THE CONSTITUENT STRUCTURE OF NOUN PHRASES

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It is customary to describe the English nominal as consisting of a sequence of constituents: predeterminers, determiners, adjectives, the noun head, and finally certain postnominal modifiers, such as relative clauses. Of course, certain types of the nominal, such as the proper noun or the personal pronoun, can then be taken as special reduced cases in which some or all of the subsidiary constituents may be forbidden. As a superficial description of the 'physical' parts of the nominal, such an analysis seems unassailable, but unfortunately it is also not very illuminating.

A slightly more detailed analysis has been given on several other occasions. For example, C. W. Barritt, in his dissertation, analyzed the adjectival and determiner parts into finer subdivisions according to some more-or-less strict ordering among modifiers, and he succeeded in this way in explaining why we have no nominals of the form:

1. *three the clowns
2. *some tall both men
3. *an 'in the corner table

But this and other such 'segmentative' analyses fail to explain a number of other grammatical facts about nominals which a linguistic description should somehow represent.

In a long and rather abstruse study of the proper noun in English, Sørensen

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1. This is the revised version of a paper which was presented on May 6, 1961, at the Sixth Annual Conference on Linguistics sponsored by the Linguistic Circle of New York.
2. Nearly all 'descriptions' of the English nominal analyze it into a sequence of different 'kinds of modifiers' together with a head noun; there is thus little point in referring the reader to any one particular traditional analysis or to an exhaustive bibliography. A very clear exposition of the accepted position can be found, for example, in Paul Roberts, Patterns of English (New York, 1956), pp. 77–96.
4. Expressions such as an off-Broadway show, an out-of-town guest, and so forth, are not counterexamples to our assumption that *an in the corner table is ungrammatical. In the latter type of expression the apparent internal modifier is intended as an ordinary prepositional phrase adverbial with the usual weak or tertiary stress on the preposition as in the underlying sentence The table is in the corner, while in the former we recognize composite adjectivals with strong stress (secondary) on the first element constructed in the same manner as compound nouns. Thus, for example, an out-of-town guest would not be derived in the usual way from a who is out-of-town guest, in turn from The guest is out of town; it is, rather, a compound modifier from The guest is from out of town.
at least recognized certain additional grammatical peculiarities, and he tried
to represent some of the particulars of the constituent structure by means of
an elaborate and opaque Hjelmslevian terminology, a series of cumulative
pseudo definitions. For example, he correctly perceived that the postnominal
modifier in nominals of the form:

4. the car which you bought
is properly construed as a subconstituent of a discontinuous determiner con-
stituent, and he chose to analyze the definite determiner as containing an
obligatory postnominal or other modifier which can then be deleted optionally
in context. He also noticed that there is a contrasting generic determiner,
having the shape the/a in the singular, zero in the plural, which marks generic
nominals, and that these are incompatible with the so-called ‘perfect’ verb
tenses; in other words, there are no sentences of the form:

5. *Horses have been mammals.

Incidentally, one might add that generic nominals also do not appear as the
subject of a copula sentence whose predicate is a locative adverbial, as in the
ungrammatical:

6. *Horses are over there
while indefinite nominals do not occur as the subject of any other copula predi-
cate:

7. *Some horses are mammals
8. *Some horses are swift
(in which the word some is the weak-stressed plural indefinite article), nor
do they occur in the predicate itself:

9. *Those horses are some mammals.

6. Such an analysis, with a relative clause modifier as an obligatory constituent of the
‘definite article’ deleted only optionally in context, then explains why a sentence beginning
with a definite noun-phrase subject and no accompanying relative clause does not ordinarily
occur except after a sentence containing that subject or its ‘equivalent.’ In other words,
the conversation does not ordinarily begin with a sentence like ‘The car broke down,’ but only
with one like ‘The car which I was telling you about broke down,’ though it might very
well begin with ‘I just bought a car. The car...’ That is, the context for optional deletion
of the relative clause is, roughly, previous occurrence of the noun head. Naturally, one
must distinguish cases of the morpheme the used as constituents other than definite article,
as in ‘The Rockies’ (after an introductory sentence whose subject is The Rockies one does
not reply with the question ‘Which Rockies?’).

