (56)(c) is similar to the by phrase of (56)(a), in being an adverbial phrase of manner whose presence is sanctioned by the lexical verb eat. Eat is a transitive verb which takes an indirect object. It contrasts with the verb shave in (56)(d), which is intransitive. Hence, the prepositional phrase in (d) is optional and similar to the sentential adverb recently in (56)(b). Their presence is sanctioned by the general verb model.

Hence, the following types of dependents are identified for a dynamic verb: the subject, which is not governed by the lexical verb, and the object, which is lexically determined, and which comprises two types, direct and indirect. In addition, there is a fourth type of dependent, an optional dependent, whose presence is determined by the general verb model. It is noted that this dependent and the indirect object instantiate similar semantic arguments (e.g. compare (56)(b) with (c)). To distinguish between the two, the term peripheral will be used for the optional argument and that of adjunct for the indirect object (Matthews, 1981).

Returning now to the compound noun, on the basis that in Word Grammar words account for the behaviour of word-structure and utterance structure alike, the dependents of the compound head must instantiate one type of dependent, excluding the subject (see previous section), i.e. one of the two lexically specified modifiers or an optional dependent.

I agree with the claim of the two previous theories that the dependents are sanctioned by the lexical verb (as opposed to the general verb model). In the light of the distinctions discussed above, these will be actants and adjuncts. Although the distinction between actant and adjunct dependents is unclear in Selkirk's theory, the earlier assumption that the dependents of non-verbal compounds are lexically specified would support this observation. Referring back to her sources, Jackendoff and Gruber, the Theme argument is represented in the meaning of the verbal compound and other thematic arguments by the non-verbal reading. It follows from the claim about the dependents that the difference between the compound types is that the intra-word dependent of the verbal compound is an actant and of the non-verbal compound is an adjunct. This correlates with the findings of Chapter III on the subset of verbal compounds for Selkirk's theory.

The conclusion that compound nouns include both actant

and adjunct dependents is confirmed by Downing's observations on the 'cognitive proximity' of the constituents. In order for this condition to apply, the two arguments of the conceptual model instantiated by the referent of the syntactic constituents would have to belong to the same cognitive scenario. By collapsing semantic and cognitive knowledge into a single network, Word Grammar is able to incorporate Selkirk's and Downing's observations into the Grammar.

The referent of a dependent which is an actant or an adjunct, instantiates an argument of a cognitive model to which the referent of the compound's head is linked.

[first word of compound noun] is an actant of head of ditto
 [first word of compound noun] is an adjunct of head of ditto

referent of [first word of compound noun] is Theme of
 referent of head of ditto

referent of [first word of compound noun] is Location or
 Purpose or Manner of referent of head of ditto

The dotted line represents the remainder of those semantic concepts that may be instantiated by lexically specified adjuncts.

In reaching the conclusions of the previous paragraph, it is assumed that Downing's observations on root compound nouns similarly apply to non-verbal compounds. The evidence of the previous section that nouns are linked to the semantic network of their counterpart verb supports this assumption. However, it has not yet been established that the referent of the head of a root compound is also linked to the semantic network of the same type as that for verbal and non-verbal compounds. Nevertheless, semantic investigations by Lees (1970) and Gleitman and Gleitman (1966), which include root compounds as part of their data, suggest that this is the case.

Given Word Grammar's working hypothesis that word properties sanction the well-formedness of word and utterance structures, together with the claims that referents of nouns and verbs share the same cognitive network, the principles for the interpretation of verbal and non-verbal compounds should apply to root compounds. An analysis showing the similarities will be the concern of the next section, where the remaining problem of discriminating between interpretations of verbal and non-verbal compounds will be confronted. At this stage of discussion, however, two operating instructions are proposed, which enable a syntactic distinction to be made during the interpretative process, i.e.

if actant is [first word of compound noun] then ditto
is a verbal compound

if adjunct is [first word of compound noun] then ditto
is a non-verbal compound

The interpretation procedure for examples of the compound types referred to in this section are as follows.

1. -er Compound Noun: roadsweeper

word-roadsweeper is (a compound noun)
compound noun has two parts
parts of word-roadsweeper is a (word-road + word-sweeper)
second word of compound noun is head
second word of word-roadsweeper is word-sweeper
word-sweeper is a (-er noun)
parts of -er noun sweeper is (a word-sweep + an affix -er)
counterpart of word-sweeper is word-sweep which is an action
-er noun sweeper is an animate noun
referent of word-sweeper is an agent and person of referent
of counterpart word-sweep
[first word of compound noun] is an actant of head of ditto
first word of word-roadsweeper is word-road
word-road is actant of word-sweeper
word-road is Theme of word-sweeper
word-road is (inanimate noun)
word-road is affected Theme of word-sweeper

2. -ing Noun Compound: birdwatching

word-birdwatching is (a compound noun)
 parts of word-birdwatching is a (word-bird + word-watching)
 second word of word-birdwatching is word-watching
 word-watching is a (-ing noun)
 counterpart of word-watching is word-watching which is
 a participle verb
 referent of word-watching is durative action of referent
 of counterpart 'word-watch
 referent of word-watching is act of referent of
 counterpart .word-watching
 first word of compound noun is an actant
 first word of word-birdwatching is word-bird
 word-bird is actant of word-watching
 referent of word-bird is Theme of referent of word-watching
 word-bird is(an animate noun)
 referent of word-bird is recipient Theme of referent
 of word-watching

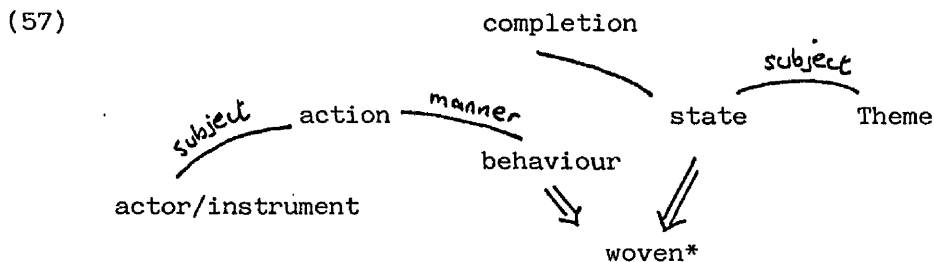
The -en adjective differs from the previous two examples because, according to the lexicalist theories of the previous chapter, its subcategorisation frames undergo deletion. However, it is not so much a matter of deletion as the re-allocation of functions for the different arguments. For example, the state model has a prepositional link with an agent in its companion role as a concept of manner, e.g. the adjunct [by + agent] but not with the subject role for an activity. The subject of a state is always Thematic.

The explanation for the re-organisation is that specific properties of instances override the automatic inheritance of more general arguments. For example, the concept of completion for an instance of an action model is overridden by the companion role of final state, which is a property of an instance of a behavioural model. With each deviancy, the forms of the semantic network alter, because individually inherited propositions affect the type of companion arguments to which the model may be linked. For example, the dynamic property has a companion change. Change itself implies that something

happens in time. Therefore, one of the companions of change is time. In connection with the concept of duration, time is not identified as individual points of time on a dimension of linear movement. Therefore, although time is not directly entailed within the meaning of duration, it is a latent concept associated with it, because there is a propositional link between the companions of time and change.

It is through the shift in companion relations that the anomaly in the instantiation hierarchy occurs, as there is an occurrence of an action and a state model. Earlier it was noted that these models have different functional companions as subject. The action model has an agentive subject and the state has a Thematic companion. The two previous theories resolve the anomaly for the -en adjective by positing an affix rule, which formulates the change in semantic roles as a movement rule, i.e. 1 2 3 \rightarrow 3 2 1. However, in Word Grammar the shift in semantic roles is explained as part of the general principle for organisation of information, i.e. the Selective Inheritance Principle.

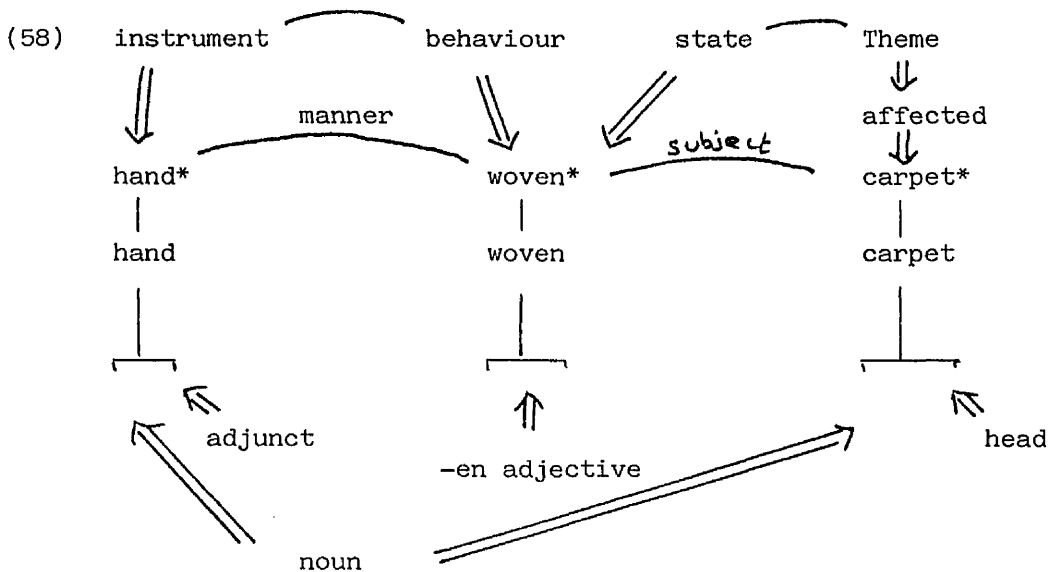
The stage at which the two concepts of agent and Theme are present within the semantic network of the -en adjective is when the adjective's referent inherits the concept of final state as an instance of completion. For example:



(57) shows that the Theme argument may be exploited by some co-occurring word of the -en adjective. The actor argument of the action model is also available within the semantic network for exploitation by

some co-occurring word. However, the latter is only indirectly connected to the behaviour model as a companion of a companion concept, whereas Theme is immediately connected to the state model, of which the adjective's referent is an instance.

Since the properties of the most specific concepts have precedence over any other arguments higher in the network, and the state model is part of the meaning of the -en adjective's referent, the argument of Theme as subject overrides that of actor. This is despite the fact that both state and Theme are more general concepts than action or actor. The subject function may then be instantiated by the head of the adjective, whose referent will be the affected or recipient of the state instantiated by the lexeme's meaning. This leaves the actor argument available within the semantic network for exploitation by the adjective's dependent. Since the semantic correlate of an actant as dependent is already part of the proposition of the state model, the only available companion links are those associated with adjuncts, i.e. actor is part of the manner proposition for the behaviour model that has action as part of its meaning, e.g. handwoven carpet.



This analysis of the role of the adjunct offers the interesting

possibility that it is a signal for the exploitation of propositions that are higher in the network than those instantiated by the actant. In such case, there is a gradual progression of generality for each type of dependent. That is to say, the actant is an argument of the lexeme's referent; the adjunct is an argument of the model of the lexeme's referent; and the peripheral is an argument of a model of a model of the lexeme's referent.

3. -en Adjective Compound: hand woven

word-hand woven is (a compound adjective)
 parts of word-hand woven is a (word-hand + a word-woven)
 second word of word-hand woven is word-woven
 word-woven is an -en adjective
 counterpart of word-woven is word-woven which is a
 participle verb
 referent of word-woven which is a verb is a completed
 action of referent of counterpart word-weave
 referent of word-woven which is an adjective is behavioural
 state of referent of counterpart word-woven
 first word of compound adjective is an adjunct
 first word of word-hand woven is word-hand
 word-hand is (an inanimate noun)
 referent of word-hand is instrument of referent of word-woven

Having examined the instantiation network for the -en adjective in more detail, the following observations are made. Only one operating instruction applies to the -en adjective compound, i.e. that which identifies the first word as an adjunct. Therefore, the -en adjective always has a non-verbal interpretation. Secondly, an explanation is given for the control on Thematic relations exhibited by Jackendoff's Thematic Hierarchy Condition. The condition is an observance of the Selective Inheritance Principle. The referent of a lexeme, which is an instance of a state, has a subject companion that is a Theme, e.g. (58). In contrast, the referent of a lexeme, which is an instance of an action, has a subject companion that is an agent, e.g. (61) below. The ordering of the other companion roles in the state hierarchy suggests that arguments like location, etc. correspond to the manner argument of (57) in degree of generality,

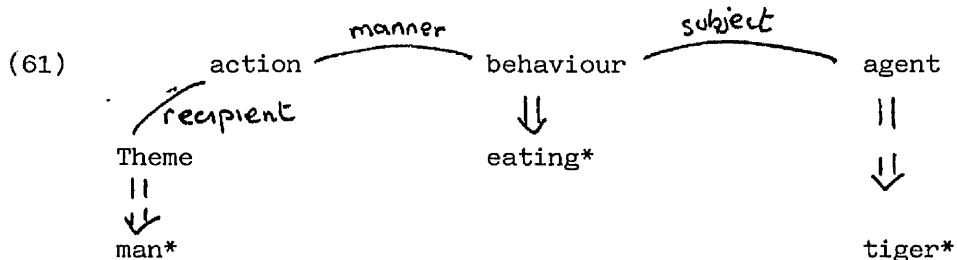
with the agent being the most general, thus corresponding with a peripheral dependent of a lexemic state, e.g.

