

## COORDINATE CONJOINED NOUN COMPOUNDS

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This paper deals with a class of noun compounds which have characteristic readings as though they were coordinate conjoined nouns. The class is termed "dvandva" by Hatcher (1951), and "coordinative" by Marchand (1960) and Botha (1974). Examples are compounds such as *fighter-bomber*, *washer-drier*, *priest-king*, *secretary-treasurer*. Note that these compounds do not have the characteristic fore-stress of attributive compounds.<sup>1</sup> For example:

*wásher-drier* vs *washer-dríer*

This admittedly small class of compounds is of interest because its regular semantic paraphrase makes it a strong contender for a syntactic derivation. (As opposed to large numbers of other classes of compounds whose idiosyncracies have been well documented, Marchand (1960).

This paper will endeavour to show that this likely class of noun compounds should not be syntactically derived but should be generated in a lexicon of the kind outlined by Jackendoff (1974). It will be shown that what regularities there are in this class of compounds are best handled by lexical redundancy rules.

### I. ARE COORDINATE CONJOINED NOUN COMPOUNDS SYNTACTICALLY DERIVED?

The hypothesis that coordinate conjoined noun compounds are syntactically derived can take two forms: a transformational form which would hypothesise that these compounds are transformationally derived and a Phrase Structure Rule hypothesis which would hypothesise that they are derived solely by phrase structure rules.

(a) *The transformational hypothesis*

To investigate this hypothesis let us examine the systematic paraphrase of these compounds. It is usually asserted that this class of compounds is paraphrasable by *and* coordination so that *fighter-bomber* means "fighter and bomber", *priest-king* means "priest and king". This is not however quite the case since a "fighter and bomber" could be two aeroplanes and a "priest and king" could be two people. The paraphrase must therefore specify that only one entity is being referred to by these compounds, so that the general structure of the paraphrase might be something like "entity which is both A and B". Thus, if these compounds were to be derived from a deep structure source by transformations their underlying structure would be roughly as in Figure 1.

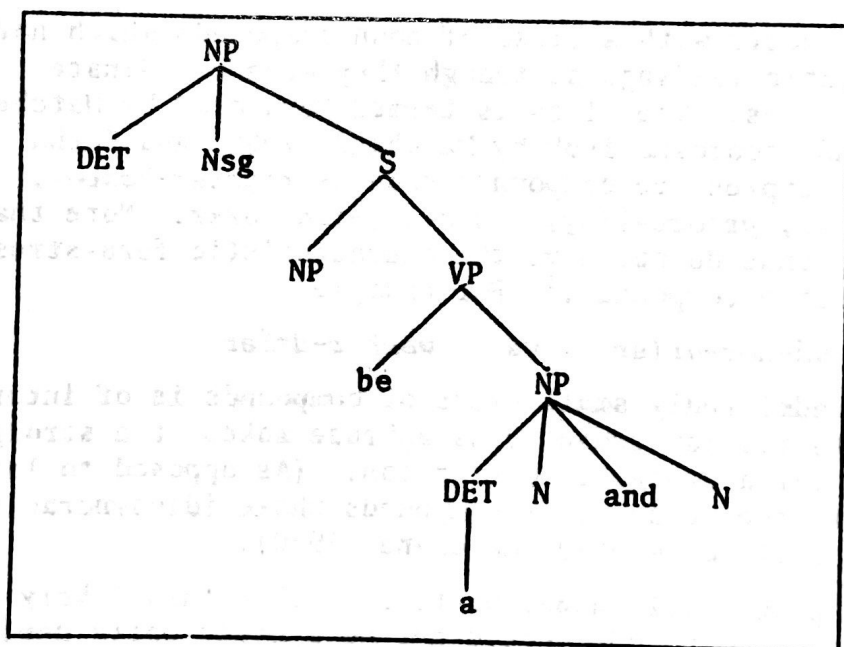


Figure 1

The singularity of the top NP ensures that the compound is read as singular. The N node dominated by the topmost NP would be filled by a dummy symbol and would, later in the derivation, come to dominate the compound. This seems to me the only plausible deep structure for these compounds if they should happen to be transformationally derived.

(b) *The Phrase Structure Rule Hypothesis*

The phrase structure rule hypothesis of coordination has its most sophisticated exposition in Dougherty (1968).

Though Dougherty mentions in his dissertation that his hypothesis is limited to coordinate conjoined structures, i.e. is not concerned with the coordination of lexical nodes, it is on the face of it not impossible that this class of compounds is subject to Dougherty's claim that "in an optimal grammar, ..., all conjunction must be generated by the phrase structure rules of the base." (p.v.)