7. In other words, the putative sentence *Horses have been mammals is not parallel to a
bona fide sentence such as Those horses have been groomed. In so far as utterances of the
form in question are used, they are best construed as elliptic variants of longer sentences of
the form It has always been true (understood, recognized, assumed, asserted, and so on) that
horses are mammals. In other words, the ‘perfectivity’ of the verb phrase is not construed
with the copula itself but rather with some other verb in an underlying source sentence.
Notice that the utterance in question could only be used in a form like Horses have (always)
been mammals as long as I have been studying zoology, or the like.
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Such constraints as these, like those on adjective ordering, are easily analyzed by means of a finer taxonomy of determiners—in this case, a subdivision into definite, indefinite, and generic determiners, various order classes of adjectives, and so on, though the constituent structure of the definite nominal will still not be expressible by means of ordinary immediate constituent analysis, except possibly through some such device as Harris’s discontinuous componental analysis.

But there are still other regularities which are not adequately expressed by any immediate constituent analysis, discontinuous or otherwise. For example, there must be some close relationship between the nominal expressions:

10. A dog is barking
11. a dog which is barking
12. a dog barking
13. a barking dog

a fact which is supported by both intuitive and formal grounds. As for the former, any speaker of English knows that these expressions are used in very similar ways, almost equivalently, though it is hard to specify what is meant by such synonymy. On the other hand, there are systemic reasons why we should like to relate such expressions in a strong way in a formal description of English. Somewhere, the rules of an adequate grammar would have to permit the construction of the sentence

14. The crowd is scattering
but surely not the utterance
15. *The dog is scattering.8

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8. Again, as in the case of the previous footnoted examples, those who for various reasons choose to adopt the shallowest view of grammaticalness will object that by exercising a modicum of imagination one can construct a Gedanken situation in which the starred utterance might well be used. But this fact is not really to the point, for indubitably ungrammatical utterances are often used, say for their comic or poetic effect. The point at issue is rather whether such utterances are best accounted for on the basis of ordinary grammatical rules of English, in which case their abnormal character remains unexplained or is ascribed to some unanalyzed and vague semantic fact about the world, or whether they are better accounted for on the basis of more or less severe distortions of the ordinary grammatical rules.

It is often asserted that the strangeness of utterances such as no. 15 can only be ascribed to a semantic fact about the unitary nature of dogs as objects and the meaning of scatter; that is to say, the utterance is avoided only because of the incongruous lexical choices involved. But notice that this interpretation is equally plausible for acknowledged cases of ungrammatical utterances, such as *The dog are barking. Avoidance of the latter utterance can be interpreted as an incongruity in meaning between dog which refers to singular objects, and are (or are barking), which refers to collections of singular objects. Why is this explanation never offered for this case? Why is it always explained in terms of a formal grammatical rule of agreement in number between subject and verb in English sentences? The answer is obvious: it is simply a question of simplicity, economy, or generality. The latter, or semantic, explanation would require us to specify for infinitely many individual
But notice that there will also have to be corresponding restrictions built into the grammatical rules to permit the construction of the nominals:

16. the crowd which is scattering
17. the crowd scattering
18. the scattering crowd

but to prevent the construction of the ungrammatical expressions:

19. *the dog which is scattering
20. *the dog scattering
21. *the scattering dog

Since these latter restrictions are identical to the former, either they must be repeated en masse in the grammar, or else the one set of restrictions must be made to entail both sets of desired expressions and reject both sets of ungrammatical expressions. The only way to achieve this kind of simplification which has ever been proposed is Chomsky’s suggestion to formulate the rules of the grammar so as to derive one of the expression types from the other after the necessary restrictions have been imposed.9 A ‘segmentative’ analysis of nominal expressions, that is, one which serves simply to fragment nominals into subsequences of words, with or without class labels, cannot afford this kind of generalization about grammatical form.