(59) The carpet was woven by hand by a group of men

Thirdly, the -en adjective contrasts with the -ing adjective, which has a verbal compound reading, e.g.

(60) man-eating tiger.

Within the instantiation hierarchy of an -ing noun there is no state model (see (35)). Therefore, the agent and Theme arguments are inherent to the semantic network of this word-type. Hence in (60) tiger is the agentive subject of the -ing adjective eating and man is the actant of eating instantiating a recipient concept of the more general Theme argument. Again, here, there seems to be a gradience of exploitation of companions in connection with the models of the -ing noun's referent. For example:



If the hierarchy condition is a reflection of generality, the adjunct of the lexeme eating (Adj) will be further up the hierarchy than the Theme argument, i.e. a companion of the activity model. As an instance of an activity, an action may inherit the argument of location, e.g.

(61) John is eating his supper in the kitchen

This would be an argument that is more remote from the behaviour model and less easily accessible for interpretation than the Theme argument. Hence, the less likely non-verbal reading of examples

like Selkirk's tree eater , i.e. 'eater in trees'.

4. -ing Adjective Compounds: man eating

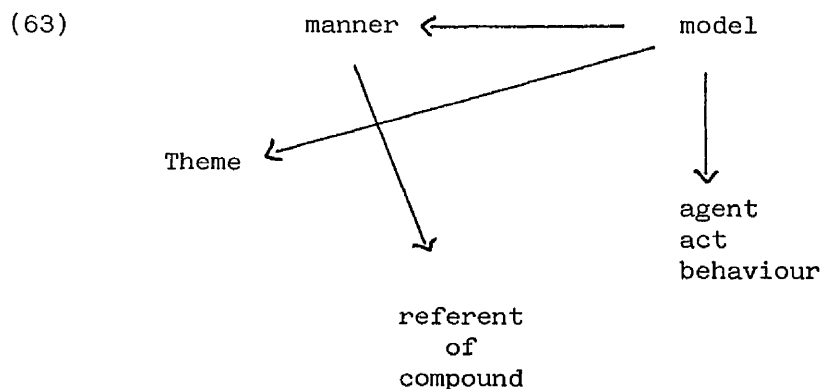
word-man eating is(a compound adjective)
 parts of word-man eating is a (word-man + word-eating)
 second word of word-man eating is word-eating
 word-eating is -ing adjective
 counterpart of word-eating is word-eating which is a
 participle verb
 referent of word-eating which is a verb is a durative
 action of referent of counterpart word-eat.
 referent of word-eating which is an adjective is behaviour
 of referent of counterpart word-eating
 first word of compound adjective is an actant
 first word of word-man eating is word-man
 word-man is (an animate noun)
 referent of word-man is recipient of Theme of referent
 of word-eating

To sum up. In this section, an analysis of the intra-word dependents of the compound has shown that actants and adjuncts are part of the composition of verbal compounds. But it is only those compounds whose first word is an actant that have a verbal interpretation. Hence, the definition of a verbal compound is one whose semantic structure includes a Theme argument (as opposed to other lexically specified arguments).

However, the application of the interpretation process for the compound noun and adjective has not provided evidence of the referent for the lexical compound, i.e. the 'missing link' to which Downing refers. To identify this we need to consider the compound as a whole. The role of the internal head is claimed to be the entity of which the compound is an instance: e.g. roadsweeper is an instance of sweeper. An alternative description given to the compound is that it is a type of entity denoted by its head, e.g.

(62)	(a) roadsweeper (b) bird watching (c) hand woven (d) man eating	} type of	[agent = sweeper act = watching quality = woven behaviour = eating
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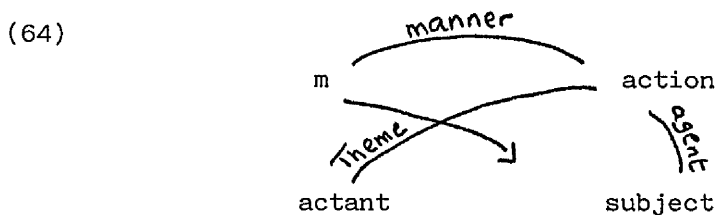
Each of the compounds referred to in (62) is identified as a type of entity by virtue of the mode of activity referred to by the verb, i.e. the manner of the action. Therefore, I propose that the missing link for the verbal compound is the general concept of manner. It is this concept which provides the basis on which the significance of the compound's referent has classificatory relevance when the compound is used.



Although (62) lists an example of an -en adjective, it is not included within the scope of the claim regarding the missing link. We have yet to establish whether there is a similarity between the verbal and non-verbal compound readings before this claim could be justified. It seems, however, that one conclusion to be reached from the evidence so far is that a constraint exists on the exploitation of arguments for the semantic network of any particular lexeme. This is that any individual concept of the instantiation network may only be exploited once. Hence, a verbal reading cannot be assigned to an -en adjective compound because the manner argument is already exploited by one of its constituents. In this connection, sequencing

of syntactic dependents according to the adjacency principle cross-refers to the generality of concepts of the instantiation hierarchy.

The identification of the concept which, according to Downing, has to be worked out, does not undermine her claim. The nature of the concept manner has to be inferred by what speakers know of the compound's head model and this will depend on the individual's experiential knowledge. Since this is the factor which provides the greatest influence on variations of word meaning, the hearer's understanding of the compound's referent will depend on the amount of known information, and that supplied by the context of the compound's use. That is to say, the concept of manner will vary for each speaker. A diagrammatic representation of the action network instantiated by the verbal compound is as follows:



m = missing argument

Propositions referred to in this section are as follows:

[first word of compound noun] is an actant of head of ditto
 [first word of compound noun] is an adjunct of head of ditto
 referent of head of compound noun is subject of counterpart
 referent of [first word of compound noun] is Theme of referent
 of head of ditto
 referent of [first word of compound noun] is Location or Purpose or
 Manner of referent of head of ditto

Operating Instructions:

if actant is first word of [compound noun] then ditto is a verbal
 compound

if adjunct is first word of [compound noun] then ditto is a
 non-verbal compound

4.1. Non-Verbal Compounds

Non-verbal compounds are word-types that contain an adjunct in first word position. This set of compounds comprises morphologically simple and complex word-forms as constituents.

In this section, I intend to show that non-verbal compounds (as defined by Selkirk, 1981/2), and root compounds containing morphologically simple constituents, exhibit a similar pattern of organisation and are subject to the same interpretation principles as verbal compounds. I shall begin with those non-verbal compounds that have a similar formal representation to verbal compounds, i.e. the head is an -er, -ing or -en word.

In the previous section it is argued that the functional concepts of agent, Theme, subject and actant are exploited to determine the missing argument that is inherited by the verbal compound noun's referent. That is to say, the noun's role within a given semantic scene, determined by the action verb, is identified. Non-verbal compounds are also connected to the semantic network of some dynamic model, but the propositional links are extended to include cognitive information. The identity of a cognitive model determines the companion role of the adjunct. This is equivalent to saying that the meaning of the lexeme determines its adjunct's role.

The identity of the cognitive model is established by the relative concept, which is a property of the non-verbal compound. Recalling Selkirk's analysis of non-verbal compounds, the word-type exploits the properties of nouns in general, i.e. the head noun's identity as a physical or abstract object. This is in contrast to its functional role for the verbal compound. As a general entity, the concept of the noun is part of some defined schema, which can be identified by applying wh-/that S to specify the noun's semantic

content (Langendoen, 1971:344). Rephrased within Word Grammar's framework, the noun's model, e.g. physical object, has an argument which is a relative concept

referent of noun has a companion
companion of noun referent is a relative concept

and this concept specifies a definite scene of which it is a part

relative is a definite model

As a consequence, that portion of the noun's referent that matches the semantic network to which it is connected identifies its meaning. Since the semantic network is an instance of some cognitive model, the noun's identity is linked to a model of information that is known to the speaker

possessor of knowledge of definite model is speaker

Therefore, the paraphrastic meaning of the defining relative clauses provides deictic information on the semantic content for non-verbal compounds known to the speaker.

A paraphrastic interpretation of the verbal compound has the format X of Y, e.g. 'eater of trees', where the linker 'of' introduces the actant/Theme. In contrast, the non-verbal compound reading 'eater in trees' has a relative concept, i.e. 'one who eats in trees'. It is recalled that the function of the relative concept is deictic and indicates definite knowledge concerning the entity that it modifies (see Chapter II).

In the environment of a compound word structure, the relative concept is linked to a model of the head's referent and points to a specific cognitive scenario, of which the meaning of the lexeme is a participant. For example, the head of cave dweller

has two models, agent and person. If the person model is exploited for information, instead of the agent model, then the concept of person has the same relation with the cognitive scene, e.g. 'person who dwells'. Hence, the relative concept is defining within the context of a known semantic field, e.g. 'dwell'.

The question arises as to what is being deictically indexed by the relative concept. I suggest that the answer is that the relative links an identifying property of the semantic model with the head's referent, thereby defining the latter's relevance to the semantic field. For example, cognitive models have observable deviant properties that separate them as recognisable states of affairs. The concept of 'dwell' contrasts with 'abide' because part of its structure has a property of location. This specific concept must be part of the propositional network in order that it is identified as a separate state of affairs. A parallel situation is found in syntax for verbs of incomplete predication, inasmuch as the meaning of this type of verb is only understood when the referent of the complement is present.

In Word Grammar, the conceptual structure of a cognitive model is instantiated by the semantic network of a lexical referent. Therefore, if the meaning of 'dwell' has an inherent property of location through inclusion, it can be exploited by the interpretative procedure. Since the relative concept links the lexemic referent to a cognitive model, its function is to index the latter's deviant property as significant to the compound noun's meaning. Being the significantly identified property, the concept is instantiated by the referent of the adjunct, e.g. in caves denotes the property of location, which is part of the meaning of dwell for person who dwells in caves.

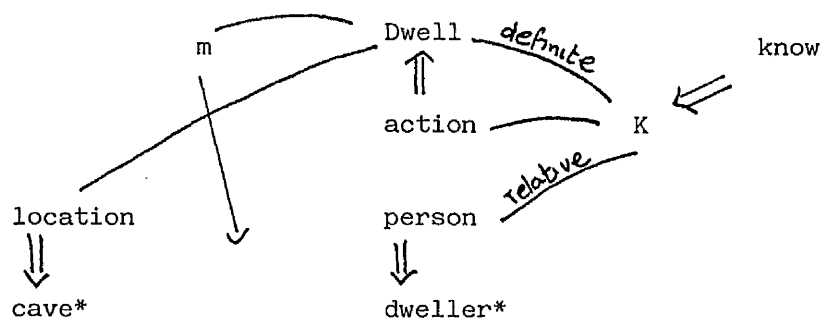
It then remains for the salient argument of the compound's

referent to be deduced from the information of the semantic network. This, however, is the task of the hearer, and the speaker assumes that the hearer is able to infer an appropriate reading. This assumption is made because the speaker and hearer possess shared knowledge about the conventions of the compound structure as a naming device (Downing, 1975:46,108) and the speaker expects that the hearer will have information of the link between the noun's referent and the cognitive model. The hearer will be assisted in this by the identity of the head noun.

knower of definite model is addressee

The problem with situations of shared information is that there will always be individual variation. Therefore, in order to guarantee the greatest communicative value, the concepts exploited by the non-verbal compound structure must be of a degree of generality similar to those referred to by verbal compounds. This is confirmed by the discussion in the above paragraphs on the deviant properties which individuate cognitive models. These deviances are concepts of a most general degree and additional to the functional concepts of the activity model. It will be shown below in the examination of the semantic models that the general concepts are just those instantiated by adjunct dependents. The following is a diagrammatic representation of the organised information for the -er non-verbal compound:

(65) cave dweller: person who dwells in caves



In (65) the person model has an argument relative which links it

to a definite action model dwell. This has an argument of location that must be semantically satisfied, e.g. by cave*. Since dweller* is the semantic subject of dwell, the missing argument, m, must be some participatory concept which is relevant to the identity of the specific action. That which distinguishes dwell from all other actions is its manner as a state of affairs. Therefore, the salient concept for this compound noun is the argument of manner. The following is a list of propositions for the interpretation procedure of (65) above:

word-cave dweller is(a compound noun)
 parts of word-cave dweller is a (word-cave + a word-dweller)
 second word of compound noun is head
 head of word-cave dweller is word-dweller which is a noun
 parts of word-dweller is a (word-dwell + er suffix)
 counterpart of word-dweller is word-dwell
 word-dweller is(an animate noun)
 referent of word-dweller is a person
 person has a relative
 relative is definite model
 model is dwell
 dwell is an action
 dwell has(location)
 referent of word-dweller is subject of dwell
 first word of word-cave dweller is an adjunct
 first word of word-cave dweller is word-cave
 word-cave is(an inanimate noun)
 referent of word-cave is hole
 hole is location of dwell

The remaining argument will be part of some propositional link with the model and which is deduced from the given information of the propositional links with the referents of the compound's constituents. This procedure is formulated by the following operating instruction

If W is X of Z and Y is subject of Z, then Zm is property of WY

Since the meaning of the head of the compound is always the subject of the counterpart model (which in the example is dwell) the instruction may be reduced to

If W is X of Z, then Z_m is property of WY

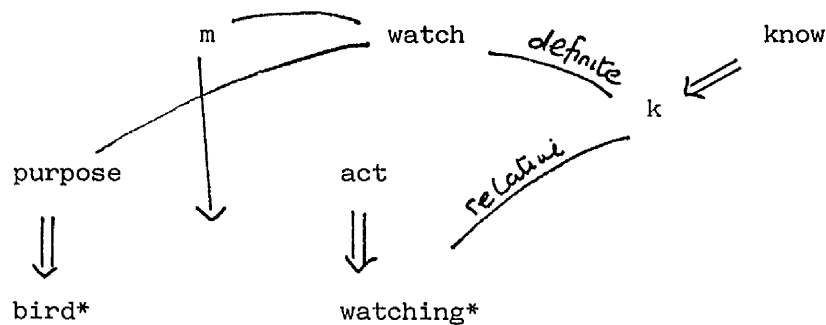
For example, where Z_m = manner

If hole is location of dwell, then manner is property of cave dweller

Hence, the meaning of the compound cave dweller will be some specific interpretation of the above instruction with the approximate reading given in (65) above.

Turning now to the -ing compound noun, a similar interpretation procedure applies, mutatis mutandis. For example, a non-verbal reading for the compound noun birdwatching is 'act which is watching for birds'. This contrasts with the verbal meaning, involving the behaviour of watching birds. The inherent argument of the cognitive model is purpose.

(66) birdwatching: act which is watching for birds



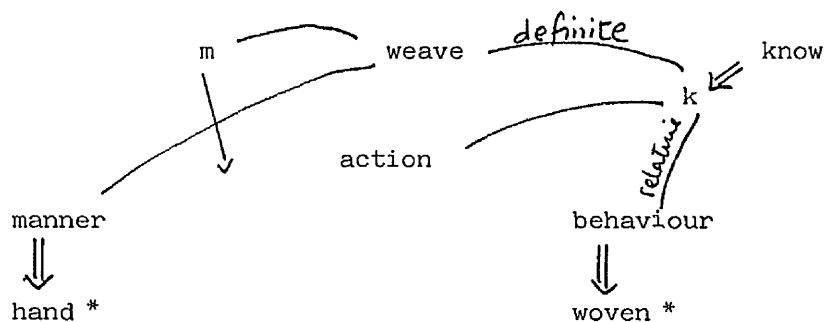
word-birdwatching is (a compound noun)
 parts of word-birdwatching is a (word-bird + word-watching)
 head of word-birdwatching is word-watching which is a noun
 counterpart of head is word-watching
 word-watching is a noun
 referent of word-watching is an act
 act has a relative which is a definite model
 model is watch
 watch is an action

watch has(purpose)
 referent of word-watching is subject of watch
 first word of word-birdwatching is an adjunct
 first word of word-birdwatching is word-bird
 word-bird is(an animate noun)
 referent of word-bird is fowl
 fowl is purpose of watch

Again, the relevance of the identity of the missing argument is the type of action denoted by the counterpart of the head's referent, i.e. watch. Following the procedure of the previous example, a similar argument of manner is identified, as that which is most salient to the compound's meaning.

With regard to the -en adjective, certain conclusions have been reached in the previous section on the role of the adjective's dependent, namely, that it can only function as an adjunct to the -en adjective head. This is because the argument of the action model is the only available companion role within the semantic network instantiated by the lexeme's referent (i.e. the behaviour model). The argument of its second model is instantiated by the referent of the adjective's syntactic head. If the above interpretation procedure is applied to the -en adjective to include the identity of a specific cognitive model, these conclusions are vindicated.

(67) hand woven: behaviour of weave by hand



In addition, the instantiation of the manner argument by the adjunct is confirmed. There is a caveat to this, however. In the example,

manner is interpreted as a specific method of achievement. Part of the meaning of weave is the method which involves the interlacing of threads. This may be carried out either by hand or on a loom. However, under the Principle of Best Fit, which provides for deviancy in the instantiation hierarchy, the referent of hand may override the normally expected concept for weave in terms of the instant used.

This particular example provides insight into the effect of cultural development on shifts in meaning. The existence of machines to replace manual labour gives priority to the machine as a concept, which is part of the process of weave. Hence, the normally expected collection of properties for the semantic model includes the concept machine; whereas prior to machines, and in small communities engaged in cottage industry, the concept of hand may be part of the model instead.

It is observed with the above example that the manner argument correlates with the actor argument of the action model. This further substantiates the earlier claim of reorganisation for companion roles in connection with the [by + agent] dependent. The action model for the -en adjective is part of the lexical meaning by inclusion, but its arguments cannot be exploited for the functional roles, e.g. subject. This is invoked in connection with the state model, which is a specific property of the lexical referent.

Another conclusion reached earlier is also confirmed, i.e. the manner argument, is already exploited by the interpretative procedure. Therefore, the remaining unidentified argument must be some other participant of the semantic network. In this case, I suggest that the participant is quality or condition. This is a specific concept of composition, and one which overrides the more general concept of change in the semantic hierarchy

of the state model. As a consequence, quality is made relevant by the identity of the manner in which the action is completed. Hence, the following proposition is formulated as part of the meaning of the -en compound adjective

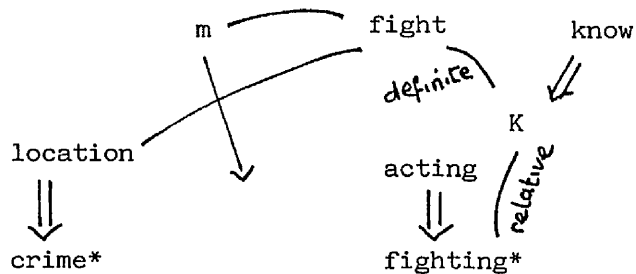
companion of definite completed action is quality

and the propositions listed below complete the interpretation procedure given in the previous section for the -en adjective hand woven

counterpart of behaviour is action
 behaviour has a relation
 reflection is a definite model
 model is weave
 weave has manner
 action has an actor
 actor is an instrument
 instrument is a manner

Another adjectival compound containing the -ing adjective as head has a similar organisational network, e.g.

(68) crime fighting: acting which is fighting against crime



In (68) the cognitive model has an argument of location, specifically against, which is instantiated by the concept of crime*. The referent's model, which is connected to the relative concept, is acting, and the specific lexical referent signifies the relevant cognitive model. The following is the interpretation procedure for (68) above:

word-crime fighting is(a compound adjective)
 head of word-crime fighting is word-fighting
 counterpart of head is word-fighting which is a verb
 word-fighting is an adjective
 referent of word-fighting is an acting
 acting has a relative which is a definite model
 model is fight
 fight is an action
 fight has(a location of against)
 referent of word-fighting is subject of fight
 first word of word-crime fighting is an adjunct
 first word of word-crime fighting is word-crime
 word-crime is(an inanimate noun)
 referent of word-crime is evil act
 evil act is locatïon of fight

A comparison with (67) above shows that the manner argument for (68) is not instantiated and is therefore available for exploitation as the missing concept. Hence, the -ing adjective compound may instantiate some property of its head, where the manner of the fighting is relevant. Compare crime fighting cop with crime fighting citizen, where the manner of the activity describing cop contrasts with that for citizen.

To recap. It is seen that all the non-verbal compounds examined so far exhibit similar semantic networks, linking the referents of the constituents with the appropriate arguments of the cognitive model. This, in turn, allows for the derived proposition containing an unspecified argument for the compound's own referent to be inferred on the basis of the information available.

It is noted that the counterpart of the non-verbal compound's head is an action model. This corresponds to the identity of a similar counterpart model for the verbal compound (see previous section). On the evidence presented at this stage in the analysis, a generalisation regarding morphologically complex compounds can be formulated:

counterpart of non-verbal compound noun is an action

In addition, it is observed that, with the exception of the -en adjective compound, the compound noun's referent includes the concept of manner, i.e.

referent of [compound noun] has manner of referent
of counterpart (head) of ditto

As the counterpart of the non-verbal compound's head is specified by the relative argument, an operating instruction to this effect will differentiate between the verbal and non-verbal meanings.

if referent of [head of compound noun] has relative companion,
then model of counterpart ditto is a definite concept.

Since the head of the compound is the entity to be exploited first, then the speaker has two possible interpretations. But, different interpretations will result depending on which of the referent's models is selected (with the exception of the -en adjective, where the semantic network will be absent). Therefore, the proposition identifying the actant and adjunct roles for the first word of the compound may be reformulated to conform to the interpretation procedure.

if referent of head of compound noun has linker companion,
then compound noun has verbal meaning.

if referent of head of compound noun has relative companion,
then compound noun has non-verbal meaning.

The second set of compounds to be analysed here are root compounds. Root compounds contain two constituents that have morphologically simple representations. Hence, there are no overt verbal clues to the identity of the counterpart model that will help to define the type of semantic network linked to the compound's head. There are, however, two parameters of knowledge to assist speakers. First, it is observed that the functional concepts of subject, agent

and Theme are part of the structure of verbal compound meaning. In contrast, the non-verbal compound organises general concepts of a cognitive model identified by the lexical head. The concepts instantiated here are predominantly structural ones, e.g. the identity of dwell includes the concept of location. Secondly, there are two types of semantic concept that characterise the referent of the root compound: functional and compositional. Downing lists five instances of the functional concept; purpose, occupation, product, source and user; and seven instances of compositional concepts, i.e. part-whole, whole-part, part-part, comparison, composition, location and time. Although not exhaustive, these concepts are considered by Downing to form the basis for a semantic classification of compound categories, i.e.

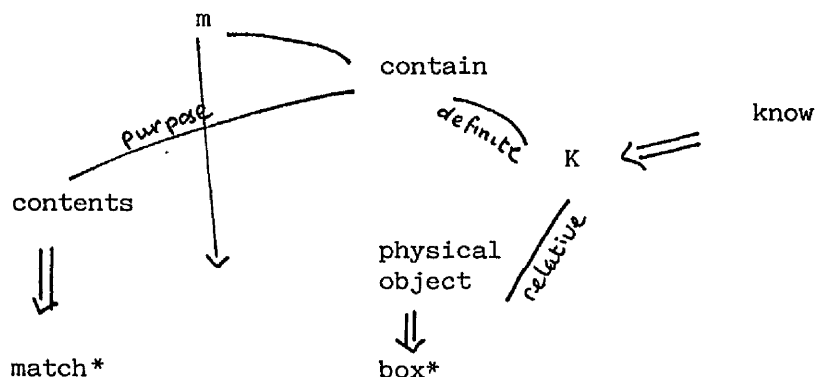
knowledge range of root compound noun is functional relation
 knowledge range of root compound noun is compositional relation

e.g. functional relation of root compound noun is purpose
 compositional relation of root compound noun is part + part

function of word-matchbox is purpose
 composition of word-player-manager is part + part

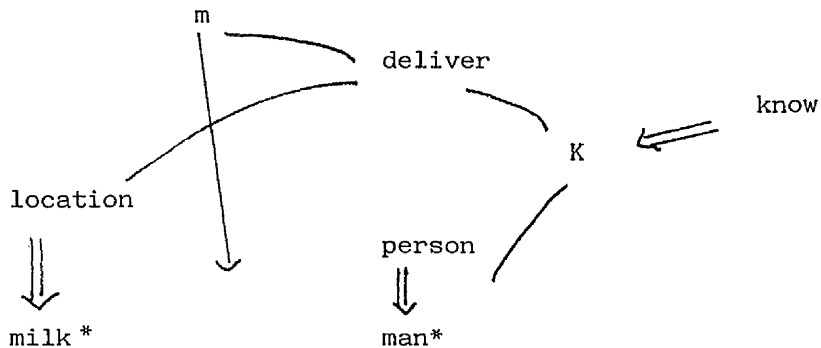
Using this knowledge and the operating instruction formulated above for the adjunct, together with the procedure adopted for previous compound nouns, the following analysis is presented for the twelve semantic types.