Dougherty's hypothesis requires two phrase structure rules which make use of the X convention (see Jackendoff 1974):

- (1) X-----> +exhaustive  
 †totality  
 †individuality  
 †disjunctive  
 †negative
- (2) X-----> ([SPEC,X]) + X<sup>n</sup> + ([COMP,X])  
 +exh.  
 †tot.  
 †ind.  
 †dis.  
 †neg.

where X represents any of the major categories NP, VP, S and their heads; [SPEC,X] represents the specifiers of these structures, e.g. [SPEC, NP] rewrites as quantifiers; [COMP, X] represents the complements of these structures; e.g. [COMP,N] rewrites as the PP and S complements of nouns.

The features of rule (1) account for the type of coordination which is being used to coordinate structures, and the cocurrence restrictions among the conjunction, the specifiers and the complements.

The index <sup>n</sup> over the major category in rule (2) indicates the number of structures which are conjoined.

One further innovation of Dougherty's must be mentioned and that is his "feature percolating mechanism." This mechanism copies the features of one node onto the nodes which it dominates. "This feature percolating mechanism is equivalent to the statement: a node is marked for all the features of its head element" (p.148). This mechanism has many functions in Dougherty's theory which need not concern us. However one function can be illustrated by showing how it operates to give the correct

selection restrictions between a conjunction and the distributive adverbs which can function as its complement. For example, when *or* conjoins two structures the distributive adverb *together* does not occur:

(3) \**John or Jim together caught fish.*

Here the node which dominates the two conjoined NPs has the feature [+disjunctive]. However, *together* belongs to the class of distributive adverbs which are [-disjunctive]. When the feature percolating mechanism copies the [+disjunctive] feature onto the complement node, this takes care of the selectional restriction of (3).

I now note that coordinate conjoined noun compounds like *priest-king* cannot be generated by the rules of Dougherty (1968), because this grammar contains no rules for the expansion of N. As these compounds are Ns,<sup>2</sup> Dougherty's grammar is deficient in not being able to generate them. However, this is not a serious matter if Dougherty's rule schema outlined above can be naturally enlarged to include a rule for the expansion of N. In order to conform to this schema, the required rule would have to be:

(4)  $N \rightarrow ([SPEC, \bar{N}^1]) + \bar{N}^{1n} + ([COMP, \bar{N}^1])$

Where the bar minus one notation indicates that these nodes are dominated by N. This rule can be interpreted by supposing that  $\bar{N}^1$  represents noun stems and that  $[COMP, \bar{N}^1]$  is the source for the left-hand constituents of the class of noun compounds which have a modifier-head structure. This rule would generate all the noun compounds under discussion.

(c) *Facts which argue against syntactic derivation*

(1) *Lack of disjunctive coordination.*

If we supposed either of the two hypotheses of syntactic derivation to be the case, we would expect there to be compounds which are understood as disjunctively coordinated since the syntactic rules of coordination offer this possibility. However there do not appear to be any noun compounds which are understood as either

	X	or	Y
and <i>neither</i>	X	nor	Y.

(2) The Lack of overt conjunction.

If these compounds were generated by the rules of syntax we would expect to find the conjunction *and* present since *and* can normally only be deleted when the number of coordinated constituents is higher than two. Since noun compounds of this type normally have only two constituents, coordinator deletion should not be possible.

(3) The limit of two constituents.

One of the characteristic features of coordination is its non-finite nature. Any number of constituents may be coordinated. In English the number of constituents of coordinate conjoined noun compounds invariably appears to be two.<sup>3</sup>

(4) The ordering of constituents.

Where ordering of constituents occurs in coordinated structures, it is normally a function of semantics. For example, temporal sequences of events such as

*John went to town and was killed by a bus*

have to be ordered, as do inclusion sequences such as

*John entered the bedroom and got into bed.*

However in a large number of cases such ordering is not present.

Ordering is however present in all cases in noun compounds. In some cases it may be semantically induced e.g. *reaper-binder* but in the case of *priest-king* or *prince-archbishop* there seems to be no reason for the ordering other than the convention of doing so. Note that the word *king-priest* is not an English word, (though, of course, there is no reason why it shouldn't be).

(5) The semantics of coordinate conjoined noun compounds.

It is generally accepted that for structures which are syntactically derived, the meaning of the structure can be obtained if one knows the meaning of the words in it and the syntactic structure which relates them. If coordinate conjoined noun compounds are syntactically derived then we would expect to be able to predict their meanings. In fact the original decision to explore this class of

compounds was based on this as a working hypothesis. It is, in fact, not correct.

(i) Selected readings.

Coordinate conjoined compounds would, if syntactically derived, be ambiguous in some cases since they coordinate lexical items which are polysemous. e.g. *fighter-bomber* could be ambiguous between a person or an aeroplane. But *fighter-bombers* are aeroplanes and not people. Or they may have relatively unspecified reference as in the case of *washer-drier* where individually the constituents could refer to the washing and drying of anything. But, in the case of the compound, only the washing and drying of clothing, linen and the like is meant.