Since in each set of related expressions there is always at least one full sentence (very often a copula type of sentence, since sentences of this form are required among all the enumerated expressions in any case), whether related to a nominal modifier expression or not, and since the nominal modifiers are in general shorter, or less complex, than the related sentences, it seems reasonable

cases which nominals could accompany which verbs (as subject and predicate), depending upon which of them referred to singular objects and which to collections (or the like). But generalizing over all such cases, the linguist can telescope them into one single, economical rule of agreement as a formal requirement for well-formed English sentences; and he can do this despite a number of apparent exceptions which must be accounted for on the basis of subsidiary rules (for example, people must be interpreted as an inherent plural).

Now, the point of view adopted here is the same: rather than describing each individual avoided utterance in terms of some vague semantic incongruity about singular objects performing acts of scattering, collecting, dispersing, meeting, convening, joining, combining, and so on, we note that there are regularities here which can be construed as formal constraints on well-formed sentences; that is, one can generalize about the failure of singular count nouns to occur as subjects of certain verbs. Some of the latter, such as scatter, may take only mass nouns and plural count nouns; others, such as kiss or meet, may take only conjoined nominals or plural count nouns. These small classes of verbs are then often characterized by other formal peculiarities, and thus the distinctions which the classification makes among verbs permits one to formulate even more generalizations about normal English sentences than just the one peculiarity in question.

While we do not thereby deny that there is some difference between cases like *dog are on the one hand and *dog scatters on the other, our point is that this difference is not one of grammatical versus semantic.

to derive nominal modifiers from underlying sentences. In other words, we shall view both the adjectival *who is tall* in the nominal *the man who is tall* and the adjective *tall* in the nominal *the tall man*, as being derived from an underlying copula sentence *The man is tall*, which is incidentally also a kernel sentence of English.10

Clearly, an intermediate problem will be to specify exactly which of the resulting derived nominal modifiers is to appear in the position just before the head noun and which of them must appear in postnominal position. Roughly speaking, the prenominal adjectivals will be only single, simplex (descriptive) adjectives. All others, including complex adjectives (such as *blue in the face*) are postnominal. However, because of certain constraints which must be developed in the underlying constituent structure of all noun phrases, it is not desirable simply to generate simplex adjectives to the left and complex modifiers to the right of the head noun. Rather, both must be developed between the determiners and the noun, and then postnominal modifiers can be shifted out beyond the noun obligatorily.

The reason that we wish to have all the modifiers directly adjacent to the article is that one (and, incidentally, only one) relative clause modifier (or its equivalent) will be construed as an obligatory constituent of the prenominal determiner in a definite noun phrase, though modifiers are optional in non-definites, whether generic or indefinite. In other words, we wish to construe as exactly parallel the determiners in *each dog, this dog*, and the composite *the dog which . . .*, for while these are reducible identically to the pronominalized *each one, this one*, and the one *which . . .*, or finally all the way to *it*, the definite noun phrase containing only an article *the* is not so reducible to a pronominalized *the one*. Therefore we take the latter type to be an elliptic variant of *the . . . which . . .*, the optional deletion of the modifier either occurring in the grammar after the pronominalization, or else being so constrained as to reduce only the full determiner with undeleted relative clause.

Thus, to this point, the description of the formal features of English nominals which we have adopted might be expressed in the form of the following grammatical rules specifying explicitly how to construct well-formed noun phrases:11

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10. Ibid., p. 45.