1. Purpose: matchbox - physical object which is a container for matches



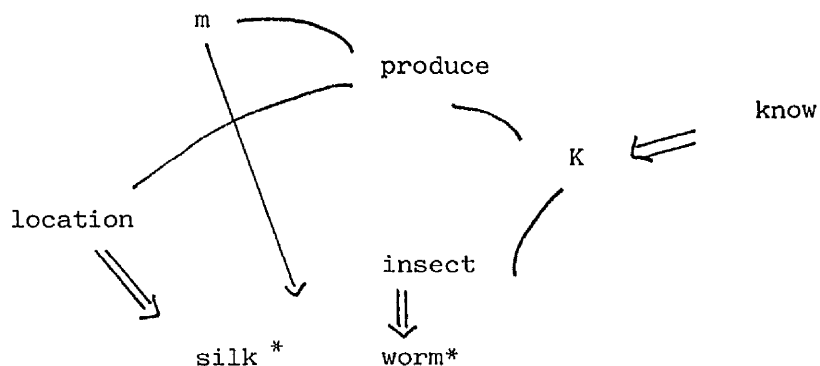
m = design: basis for inference of size
 action counterpart identified by definiteness (see explanation below)
 suggests verbal reading also accessible, i.e. box of matches, where
 box* is agentive subject of action and match* is Theme
 Concept of purpose is inherent in meaning of box as a container and
 instantiated by the dependent's referent, match*.

2. Occupation: milk man - person who delivers milk



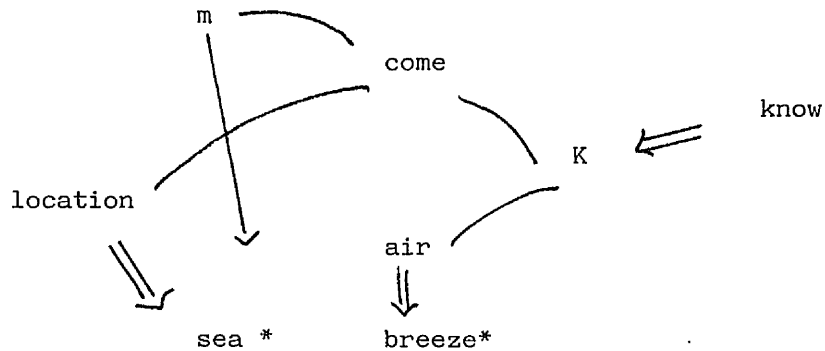
m = occupation: basis for inference on type of word
 Other referent model of head is agent and argument of counterpart,
 which is subject. Therefore, verbal reading accessible - possibly
 one who does work connected with Theme liquid*.

3. Product: silk worm - insect which produces silk



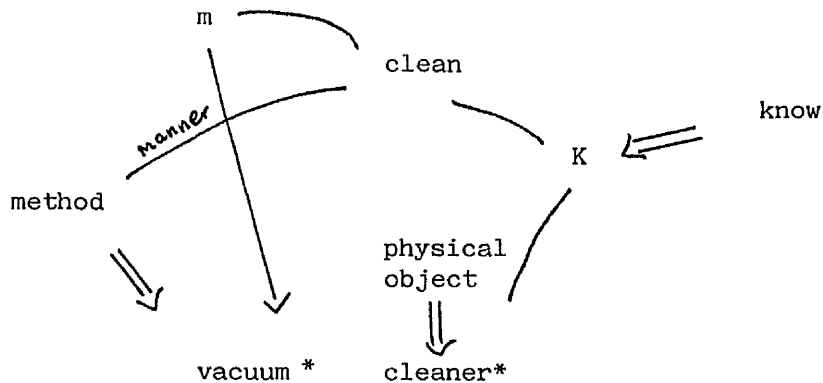
m = manner: provides basis for inference on type of produce
 Action counterpart suggests verbal reading also accessible
 head is agentive subject of action and silk* is the entity affected
 by the action carried out.

4. Source: sea breeze - air which comes from the sea



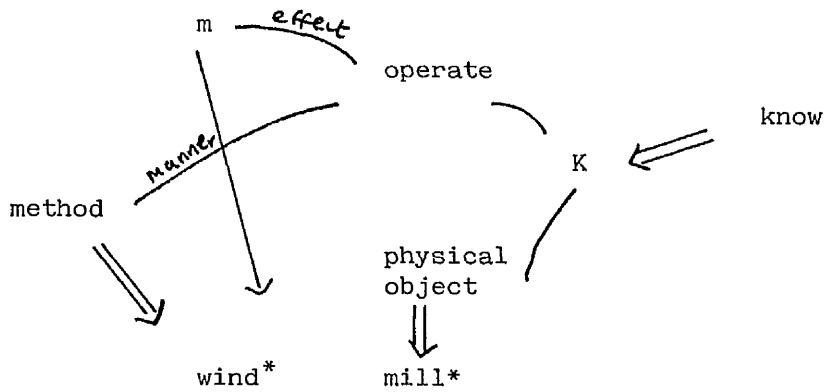
m = quality: basis for inference of type of breeze
 Verbal reading inaccessible because meaning of come has obligatory argument of location. Breeze* is Thematic subject of compound noun.

5. User: (a) vacuum cleaner - physical object that cleans by vacuum



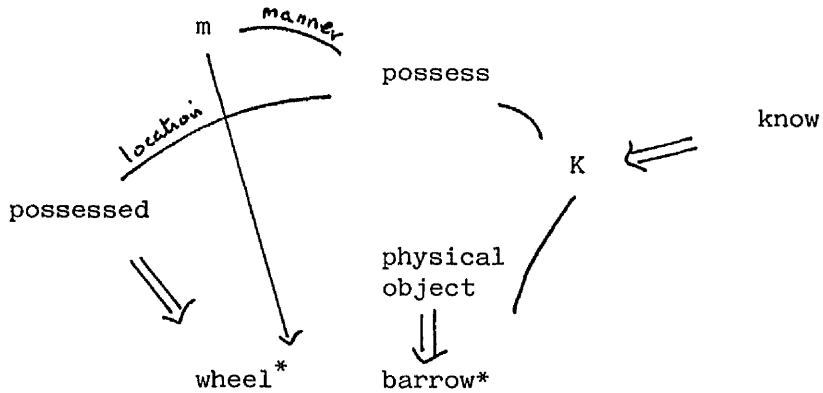
m = design: basis for inference of type of machine
 Verbal reading inaccessible because clean has manner argument

User: (b) wind mill - physical object which operates by air



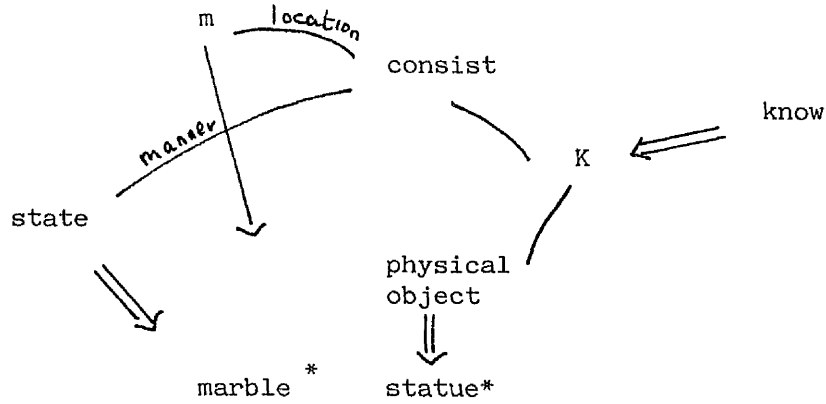
m = design: basis for inference of type of operator
 No verbal reading. Theme argument blocked by manner

6. Part-Whole: wheel barrow - physical object which possesses a wheel



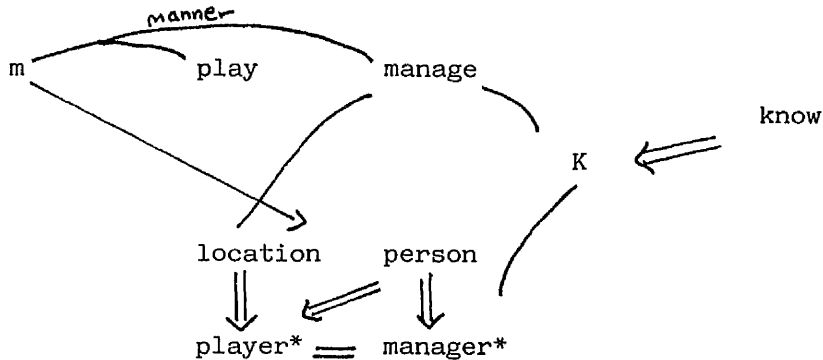
m = design: basis for inference of type of vehicle
 No verbal reading. Theme argument blocked by possessed

7. Composition: marble statue - physical object which consists of marble



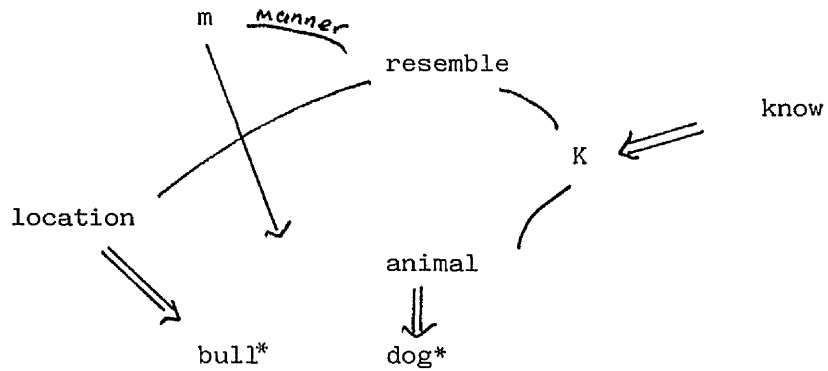
m = quality: basis for inference on type of composition of object
No verbal reading

8. Part-Part: player-manager - person who manages and plays



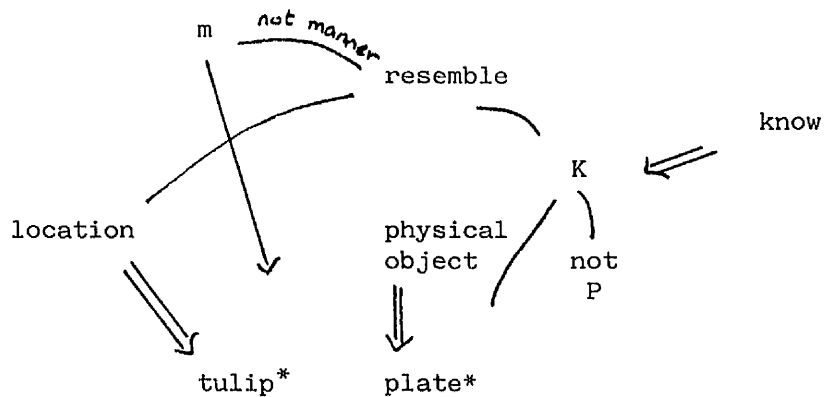
m = occupation: basis of inference on type of work
Verbal reading accessible because head is agentive subject and Theme fulfils actant role. However, this is an assumption that person models are not coreferential.
Conjunct link for m shows head = adjunct.
In addition, knowledge that part-part compound structure denotes equality indicates non-coreferentiality is overridden by the instance, i.e. compound word as instance of word.
The head shares similarity with other occupational compound-type of the functional class in having a second model which is agent.

Part-Part: (b) bull dog - animal which resembles another animal



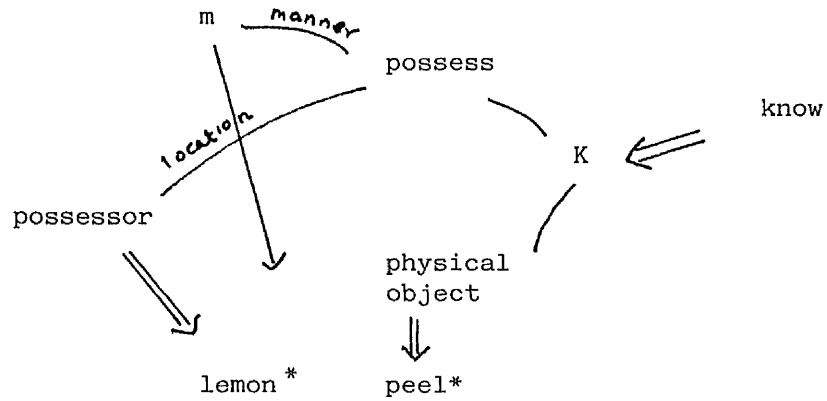
m = condition: basis for inference on type of dog.