(ii) The ordering of the semantics of the constituents.

Normally the ordering of the constituents of a compound has no semantic consequences but in some cases it does. For example a *washer-drier* first washes and then dries<sup>4</sup> and a *reaper-binder* first reaps and then binds but a *fighter-bomber* does not perform its dual functions in the sequence of its constituents. Whether such ordering is present or not is entirely idiosyncratic, if not pragmatic knowledge. We would not expect this if these compounds were syntactically derived.

(iii) The semantics of coordinate conjoined compounds in triples.

There is a class of coordinate conjoined structures in compounds which I have not dealt with so far where the coordinate structure is itself the left hand constituent of a compound noun. These are such cases as *parent-teacher association*, *air-sea rescue*, *body-mind problem*. In such compounds the coordination no longer has the characteristic of defining a semantically singular entity. In fact they seem always to be semantically plural. The rules which generate the two types of coordinate conjoined structures in compounds do not therefore seem to be generated by the same rules.

## II. A LEXICALIST HYPOTHESIS OF COMPOUNDING

### (a) A counter-example to the feature percolating mechanism

I wish to look now at a counter-example to the phrase-

structure rule hypothesis which strongly suggests that the phenomenon of compounding is a lexical one. The problem I wish to examine is the failure of the feature percolating mechanism to operate across the node N. If it did then the sentence:

(5) *This country needs neither a priest-king nor a prince archbishop*

would be ungrammatical. It obviously is not. According to Dougherty (1968) - if his rules are extended to include the required re-write for N - the base structure of the object NP in (5) would be as follows:

(6)

	-			
	N̄			
	+exh.			
	-tot.			
	+ind.			
	+dis.			
	+neg.			
SPEC, NP	NP		NP	
+exh.	+exh.		+exh.	
-tot.	-tot.		-tot.	
+ind.	+ind.		+ind.	
+dis.	+dis.		+dis.	
+neg.	+neg.		+neg.	
SPEC, N̄	N̄	SPEC, N̄	N̄	
+exh.	+exh.	+exh.	+exh.	
-tot.	-tot.	-tot.	-tot.	
+ind.	+ind.	+ind.	+ind.	
+dis.	+dis.	+dis.	+dis.	
+neg.	+neg.	+neg.	+neg.	
neither a	N	a	N	
	+exh.		+exh.	
	-tot.		-tot.	
	+ind.		+ind.	
	+dis.		+dis.	
	+neg.		+neg.	
N <sup>1</sup>	N <sup>1</sup>	N <sup>1</sup>	N <sup>1</sup>	
priest	king	prince	archbishop	

However, this deep structure is incorrect for two reasons.

First, *priest-king* and *prince-archbishop* do not have a [+disjunctive] reading. They are [-disjunctive]. Therefore, the features under N cannot be the result of the operation of the feature percolating mechanism. Second, none of the features [±exhaustive, ±totality, ±individuality] apply to these noun compounds because the compounds do not pattern with any of the quantifiers which these features account for. For example, these compounds do not pattern with *each*, *all*, *both* where these refer to the constituents of the compound. In fact only the feature [±disjunctive] seems to be needed to indicate the type of coordinate reading these compounds have.

These facts might be taken as counter-evidence for the existence of the feature percolating mechanism. However, an alternative hypothesis would be that the operation of the feature percolating mechanism does not take place across lexical nodes. The feature percolating mechanism would thus indicate a natural boundary between syntax and lexis.

(b) *The lexicalist hypothesis of compounding*

What support is there then for supposing, as I have now suggested, that compounds, even though they have internal structure, are to be found in the lexicon? In fact all the problems mentioned earlier for syntactic derivation of compounds turn out to offer support for a lexical view of compounding. The lack of disjunctive coordination is no problem for a lexical solution since lexical processes are typically of limited productivity. The lack of an overt conjunction suggests that the readings of this class of compounds are not related directly to the syntactic processes of coordination but may relate to the semantics of coordination in a limited way. The limit of two constituents is an arbitrary one and typical again of lexical processes, as is the conventional ordering and the idiosyncracies of the semantics of these compounds.