11. The following notational conventions are employed in these rules: *Nom*=nominal; *NP*=noun phrase; *PP*=personal pronoun; *Pl*=plural morpheme; *N*pr=proper noun; *T*=article; *Sb*=substantive; *Cn*=nominal complement (i.e., modifier); *N*=noun; *Td*=definite article; *Tn*=nondefinite article (i.e., indefinite and generic); *Cm*=modifier complement (i.e., postnominal modifier); *Cp*=property complement (i.e., prenominal adjectival); *X* and *Y* are arbitrary strings of constituents; *WH*=the interrogative/relative morpheme of *which, who, etc.; ‘—’ means *may be rewritten as*; parentheses enclose optionally chosen constituents, braces enclose alternatively chosen constituents; ‘+’ concatenates otherwise unseparated constituents; and all rules must be applied in the given order wherever applicable.
This set of constituent structure expansion rules provides for the underlying phrase structure of all noun phrases. As indicated above, there will then be a later rule of ellipsis in the transformational component of the grammar to delete optionally the modifiers in a definite noun phrase:

(ix) \( X + T + d + C_N + Y \rightarrow X + T_d + Y \)

Furthermore, among the grammatical transformational rules there will be a set which serves to replace the 'property'-type modifiers \( C_p \) by relative clauses which can later be reduced to adjectives or other prenominal modifiers, a set which replaces the postnominal modifier component \( C_m \) by its relative clauses, a set to reduce relative clauses of all types to modifiers of the verbal, copula, have, and possessive genitive types, and finally an obligatory transformational rule to shift the substituents of \( C_m \) out beyond the noun:

(x) \( X + C_m(C_p)N + Y \rightarrow X(C_p)N + C_m + Y \)

The underlying constituent structures developed by Rules (i) through (viii) are, then, of the forms:

\[
(A) \quad \text{Nom} \\
\quad \text{NP} \\
\quad \text{T} \\
\quad \text{Sb} \\
\quad \text{T}_d \quad \text{C}_N \quad \text{C}_m \\
\quad \text{the} \quad \text{whom} \quad \text{you} \quad \text{see} \\
\quad \text{the} \quad \text{tall} \quad \text{man} \quad \text{whom} \quad \text{you} \quad \text{see} \]

\[
= \text{the tall man whom you see} \]
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(B)

Nom

NP

T

Sn

(T_n)

(C_N)

(N)

(C_m)

(C_m)

(C_p)

man

I

man

E. g.: a tall man whom you see

a whom you see tall man =

To illustrate the operation of the sentence-embedding relative clause rules and the subsequent reductions, consider the case of the definite nominal the tall man on the corner. As just mentioned, the underlying constituent structure of the matrix nominal would be (A):

Nom

NP

T

T_d

C_N

the

C_m

(C_N)

(N)

(C_p)

man

We have then the derivation:

23. $X + \text{the} + C_m + C_p + \text{man} + Y$

24. The man is on the corner.

25. $X + \text{the} + \text{WH} + \text{the} + \text{man} + \text{is} + \text{on} + \text{the} + \text{corner} + C_p + \text{man} + Y$

Next, the other complement $C_p$ is replaced by its appropriate relative clause from another underlying constituent sentence:

24. $X + \text{the} + \text{WH} + \text{the} + \text{man} + \text{is} + \text{on} + \text{the} + \text{corner} + C_p + \text{man} + Y$

25. The man is tall.
26. $X + \text{the} + WH + \text{the} + \text{man} + \text{is} + \text{on} + \text{the} + \text{corner} + WH + \text{the} + \text{man} + \text{is} + \text{tall} + \text{man} + Y$

[Incidentally, this string (no. 26) underlies a nominal of the form:
27. (*) The man who is tall who is on the corner,
which is, I presume, best reduced obligatorily beforehand to
28. the tall man who is on the corner;
and optionally to
29. the tall man on the corner.]

After the construction of the relative clause modifiers the next rules to apply are those which reduce these to nominal modifiers by deletion of the $WH$-constituent (which otherwise would ultimately have become $who$ or $what$) and also certain parts of the embedded verb phrase. In our example, the underlying constituent sentences were both copula sentences in be, and this constituent is always deleted in the formation of such nominal modifiers as those of the forms:
30. a man deserving of reward
31. a man accepted by the committee
32. a man in a white suit

Thus, the underlying string derived so far is reduced:
26. $X + \text{the} + WH + \text{the} + \text{man} + \text{is} + \text{on} + \text{the} + \text{corner} + WH + \text{the} + \text{man} + \text{is} + \text{tall} + \text{man} + Y$ \longrightarrow
33. $X + \text{the} + \text{on} + \text{the} + \text{corner} + \text{tall} + \text{man} + Y$.