9. Comparison: tulip plate - physical object which is not a flower



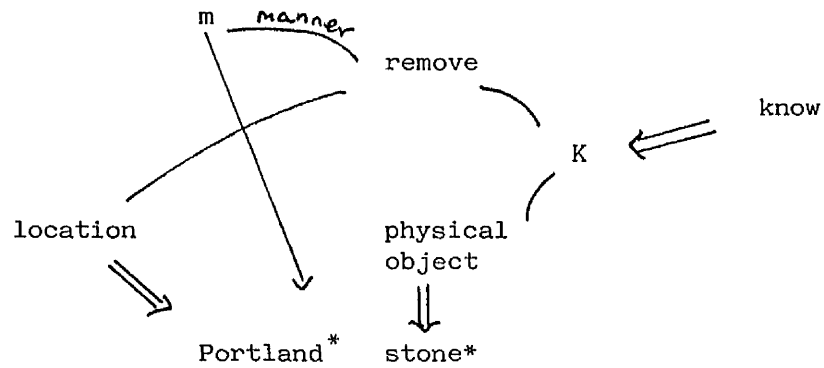
m = design: basis for inference on type of plate
 Not-concept part of knowledge range and matched by contrastive manner argument for m.

10. Whole-Part: lemon peel - physical object which is part of another



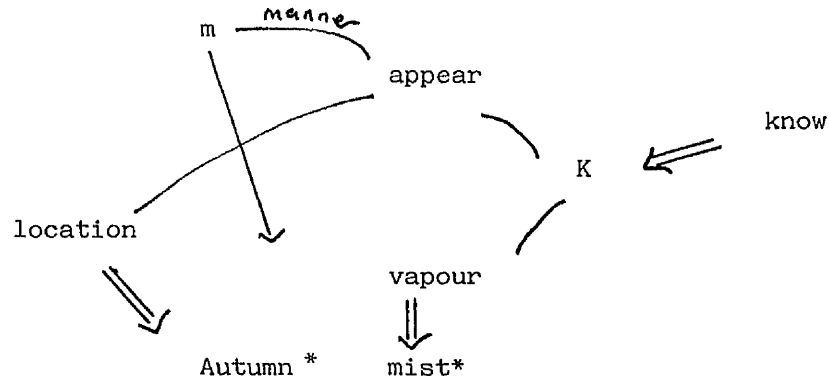
m = design: basis for inference on type of peel

11. Location: Portland stone - physical object which is removed from Portland



m = quality: basis for inference on type of stone

12. Time: Autumn mist - vapour which appears in Autumn



m = quality: basis for inference on type of mist
 The notion of time is semantically inherent to the meaning of Autumn, i.e. period of the year. Therefore, as an instance of location, time is part of the semantic network for the compound noun.

Details of the above are summarised in the following table of information for the semantic classification of compound nouns:

<u>Functional concepts</u>	<u>counterpart</u>	<u>missing argument</u>	<u>Head</u>
1. Purpose	relation	design	inanimate/synthetic
2. Occupation	action	occupation	animate
3. Product	action	manner	animate
4. Source	action	quality	inanimate/natural
5. User	action	design	inanimate/synthetic
6. Part-Whole	relation	design	inanimate/synthetic
7. Composition	relation	quality	inanimate
8. Part-Part	action relation	occupation condition	animate animate
9. Comparison	relation	design	inanimate/synthetic
10. Whole-Part	relation	design	inanimate/natural
11. Location	action	quality	inanimate/natural
12. Time	action	quality	inanimate/natural

From the table above it is noted that one of two types of states of affairs is identified as the counterpart for the root compound head: action or relation. The identity of an action concept supports the claim, on the notion of observational evidence, for compounding as a naming device; and the exploitation of a relational network confirms the relativity between compound constituents. The notion of relativity is implied syntactically by the attribute-attribuand companionship of the members.

But relational verbs contrast with activity verbs in not having an agent argument, e.g. the failure of adverbial tests for agentive subjects.

- (69)(a) *The box deliberately contains matches.
- (b) *The dog resembles a bull on purpose.

However, if the relational verb is embedded in a structure containing an agentive subject, the output is well formed:

- (70)(a) John purposely told me that the box contains matches.
- (b) They specifically state that the dog resembles a bull.

In each of the two examples above the connection between the participants of the embedded relation is identified by an agent who carries out some action that links the two participants together. As a result, relating two concepts together becomes part of the action, i.e.

relative is part of an action

Hence, where the above proposition applies, it will be associated with the dynamic concept that is an argument of the action model. For example,

- (71)(a) The box specifically contains matches.
- (b) The barrow possesses a wheel.

(71)(a & b) are well formed because the relation between the participants is being judged through an act of observance by the speaker who is making the connection. In other words, the relation is being made during the act of communication *by an agent*.

Turning now to the compound noun, the latter combines the referents of its constituents together to function as part of a 'relevant act'. Therefore, whenever the speaker utters an instance of a compound, the connection between the two constituents is observed as a relation within the act. Moreover, the compound noun is an act which, in turn, is an instance of an action model. Hence, under the Selective Inheritance Principle, the compound automatically inherits the relative concept which is part of its action model.

Thus, within the context of the compound device, the relative verb inherits a dynamic concept from the action model. However, since it is normally more like a stative verb, there is an absence of the property change which is usually a companion of the dynamic concept. In consequence, the behaviour of the relational counterpart is similar in degree of specified information to that provided by an -ing noun (which is also an instance of an act model) and is linked to a similar semantic network.

Finally, it is observed that the root compound, like the non-verbal compound, also exploits the pragmatic convention of including the speaker's knowledge as a participant of the event denoted by the compound as a whole. In this connection, the definite concept, which is a cognitive model, is instantiated by a semantic model that is part of a dynamic state of affairs.

The type of entities denoted by the compound heads include natural and synthetic objects, humans and animals. Of the twelve

semantic classes exemplified here, it is observed that five of these contain a (missing) argument of design. This set includes heads denoting synthetic and natural objects. The five are purpose, whole-part, user, part-part and comparison.

Two compound types include an argument for occupation, i.e. part-part combinations and occupation. Both of these word-types have an animate head. The manner argument characterises the producer compound types, whose head denotes a natural object. The other classes, composition, location, time and source, include the concept of quality. This concept is similar to manner for the verbal compound type inasmuch as its presence enables an inherent condition of the entity concerned to be identified.

Finally, only one example of condition and its derived concept, the ((not) condition), occurs, i.e. part-part and comparison. In Word Grammar, the negative concept is conceived to be simply another type of positive concept and, therefore, may be identified as part of a semantic network. Negative concepts are restricted in compound structure and only one other negative type occurs. This is found within a semantic network linked to a constituent that has a negative prefix. It only occurs word-internally where negation is morphologically indexed in this way on the first word of the compound, e.g. non-transformational grammar.

Negative prefixation does not occur to the compound head, because the concept of negation is a derived notion. This is to say, it is an instance of a positive concept, which is a counterpart to the negative. In connection with the compound head, its referent has two models, both or either of which have properties that would be negated. This would add extra effort in processing not only

the negative concept as a derived property of one of these models, but also in isolating the appropriate dependent's argument.

By contrast, negation of the first word is possible, because the entity represents an argument rather than a model. As a consequence, there is a positive counterpart already available within the semantic network. The argument role as a companion of the counterpart is known, making it relatively easy for a derivation of the not-concept.

A comparison of the semantic networks for non-verbal and root compounds demonstrates that their organisation is similar. In addition, the principles controlling the interpretation procedure are the same. Variation in the output of interpretation is due to the nature of the entities referred to by the constituents, the combination of companions which affect the derivation of propositions, and knowledge of conventions for the compound as a naming device. Understanding of the nature of the entity referred to by the head of the compound noun is also conditional upon the experiential knowledge of the speaker. This will evidently affect the kind of interpretation that will be given to the identity of the missing argument.

Whilst the specific propositional links of the semantic network for individual compound words are only identifiable on recognition of the lexical head's referent, and the nature of the particular argument inherited by the compound's referent is subsequently determined, one general pattern is observed. The recognition of the entity referred to by the compound word is made known by its identity as an instance of a more general concept. The method by which this is achieved is through the exploitation of either a functional or compositional concept typical of the entity. In this respect a parallel is drawn with the classification of real world entities using a single word. A generalisation of the operating instruction

for the compound noun is given by the following proposition

if W is X of Z, then Zm is property of WY

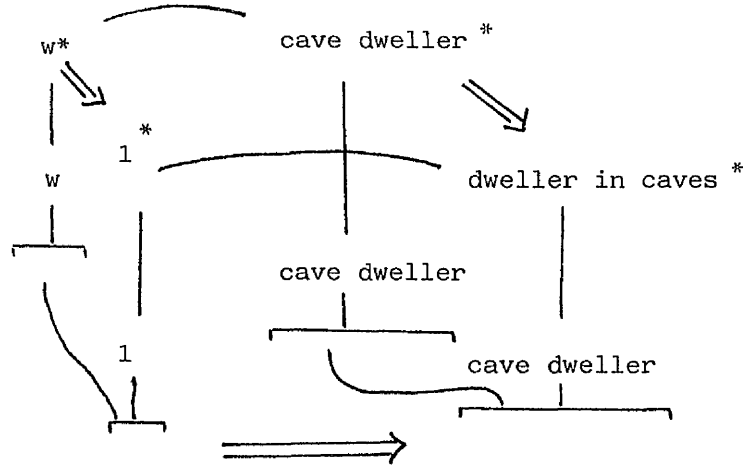
It will be recalled that this proposition is identified earlier in connection with the non-verbal compound noun. Hence, the procedure for non-verbal and root compounds is the same and a general proposition can be formulated for the compound meaning

referent of [compound noun] is type of referent of
head of ditto

If a semantic argument cannot be instantiated for an individual compound noun, this generalisation would apply as an emergency factor in the utterance event, allowing some meaning to the word.

However, if the full interpretation procedure is implemented in an utterance event, the argument which is salient must still be instantiated as a derived concept. The deviancy between the uttered word and its stored concept means that the derivation of the argument must be inferred from the context of the utterance event. At this stage of the interpretation procedure, differences in semantic content between compound noun types are identified. That is to say, speaker judgement on the internal dependent's role is based on choice of an appropriate model for the lexemic head's referent. This choice is dependent on the compound's use in an utterance event, e.g. verbal versus non-verbal compound reading. The instantiation hierarchy between the stored and the uttered word is diagrammed below for the non-verbal compound cave-dweller:

(72)



To conclude. Within the range of speaker competence for root compound nouns, it is known that these word-types fall into approximately twelve different semantic classifications, according to their referential meaning. This is a contributory factor to the identity of the semantic network for root compound nouns, where there is an absence of syntactic clues such as affixation. The head words, however, are deictic devices in establishing the semantic classes, e.g. matchbox. The syntactic identity of the constituent's relation is known to be one of adjunct + head and, therefore, is invoking a relative concept. The convention applies to both non-verbal and root compounds (see the operating instruction for adjunct in the previous section). This indexes the cognitive model of the head, whose referent also has a deictic function in identifying the semantic model linked to the cognitive scene.

The nature of the cognitive model is marked by the atomic concepts, which differentiate it from other scenarios. These are inherited by lexemes as part of their semantic structure and contribute to the understanding of the dependent's role. Cognitive information, however, is experiential and variable. Therefore, the output of computation that applies to the compound's network may vary and affect the speaker's comprehension of the word's meaning. At one extreme

of the interpretation procedure, it is anticipated that since the atomic concepts are responsible for the identity of separate states of affairs, these at least will be identified (Hudson, 1980:95), even where speakers find difficulty in supplying a detailed interpretation. That is to say, even if speakers are unable to identify the derived propositions for the lexemic instances, the atomic arguments will be available for exploitation. Failing this, there are the concepts of syntactic convention, exploited by compounding as a naming device.

At the other extreme of the interpretative process, it is noted that some root compounds inherit arguments of the more general semantic model of action. Given that this type of network relies on knowledge which involves functional concepts, the accessibility of this network makes the root compound-type completely compositional, i.e. semantically transparent, e.g. matchbox, milk man, silk worm, player-manager. Less semantically compositional are root compounds containing an action model, where the Theme of the action counterpart is blocked, e.g. sea breeze, vacuum cleaner, wind mill, wheel barrow. In these examples, the functional concept is overridden by the inherent property of the cognitive model, which is a specific property of the lexical noun's referent.