However, we have seen that there are certain, albeit limited, generalisations that can be made about these (and for that matter other) compounds. How are such limited regularities to be accounted for in a generative grammar? A solution is offered in Jackendoff's view of the lexicon (Jackendoff 1974). In a lexicalist lexicon each compound which exists in a language is given a normal lexical entry just like those for single words. The predictabilities among lexical items are accounted for by lexical redundancy rules. Jackendoff shows that these rules can



be linked to an evaluation measure for the lexicon which calculates the amount of independent information a lexical entry contains. For example, in the case of the lexical entry for the word *bomb* virtually all the information in the entry is idiosyncratic and unpredictable whereas in the entry for the word *bomber* the morphological structure is predictable from the entry for *bomb* and the structure of the suffix. The syntactic features are predictable since all words which have the *-er* suffix are nouns capable of performing actions. The semantics of the word are also predictable up to a point. We can say that words having the *-er* suffix are agents capable of performing the action of the verb they are tacked on to. What can't be predicted in this case is that bombers are either people or aeroplanes. The redundancy rules indicate what information is predictable and thus specify the independent information content of the entry. In so doing they explicate our intuition that some entries are easier to learn since they are partly learned on the basis of words we already know and rules like those of derivational morphology.

How are the rules of compounding to operate as lexical redundancy rules? First we must look at what is predictable. Obviously the phonological structure of the compound is predictable on the basis of its two constituents. Secondly the syntactic features of these compounds are predictable since they are subject to Schachter's Coordinate Constituent Constraint that:

the constituents of a coordinate construction must belong to the same syntactic category and have the same semantic function. (Schachter 1974:5)

We also know that the semantics of this class of compounds is basically a coordinate one. The kind of redundancy rules which would operate to calculate the independent information content of these compounds would thus be something like:

(7)  $\begin{matrix} /[\text{N}^x] & [\text{N}^y]/ & /x/ \\ & & +\bar{N} \\ +N & & /y/ \\ & & +\bar{N} \end{matrix}$

(8)	+N	+N
	Z AND W	Z
		+N
		W

Rule (7) specifies the morphological structure of the entry by relating the structure of the compound to the structure of its two constituents. Rule (8) specifies the semantics of the compound by relating it to the semantics of the two constituents. The double headed arrow reads "is lexically related to".

### III. RESIDUAL PROBLEMS

There is much that seems correct about Jackendoff's suggestions for the structure of the lexicon. However some residual problems remain. The first of these is with the stress of these compounds. I mentioned at the outset that this class of compounds has a different stress pattern from the normal run of noun compounds. This means that it cannot be subject to the compound stress rule (Chomsky and Halle 1968).

What this means is that this class of compounds has a certain unpredictability viz a viz the compound stress rule but a predictability lexically in that the members of this class have the same stress contour. There are thus two problems. The first is how to do the accounting for these items in the evaluation measure that Jackendoff proposes. On the one hand they must be regarded as less predictable and therefore cost more and on the other hand the redundancy rule which spells out what the contour is must have them costing less. I have no idea how such a trade-off between components with regard to the evaluation measure might work.

The second problem relating to stress comes about through Jackendoff's separation of the morphological aspects of the redundancy rule from the semantic one. In this particular case, the stress contour of these compounds is related to their semantic interpretation. Yet phonological idiosyncracies obviously cannot be specified in a semantic redundancy rule.

This brings up a second major problem with Jackendoff's formulation of redundancy rules and that is their informality. The double headed arrow notation appears to

have no formal status and needs to be replaced by a rather more rigorously formulated calculus for a full study of such rules to be possible. Only when that is done will it be possible to make decisions about how these redundancy rules might best be written. And, for example, how one might deal with the fact that there appears, in the case of coordinate conjoined compounds, to be a correlation between stress and semantics.

It might be the case that redundancies are best specified in three rather than two types of rules: phonological redundancy rules which relate phonological features to phonological features. In the case of compounds such a rule could be specified as a lattice structure. Syntactic redundancy rules would specify the constraints on what syntactic features will go with what others to make compounds. These again seem to be able to be specified as ordered sets (see Kuiper 1972). How one might write semantic redundancy rules seems to need the arrival of a rather fuller semantic theory than is presently available in generative grammar. Obviously, though, what is also needed is a system for linking particular rules together as in the case of the stress of coordinate conjoined compounds and their semantics.

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#### NOTES

- <sup>1</sup> I have noticed that some people do not always this pattern but do follow the compound stress rule. However I did notice a newsreader employing the coordinate type stress contour on a coordinative compound which must have been new to him; namely *ski-instructor boyfriend*. This does suggest that the coordinative compound does have the marked contour.
- <sup>2</sup> For some evidence for this not very contentious proposition, see Kuiper (1972).
- <sup>3</sup> I am grateful to Peter Tremewan for pointing out to me a French coordinative compound, *moissoneuse-batteuse-lieuse*, with three constituents.
- <sup>4</sup> I am not sure whether a twin tub machine is a *washer-drier*. If it is then it is like a *reaper-binder* which performs both functions at the same time but sequentially when viewed from the point of view of the items being processed.