Even less semantically transparent in terms of argument identity are the compounds with a counterpart of possession, e.g. wheel barrow, lemon peel. This is understandable when considering that not only is the concept of possession gradable in degrees of inalienability (Seiler, 1983), but also that it may be perceived from the aspect of the possessor and the possessed. In respect of the latter, some syntactic clues are provided by the compound types. That is to say, the direction of possession is indicated by the classification of their constituents, e.g. whole ----> part, part <---- whole. This may be necessary due to the fact that entities are initially perceived

as wholes rather than by their parts.

Finally, root compounds that probably exhibit the greatest degree of non-compositionality are those where the first word instantiates part of the head referent's internal make-up, e.g. marble statue, tulip plate, bull dog. The concepts of internal structure include material, shape and size and are less easily discernible as contrastive features over a group of entities than the observed functional attributes. For example, material is a concept of carpets, bed clothes, shoes, furniture, windows, typewriters, paper, pens.

It has already been observed that the function of identifying intrinsic properties of the head's referent is usually carried out by the noun phrase. This type of root compound structure, therefore, comes close to being a predicating dependency structure. As a consequence, these specifically exploit speaker knowledge of the entities referred to, because as much information of their structural form is needed as that which identifies a cognitive model. However, since the compound noun is non-assertive, the referents of its constituents must remain sufficiently general to guarantee a non-predicating function.

Having identified the specific argument which is salient to the compound noun's referent, the interpretation procedure must extend to include information provided by the utterance-event. Factors relating to the utterance-event include knowledge that the compound's head refers to a class of entities of which the compound itself is an instance. But the situational context affects judgement on the model of the head's referent to be exploited for semantic information. With the utterance-event containing participants which are variable factors in semantic interpretation, the lexeme is the constant feature of speaker competence.

In the light of the conclusions reached here, the similarity between the organisation and interpretation procedure for the root compound and for non-verbal and verbal compounds demonstrates that nouns and verbs share the same grammatical relations. The interpretation procedure demonstrates that it is not necessary to decompose the morphological composition of the compound's constituents. At the same time, semantic decomposition is obligatory in order to determine the type of concepts that are part of a speaker's semantic knowledge. Therefore, whilst Word Grammar agrees with Selkirk's claim that there is no need to decompose the head of a morphologically complex compound, there is disagreement on the principles of inheritance, especially in connection with the semantic properties of words. In this respect, the function of the noun and verb differ in their role of identifying aspects of real world states. The differences in the nature of the concepts which these categories classify correlate with the type of knowledge that speakers experience in the real world, i.e. objects and actions, and it is these two categories that provide speakers with the means of describing their real world environment (Goldsmith and Worsetchlaeger, 1982).

The following propositions are referred to in this section:

person has knowledge
 possessor of knowledge is speaker
 possessor of knowledge of definite model is speaker
 knower of definite model is addressee
 relation is action

referent of noun has companion
 companion of noun referent is a relative concept
 relative is definite model

referent of [compound noun] is type of referent of
 head of ditto
 [referent of compound noun] has manner of referent of
 counterpart of ditto

companion of definite completed action is quality
 counterpart of non-verbal compound noun is an action

knowledge range of root compound noun is compositional
 relation
 knowledge range of root compound noun is functional
 relation
 functional relation of root compound noun is purpose
 compositional relation of root compound noun is part
 + part

Operating Instructions:

If W is X of Z then Zm is property of WY

If referent of [head of compound noun] has relation companion,
 then model of counterpart of ditto is a definite concept

If referent of [head of compound noun] has linker companion,
 then compoundnoun has verbal meaning

If referent of [head of compound noun] has relative companion,
 then compound noun has a non-verbal meaning.

5. Summary

In this section the grammatical relations between the constituents of compound nouns are examined. First, it is established that two types of dependent are typical of grammatical relations for compound nouns, i.e. actant and adjunct. These two dependent types are lexically specified, and distinguish the verbal and non-verbal interpretation for compound nouns. It is observed that compound nouns containing an overt verb in their morphological structure and an actant as first word are semantically compositional. The semantic network is predictable in terms of the functional concepts of the action counterpart. The -en adjective compound is not included within this set, because its counterpart is a state network. It belongs to the set of non-verbal compounds. The non-verbal interpretation exploits knowledge of concepts denoted by an adjunct which are those entities of spatio-temporal existence identified on Jackendoff's hierarchy as falling between the agent and Theme roles. The number of entities is increased to include all concepts

that may be lexically specified. The ordering of Jackendoff's hierarchy, which corresponds to a linear sequence for the utterance, is also indicative of sequencing in the generality of argument concepts for the lexical networks of action and state counterparts.

The dependent-head roles are contributory factors in the identity of the salient concept which is a part of the compound's meaning. The semantic concepts which they instantiate cannot be exploited more than once for any individual stage of generality. They are then evaluated, in the context of other known information, to determine the status of the remaining argument. In the case of verbal compounds this is the concept of manner, deduced on the evidence of the compound as a whole. The results of the final deduction are consistent with the findings for the evaluative procedures of non-verbal and root compounds.

Those compounds specifically identified as belonging to a semantic class containing a functional concept, have a missing argument that instantiates some concept of inherent composition. The functional property as such, e.g. purpose, is inherent to the lexical referent of the head and is instantiated by its internal dependent in accordance with the adjacency principle. Similarly, notions of time and location are inherent properties of the internal dependents of some compounds and are understood, in connection with the referent's role, to instantiate an argument of the head, e.g. Autumn mist.

The morphological differences between the non-verbal and root compound do not affect the organisation of semantic information. Both word-types exploit information of the cognitive networks and the relative concept which is an argument of one of the referent's models. The lexical head also has a deictic function in identifying specific semantic types. e.g. purpose is inherent in the concept

of container as a semantic model for box. The output of a derived proposition for the compound's referent includes the salient argument that must be inferred from information given in the semantic network. This argument is a concept from which the nature of the object is understood. If the entity named is some instance of an action, the argument refers to its manner. If the entity is a physical or natural object, the argument refers to its condition. This may be structurally or functionally relevant, e.g. design = size, for matchbox; size being functionally relevant to the matchbox's use as a container for matches.

In connection with principles of storage and interpretation, no differences are found between verbal, non-verbal and root compounds. The differences occur as a result of the nature of the concepts which function in companion combinations instantiated by the individual lexemes. Additional deviancies are the result of pragmatic factors, such as experiential knowledge. But speaker competence for compound word-structure exploits the same type of knowledge needed in the comprehension of utterances.

Chapter V

Conclusions

In the previous chapter, a Word Grammar analysis of compound nouns demonstrates that the principles of organisation and interpretation for word structure apply equally to all types of compound nouns.

In this respect, the evidence of compounding as a type of word structure supports the working hypothesis of Word Grammar that all linguistic structure is sanctioned by the properties of the word. In addition, the framework of Word Grammar compares favourably with the theories of Chapter III in being able to show that speaker competence for compounding does not entail a different type of mental apparatus from that of sentential structure. As a result of a single interpretative procedure applied in the comprehension of compound nouns, the grammar provides an explanation for the gradience of semantic complexity identified in Chapter I.

The most semantically transparent compound nouns are those which exploit functional concepts, i.e. verbal compounds with the three suffixes -ing, -en and -er; and non-verbal compounds like the root compound of purpose or occupation, e.g. tea cup, postman, etc. Since functional concepts are more easily observable than structural concepts, they assist the heuristic purpose of the compound as a naming device.

As a consequence of these findings, the criterion of overt syntactic presence of the verb is not characteristic of semantic compositionality, and this leads to the rejection of Roeper and Siegel's observations on the predictability between morphological compositionality

and semantic content. An unpredictable relation between form and meaning requires a highly systematic organisation of semantic content to guarantee communication of content. In this connection Jackendoff observes a high degree of predictability between the functional concepts of utterances and thematic concepts.

The compound word-types considered to be semantically compositional are just those that exploit the thematic concepts associated with the functional arguments of the action model. Hence, my earlier claim that the most semantically transparent of the compound word-types are those which include verbal notions as part of their semantic structure. Since the relationship of these concepts provides the greatest range of information for inferring the propositional content of utterances, it seems intuitively natural that the most semantically compositional compound nouns should make use of these conventions to improve accessibility of information for word-structure. As a result of these findings, the notion of compositionality for semantic structure is defined as the identity of arguments for the action model, which correlate with the actant and/or adjunct dependent of a dynamic verb. This is in agreement with the findings in Chapter III on the relation between form and meaning for verbal compounds. The predictability associated with semantic compositionality is a reflection of the lack of choice in terms of functional concepts. As seen, the gradience in semantic complexity is associated with the increasing options in argument accessibility for the dependent's referent.

Another notion closely associated with compositionality in Roeper and Siegel is that of productivity, where compound nouns exhibiting morphological and semantic compositionality are claimed to be fully productive. It is concluded in Chapter III that productivity

is the systematic relation of the semantic network with the morphological representation, rather than the result of the output in terms of numbers for the word-structures generated. Word Grammar's analysis supports the former definition of productivity which typifies root compounds as well as verbal and non-verbal compounds. The analysis reveals the generalisation that with all types of non-predicating compound nouns the argument identity is sanctioned by the head's counterpart. Moreover, the counterpart must be an activity in order to guarantee the predictability of the syntactic companions. Hence, the non-occurrence of a stative verb as the counterpart model.

Morphological deviancy observed by Roeper and Siegel, e.g. early riser and beautiful dancer is representational of the dependent's link with a specific level of the semantic network. For example, the meaning of beautiful is an instance of a property of the concept 'dance', which is part of the meaning of dancer.

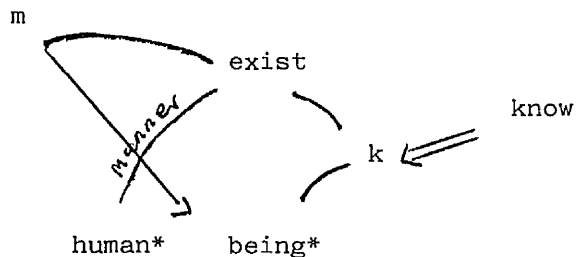
However, given the dependent's syntactic role, it must conform to morphological constraints of the word-class whose function it is carrying out. In this case, if the head undergoes nominalisation from a verb participle, its dependent may also undergo morphological change to represent a typical modifier for a noun. In examples of this kind, it is found that an equivalent adjectival form of the adverb usually exists. For example, early (SOED 1973:623) is a morphological representation of an adjective and an adverb. Hence, morphological deviancy is not always an example of lexicalisation or non-productivity, but a subjective identification of a word-type.

The conclusion on category identity contributes to the evaluation of productivity as a definition of consistency in the organisation of syntactic and semantic information. This evaluation is ratified by the findings of the previous chapter, where Word Grammar shows that all three types of compounds exhibit productivity with a propositional network of a dynamic counterpart. Non-occurring

compound nouns, like president becomer, are accounted for by a condition that the network includes an action counterpart, e.g. relational models of root compounds. Become is a verb of accomplishment which focusses on the final state rather than the activity leading to the result. Additionally, the verb has a specific referential property of transience which is a temporary concept. From the evidence of relational verbs as part of the dynamic event of compounding, it is noted that the concept of change is not instantiated within the hierarchy of the compound head's referent. In my opinion, the absence of this concept is significant to compound noun meaning being associated with a feature of permanence (Downing 1975, Levi 1978, Allen 1979) and purposeful to its role as a naming device. In order for the compound structure to be as relevant as possible in assisting the hearer to deduce the meaning of the compound's referent, the speaker exploits arguments whose concepts have permanent value. Hence, the additional absence of time as a temporary concept of compound nouns.

Where Roeper and Siegel's framework emphasises the relevance of three compounding affixes to the semantic structure of verbal compounds and their effect on subcategorisation frames, Word Grammar provides an explicit account of the role of affixes as a means of pinpointing the aspect of the activity model which is the keystone to the semantic network for the compound noun's referent. The theory demonstrates that, in contrast to Selkirk's framework, the affix's role is not that of a head. If the head is semantically defined as the entity which is the focal point of the semantic network for individual syntactic structure, then the head's role is relational, i.e. the head is the relational identity of the companion arguments that it links together. In this connection, the affix's role is one which identifies some argument of the relation. It additionally provides a point of view on to the activity model, which is sententially established by the use of auxiliary and tense, neither of which are exploited by word structure.

A possible exception to the claim that auxiliary verbs do not occur as part of a compound is the example human being. This word functions as a noun. Hence, by the criterion of internal headship, the second part of the word is a noun which has the same morphological representation as an auxiliary verb form. As a noun, the lexical item being has a referent which is an instance of something that exists. The referent of its dependent is the concept human*, therefore propositional content of the meaning of the construction human being may be inferred as 'one who exists as a human'. Hence, the compounded structure may be identified to be a root compound, e.g.



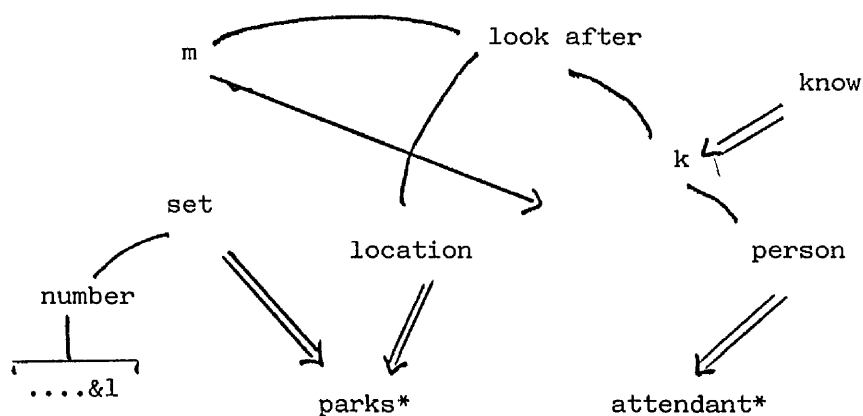
(m = condition)

One of the problems of Word Grammar's framework is that representations of word structure and noun phrases have a similar syntactic analysis. This makes the semantic criterion of non-predication an important method of differentiating the meanings of constituent structure. But in some instances an acceptable predicating structure may also be suitable, e.g. the above example may also be interpreted as 'one who is human'. For examples like this, there is no way of determining which of these two readings is appropriate without invoking a wider context in which the structure occurs. Since differences in propositional content for dependency structures provide the basis for inferential meaning and would be a contributory factor to successful communication, the grammar would have to evaluate the significance of the compound meaning with that of its context. As Word grammar is a surface grammar and can only investigate individual occurrences of dependency structure, a comprehensive analysis of compound meaning becomes wieldy and complex.

Selkirk's framework has also been criticised in the handling of comparative examples but with regard to examples of morphological deviance, e.g. park attendant v. parks attendant, Selkirk's solution is an appeal to some pragmatic device falling outside the scope of her grammar. Word Grammar's mentalistic framework has the advantage of being able to explain the difference in meaning for these two examples as part of the speaker's grammatical competence. The difference between the morphologically singular and plural representations is identified as one of referential properties. The referent of the plural noun is a set comprising an unspecified number of members (Hudson 1984:199):

set comprises many members

and contrasts with a singular noun whose set has only one member. With morphological deviation procedure being autonomous, the semantic deictic function of the plural noun is to identify the referential properties as a specific instantiation of the location argument of the head's counterpart, e.g.



Although Word Grammar can account for internal plurality of the first constituent, it cannot account for the non-occurrence of internal plurality for the head of a compound noun. A lexical item with a referent which comprises a set containing more than one member cannot occur word internally because this would conflict with any subsequent rules applying to the compound noun as a single word.

The convention that the compound's constituents refer to a class of entities rather than individuals is insufficient to prevent internal head plurality, because plural forms are also used to denote generic entities, e.g. tigers are fierce animals. In addition to this, Word Grammar makes the general claim that the propositional links within the linguistic network represent declarative knowledge. Hence, no rule ordering applies. A propositional entry for the word model for the compound word will sanction any combination of the latter with a suffix; but the compound noun model requires a specific entry to guarantee the non-occurrence of word internal plurality to override the general proposition because no distinction is made between the status of words as parts of other words and sentential constituents.

Morphological deviancy leads Roeper and Siegel to introduce the criterion of existing or possible word of the language, e.g. goer. Since deviancy is inherent to the instantiation hierarchy of Word Grammar, examples like the above may be explained as atypical.

That is to say, the normally expected correlation between form and meaning is not met. Whilst this type of approach has the advantage that no additional criterion regarding possible word status need be introduced to the grammar, little indication is given of whether possible words are a feature of the framework. The claim of declarative knowledge suggests that only existing words are stored within the mental framework but, given the principles of organisation, speakers are capable of generating possible and well formed morphological word structures even though they are not part of the network.

The advantage of a prototypical approach to the concepts of language is that words can be seen to conform to the principles of organisation for the grammar without being ill formed. This claim is shown to apply in the case of Selkirk's problematic combinations of verb plus noun, and backformations. With regard to the latter group, the framework of Word Grammar is able to give an account

where none has been available before. Moreover, the analysis provides greater insight into the semantic relatedness of compound nouns and compound verbs. Unfortunately, this investigation only touches the surface of an analysis for compound verbs. However, one of the drawbacks of the mentalistic approach is that it is unable to show that backformations are morphological reductions from the noun. That is to say, although the backform may be treated as atypical and linked to a similar semantic network, the actual process of reduction by rule cannot apply. Hence, no derivative procedure can be seen to have occurred through morphological reduction.

Returning to the issue of possible word, Word Grammar asserts that whenever organisational principles sanction the well formedness of word structure, the morphological representation may be part of the lexicon. There are, however, constraints on the acceptance of new words as part of the compound noun structure that the lexicalist theories fail to determine. In addition to external factors such as the demand for new words, semantic constraints in compounding may prevent the occurrence of some lexical items as compound heads. In this respect, Word Grammar is able to incorporate into the grammar a major constraint that the meaning of the lexical head must be an instance of a dynamic concept.

The flexibility of the mentalistic framework also enables it to provide a simple solution to the question of systematic gaps observed in Selkirk's context free rewrite rules; namely, the problematic presence of verbs in first word position are examples of nouns sharing a morphological similarity with a verb, i.e. zero derivations. This is borne out by the dependency relations of the constituents in conforming to the syntactic constraints on word class modifiers, and the role of the head as subject of the counterpart for the compound noun's semantic network. Meys' (1975) perception of the compound's constituents as elements can be rephrased within Word Grammar as the identity of constituents as parts of a wider semantic scene. Hence, these parts are arguments of the more general model and participate in

providing information to assist in the inferential process of the missing argument.

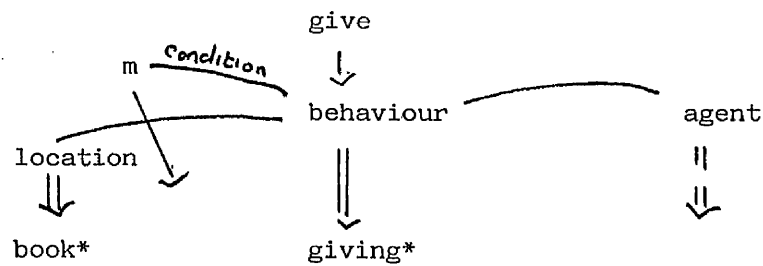
In contrast to Selkirk's claim that no constituent has a subject role within the context of the compound's structure, Word Grammar's framework demonstrates that the head is the semantic subject of the counterpart model. The disclosure of this evidence enables a greater similarity to be shown between the compound and the sentence as examples of constituent structure which are typically non-predicating constructions. A further development of this is the analogy that can be made between the dependency of propositional arguments and syntactic constituents. The propositional relation has the same function as that of the verb and the compound noun in providing identity of the relation between dependents. However, although Word Grammar claims that there is a similarity between the dependency structure of propositions and syntactic structure, it is stressed that there is no direct correlation between syntactic and semantic dependency. Many semantic dependency links may be associated with any one syntactic dependency structure.

Both the lexicalist and mentalistic approaches confirm that the dependent's role is one that is lexically determined. With regard to verbal compounds which have an actant dependent of an overt verbal constituent, the functional concepts of agent and Theme as arguments of the counterpart model are automatically inherited from the action model. But their automatic inheritance means that the lexical referents do not comprise deviant concepts to override the functional ones. This is in contrast to the root compound where a deviant property of the lexeme's semantic structure overrides that of its action model. For example, sea breeze has a concept of location that is inherent to the counterpart semantic model come and blocks the inheritance of Theme by the dependent's referent.

One of the shortcomings of the analysis for root compounds has been a failure to explain why the concept of location should be a preferred interpretation to Theme for examples like the above. A possible answer is that the convention for compound types must be observed. That is to say, the root compound has no overt verbal presence, therefore the non-functional concepts take precedence. But this would not explain a non-compositional reading for a non-verbal compound. Alternatively, the solution may be related to the hierarchical ordering of conceptual arguments. If the hierarchical storage of arguments does interact with the deductive processes, then the general claim that rules in Word Grammar are not ordered is undermined. However, I consider this latter claim to be generally unsatisfactory because it not only conflicts with the notion of hierarchical storage of concepts that are themselves the 'rules' of the grammar but also with the inclusion of interpretative if---then rules which suggest that certain conditions must prevail prior to their application. Hence, some ordering is taking place.

Word Grammar's analysis of compound nouns also confirms observations in the lexicalist grammars that the role of the dependent is lexically sanctioned. In connection with this claim, Selkirk asserts that verbs with double objects, e.g. hand, put, and give, do not function as heads of verbal compounds. However, Word Grammar correctly predicts that in the case of put and give examples of non-verbal compounds exist, e.g. shot putting (N) and book giving (Adj); and with hand an actant reading is possible, e.g. card handing (game).

Put has an inherent property of location which an adjunct may instantiate, e.g. shot. The examples given by Selkirk do not justify the non-occurrence of any compound noun with the verb put as counterpart. That is to say, baby putting may not exist simply because it is not a relevant act worth naming. It is similar with examples for 'giving', since book giving (charity) is well formed, with book functioning as an adjunct of location specified by its model give.



Hand is slightly more complicated because it has two inherent properties as a result of its derivative procedure, i.e. manner and location, e.g. 'transfer of something by hand'. However, given that the sequence is location + manner, the locative property is given priority. Hence, a non-verbal reading can be assigned to hand with an adjunct instantiating a locative property and manner providing the argument for the missing concept. The interrelationships between the linear representation of argument concepts and their status of generality on the instantiation hierarchy is a possible area of further investigation.

In connection with the actant/adjunct role of the dependents Word Grammar is more explicit than Selkirk's theory in defining the nature of these concepts. Both actant and adjunct are participants of the semantic field to which the compound's lexical head is linked. The actant is either the semantic subject or affected entity of the relevant activity, and the adjunct is some structural concept of the scene referred to by the head's referent. Another contrast in Word Grammar's approach to word-structure is that each network is part of a much larger organisation of speaker knowledge. This information is declarative rather than operational. Hence, no sequence of rule ordering for syntactic data affects the semantic content. Affixation acts as a device for identifying a particular aspect of a semantic network, such that certain arguments become more salient within its scope. As a consequence, less significant concepts of the specified action are latent within the instantiation hierarchy. In this way, the framework contrasts with the claims of the two lexicalist theories in not deleting information. As a result, a description may be given of propositional links referring across word boundaries to account for the exploitation of the latent concepts by other

participants . . . in a dependency chain, e.g. the agent argument instantiated by the -en adjective's head.

One advantage of the instantiation hierarchy is that, in contrast to the restricting parameters of the percolation principle, Word Grammar is able to show that the inheritance of properties is a natural progression of inclusion. In turn, progression describes the link between two semantic arguments each belonging to one of the semantic hierarchies. This provides the framework with the flexibility to account not only for nouns and verbs but also for the Thematic Hierarchy condition and the active-passive distinction between nouns and adjectives. The result has the expediency of insight into the non-occurrence of certain adjectivalisations of -en participleverbs, e.g. flown and an explanation of semantic differences between actional and statal passives.

In the discussion of arguments towards a mentalistic approach to compounding, Jackendoff's claim that the semantic properties of words fall into four types is verified by the analysis of compounds. So far as thematic concepts are concerned, compounding exploits the full range of lexically sanctioned verbal concepts. Modal structure (Jackendoff, 1972:284), which entails the scope of lexical meaning, is exhibited by compound nouns with adjuncts in first word position. Here, the concepts instantiated by the latter are specific properties of the semantic model and are a type of modal structure, i.e. negation is also exploited by the compounding device. Further to this, the instantiated concepts of compounds are arguments with non-specifying properties, which is characteristic of modal structure. In this respect, the dependent's function is to instantiate a general concept for the purpose of providing information from which detailed inferences may be made on the salient argument inherited by the compound's referent.

As such, the dependent's meaning has no referential function of identifying a real world entity.

In view of the findings for root compounds which incorporate the concept of negation as a contrastive device, e.g. tulip plate, a reassessment of this concept is needed within the general framework. The 1984 version of Word Grammar identifies the negative concept as a lexical one rather than a functional one. But the compound analysis suggests that negation is a relative concept. Recognition of negation as a relative concept would be more representative of the generally accepted notion that negation is a derivative of the positive concept.

Presupposition entails shared information between speaker and hearer and, with the compound device itself, speaker and hearer are aware of the conventions it exploits (Downing 1975:106). The conventions exploited include the shared knowledge that the word-order is one of dependent-head, with the head providing the link to the relevant semantic model. The dependent's role is one of identifying a participant of this model, i.e. its referent instantiates a general concept. In this way, the speaker is ensured that lack of specific detail through lack of experience will not affect the interpretative procedure. At the same time, inherent presuppositions for a semantic interpretation of individual compounds are accessible through the lexical referent's links with a semantic instantiation hierarchy (ibid:278). The head's role identifies the relevant semantic scenario and refers to the subject of the network. The head's referent denotes a class of entity rather than a specific individual. The speaker knows that the amount of information available in the compound structure is sufficiently relevant to enable an appropriate judgement to be made on the missing argument and its interpretation in a given context of use. Moreover, there is a common agreement that the

entity referred to is nameworthy. We can conclude, therefore, that the role of the head as the subject is to provide a point of view on to the semantic focus (ibid:241) which assists the hearer in forming a judgement on the unknown information. A Word Grammar analysis however, cannot determine the outcome of the individual's judgement. Hence, the comprehension of compound noun meaning will be through inferences on the propositional content of the compound's referent.

Since one of the claims in Word Grammar is that the cognitive network will vary across speakers, there is the danger that the appropriate propositional content for the meaning of the compound noun may not be part of a speaker's knowledge. Hence, there is no guarantee that the relevant inferences will be made. I have already criticised this aspect of the framework in connection with examples like human being. The lack of determinacy for the semantic structure of words seems to contradict Hudson's claim on the universality of semantic structure, unless the latter is to be understood as the general concepts internalised by the mind that reflect the nature of the world out there. This claim is also inherent to the grammar and brings the framework within the criticism applied to the transformationalist model on the notion of an ideal grammar. Namely, in order for a semantic structure to be universal, the general concepts perceived in the real world would have to be available to all minds.

One of Gleitman and Gleitman's observations on the mirroring feature of relative clauses to compound meaning is the easy retrieval of information and the degree of uniformity in the 'reconstructed' verb. Word Grammar's analysis of root compounds provides an explanation of the reason for this uniformity, namely, that all entities can be related to some semantic schema via the lexical head's referent

which indexes the semantic model.

To add to this, speakers are also aware that the relevant act belongs to some dynamic event and, therefore, is observable. Hence, the defining schema of relative concepts accounts for less easily discernible semantic properties within a given field. It is further accepted that the entity denoted by the compound noun has class significance and the semantic properties of the referent will be known through the inclusion of properties from some more general model.

There remains the property of focus, which is the information not shared between speakers. Here, the focus of unknown information is on the identity of the instantiated concept for the missing argument. Since knowledge of specific details is conditional on the identity of semantic properties that are instances of a cognitive model and this information is experiential, the speaker is aware of individual variation which will affect the final judgement on the precise interpretation given to the compound's meaning. Hence, Gleitman and Gleitman's observations (1970:150) on the widespread variability are explained.

The advantage of the framework of Word Grammar is that deviancy is inherent to it. Therefore, it is able to provide an interpretation procedure, which will alter for speaker variation. Thus, the theory is not subject to the criticism of transformational grammar that it is unable to describe the discrepancies between the underlying representations and the surface combination.

At the same time, the framework of Word Grammar is able

to take account of the deictic information of paraphrastic meaning to give a credible interpretation of the semantic network for individual compound types. In doing so, the grammar corroborates Allen's observations (1979:85) that compound-word structure is organised within the same principles of grammar as other types of word-structure.

Word Grammar's framework contrasts with the lexicalist grammars investigated in Chapter III in the scope of rules involved in compounding. Both the previous theories claim that compounding rules fall within the scope of the lexicon. Whilst not disagreeing with this, Word Grammar verifies its claim that the lexicon is representational of the grammar as a whole: for example, the inclusion of definiteness as a concept for nouns functioning in clauses and compound structures alike. As seen in the previous chapter, the notion of definiteness is part of speaker knowledge of the real world.

Another area of pragmatic knowledge is that concerning the use of compound structure itself. Both speaker and hearer are aware that the device exploits encyclopaedic knowledge. In the first place, it refers to some act that is observed in real world situations. Secondly, it is assumed that the hearer will have knowledge of these situations. Therefore, in addition to linguistic competence, a speaker's non-linguistic knowledge of relations within the world are utilised. Word Grammar shows that the format for syntactic and semantic relations is the same, i.e. propositional. The concept of a relation between two linguistic concepts, or a linguistic and cognitive concept, or two semantic concepts, supports the claim that the word organises linguistic and non-linguistic knowledge in the same way and that two types of rules for word-structure and the utterance are not necessary. The main area of concern for linguistic analysis is on the word as a concept which interfaces linguistic and non-linguistic knowledge.

In this connection, Word Grammar provides a framework which permits the investigation of pragmatic issues affecting compounding. For example, findings on actant-compound types reveal that speakers rely less on real world knowledge because the identity of a semantic model is subordinate to linguistic knowledge of the functions of subject and actant. With adjunct compound types, there is what seems to be an equal distribution between knowledge of linguistic concepts and real world knowledge. And where the latter is inaccessible, a guess can be made as to the appropriate argument role of the companion first word. Alternatively, if there is an overlap between the functional and atomic concepts, speakers can fall back on knowledge of the former to assist in referent identity of the compound.

On this aspect of compounding, the results of Downing's tests for novel compounds suggest that the members of the word-forms are predetermined. The tests required native speakers to supply new compound words from visual stimuli and to rank given word-forms in terms of a preferred response. Rephrased in Word Grammar's framework, Downing's findings suggest that the participants of the compounding event belong to a pre-determined set of concepts. The analysis has been able to show that not only is this the case in terms of general concepts, but also in the nature of the set of concepts exploited.

The degree to which the concepts are pre-determined contributes to the communicative value of the device. One of Downing's observations is that in coining a novel compound, consideration is given to the companion selection, because the compound must be able to transfer across situations during use. In this respect, the compound's referent must be general enough to allow for relevancy from situation to situation. Hence, the degree of non-specification necessary for the constituent's referents. It is noted here that movement across situations is one case of lexicalisation and shift in meaning that leads to idiomatisation.

Hence, this aspect of compounding supports my argument that idioms and lexicalised forms (e.g. backformations) conform to general principles of grammatical organisation.

Generality in the degree of instantiation of arguments also provides an answer to the intuitiveness of integral genericness of compounds observed by Downing, citing Gleitman and Gleitman (1975:83). No temporal concepts are exhibited by the compound structure. As pointed out in Chapter IV, these are part of the composition of referents of auxiliary verbs and the latter do not usually occur word-internally for this reason. Secondly, these types of concepts invoke the notion of transience or change. The compound noun's counterpart model is not one that includes this property. The example where it is found to be exploited is the -en adjective, which is an instance of movement from an action counterpart to a stative one. Thirdly, the generality of argument roles accounts for the discrepancy between the surface and underlying representations. Gleitman and Gleitman criticise the transformational approach for its lack of explanatory adequacy in this respect.

Since the compound network only exploits general concepts, the specifying role of the referent as part of an instantiation procedure does not assign referential identity to the compound's meaning (i.e. no definite real world entity is indexed). Recall that the compound noun's role is non-assertive and, therefore, non-predicating. In this respect, the non-compositionality of the subset of root compounds, which invoke structural concepts, is least typical of the compound word-type. In order for these compounds to be semantically transparent the concepts of structure would need to be specified, e.g. size, shape, colour etc. But if they are instantiated, the construction would exhibit a typical characteristic of the predicating structure for the defining relative clause. In such case, the construction would not be a compound but a noun phrase. It is the difference in purpose between the noun phrase and the compound that can be exploited

by Word Grammar using the principles of dependency to show the non-predicating nature of the compound structure. It should be emphasised that the semantic network is not exploited with each utterance-event. This will be identified on the first encounter with the word. But, the missing argument must subsequently be interpreted on the evidence of contextual clues, i.e. linguistic and situational. Agreeing with Downing's claims, Word Grammar is able to show that the semantic classificatory sets for the compound heads (given in Chapter IV) do not represent an hierarchy of preferred interpretations. Downing (ibid:180) proposes

".... that the relationships considered are
... extremely specific in ways depending on
the real world characteristics of the
entities in question."

In Word Grammar, inherent semantic properties of lexical referents are instantiations of more general concepts. Hence, given the identity of the argument for the compound's head, specification of its meaning may be inferred from the instantiated information of the other arguments.

In the light of Downing's investigations of the pragmatic use of compounding, two significant conclusions are reached. One is on the use of the compound as a naming device, which she claims may be used on a temporary basis. That is to say, instances are coined to name a class of entities, which do not find acceptance into the language by consensus. Within an exclusive situation the compound noun is known to a group of speakers and has noteworthy use on a temporary basis, e.g. 'apple juice chair' (ibid:89) for a seat in front of which is placed a glass of apple juice. Whilst the novel compound has restricted use, it is similar to single words which are used among a small group of speakers. Likewise, its structure must conform to the principles of grammatical organisation even though its use is temporary.

Downing's second conclusion is that setting up a list of possible compound noun relations would fail because of the large degree of cultural-encyclopaedic values associated with the entities to be named. In addition, a speaker's code is salient to a given context of its use. Once again, I return to the flexibility of Word Grammar's framework in incorporating general concepts that are stored by speakers. Although I agree on the basis that individual speakers' experiential knowledge will affect the form of the interpretation for the salient proposition and individuals will impose their own values on the importance of certain specific concepts, the general concepts of semantic structure are those which are shared by speakers as human beings. Added to this, both speaker and hearer have linguistic competence in the conventions of compounding. Therefore, a list of specific semantic relations is unnecessary and would restrict the structure's communicative value and ability to cross-refer to different situations. After all, it is this aspect of sentences that characterises its infinite use.

However, certain observations should be made on the above comments. First, the classification of root compounds already exists in terms of the constituent combinations. That is to say, examples like the part-part or part-whole combinations are categorisations of the conceptual relations that codify the role of the participants within the act of compounding as a whole. Secondly, specific interpretations of the meanings of the compound referents is not possible because they must be analysed within the context of relevant situations where the word will be used. This is one area which Word Grammar has not considered in relation to this type of word formation and would entail the analysis of compound meaning within the wider network of an event.

A similarity has already been shown to exist between the sentence and the compound noun structure (a) in the nature of its composition and (b) in the degree of inferred information.

In this connection. Word Grammar offers an adequate description of the relationship between the compound noun and the sentential structure that represents its meaning. Thus, I agree with Allen (1979:82) that paraphrases do not constitute the underlying representation to which syntactic rules apply in the generation of compound nouns. On the other hand, Word Grammar shows that there are no level boundaries on syntactic rules to predict compound meaning and that both the **compound** and paraphrases are heuristic devices for establishing significant information on the relationship between words. Unfortunately, insufficient investigation has been carried out in Word Grammar's framework to determine the scope of effect that the interrelation between the instantiation hierarchy and syntactic dependency has on the inheritance of properties.

The major conclusion reached on Word Grammar's analysis of compound nouns is that the original distinction identified between verbal and non-verbal compounds is a reflection of a situation that exists; namely, the dichotomy identifies a difference in the nature of the semantic concepts exploited by the linguistic procedure, i.e. actant v. adjunct. But, as noted previously, the dichotomy is not the result of an overt verbal presence. On the other hand, the framework has confirmed the observation that there is a gradience in the semantic compositionality of compound nouns. However, this gradience is due to the inclusion of encyclopaedic information. The analysis shows that there is a correlation between linguistic and non-linguistic concepts, which justifies the mentalistic claims on the organisation of knowledge. Further support is given to this claim in that the semantic complexity is, in fact, due to the perception of real world knowledge, i.e. how speakers perceive entities around them.

The analysis dispels a further myth in connection with

productivity. By taking the word as the basic unit of the grammar, it has been possible to show that productivity for sentences and compound structure alike is a matter of systematic organisation of a stored network. In this case, the network is the instantiation hierarchy of an activity model. All the non-predicating compound types examined are productive. Moreover, there appears to be a consistent interrelation between linear dependency and the concepts on the instantiation hierarchy. This enquiry has contained a brief discussion of the -en/-ing adjective. Since Word Grammar is a relatively new theory, this area offers potential data for further study especially with regard to other compound types.

In connection with the investigation undertaken here, Word Grammar has offered a descriptively adequate account of compound nouns which has resolved the semantic anomalies set up by the two lexicalist theories. In addition, the framework has shown itself to be observationally adequate in providing a description of speaker ability for compound nouns (including root compounds) that combines issues relating to grammatical and performative knowledge in the comprehension of compound noun meaning.

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