Finally, all reflexes of the $C_m$ modifier are obligatorily shifted out beyond the head noun:
33. $X + \text{the} + \text{on} + \text{the} + \text{corner} + \text{tall} + \text{man} + Y$ \longrightarrow
34. $X + \text{the} + \text{tall} + \text{man} + \text{on} + \text{the} + \text{corner} + Y$

yielding the desired representation.

All unreduced relative clauses are also obligatorily shifted out, even as reflexes of $C_p$\textsuperscript{12} so that we shall not obtain:
35. *the who is tall man
In exactly the same way modifiers in with, as in
36. the man with the green hat
can be obtained from underlying constituent sentences in have:
37. The man has the green hat.

Moreover, the so-called 'possessive genitive' can also be analyzed as a replacement of the sequence definite article plus relative clause modifier, where the latter is of the form $WH + Nom + has$. In other words, John's car is an optional reduction of the which John has car, another reflex of which would then

\textsuperscript{12} Say, by means of a rule:
\[(x) \quad X + T + WH + Y + N + Z \longrightarrow X + T + N + WH + Y + Z\]
where $WH + Y$ is a $C_p$.\textsuperscript{12}
have been the car which John has. The genitive noun or pronoun has the phrase structure, on this analysis, of $T_a + C_m$.\textsuperscript{13}

In conclusion, let us see roughly what the final constituent structure of derived, or complex, noun phrases might be. Substituting reformed versions of underlying constituent sentences for the basic nominal-complement constituents $C_m$ and $C_p$ will not alter the main phrase structure of the noun phrase; it will simply expand it from within. But shifting a constituent $C_m$ out from between the article and the noun to a position beyond the noun will surely fracture the underlying constituent structure and reduce the degree of branching or simplify the ramification in the underlying hierarchical echelon structure. Consider first the case of a nondefinite noun phrase, for which the underlying branching diagram was (B):

\begin{equation*}
\text{Nom} \\
\text{NP} \\
\text{T} \\
\text{Sb} \\
\text{T}_n \\
(C_N, C_m, C_p) \\
\text{N}
\end{equation*}

When the $C_m$ constituent is detached from the tree and shifted out, the $C_N$-node is broken up; the $C_p$ part of the fractured node must be reattached at the next higher node $Sb$, and the permitted element $C_m$ may also be reattached at that node, yielding:

\begin{equation*}
\text{Nom} \\
\text{NP} \\
\text{T} \\
\text{Sb} \\
\text{T}_n \\
\text{C_p} \\
\text{N} \\
\text{C_m} \\
\text{on the corner}
\end{equation*}

\text{tall} \\
\text{man}

\text{3. The reduction rule might then be:}

$X + T_a + WH + T_a + N' + Nom + Tns + have(C_p)N + Y \rightarrow X + Nom + Gen(C_p)N + Y$

where $Tns$ is the tense or obligatory part of the auxiliary and $Gen$ is the genitive morpheme; and where $WH + \ldots + have$ is a $C_m$.\textsuperscript{13}
Thus, where there were originally five hierarchical levels of binary branching in the underlying tree, the transformed tree has only four, but it now contains one trinary branching.

The case of the definite noun phrase is slightly more drastic, for we have construed the $C_m$ complement to be a member of the determiner constituent. This means that shifting it out will involve the erasure of even higher nodes of the tree than was the case with nondefinite nominals. The underlying branching diagram was (A):

\[
\text{Nom} \\
\text{NP} \\
\text{T} \quad \text{Sb} \\
\text{T}_d \quad \text{C}_N \quad \text{(C}_N \text{)} \quad \text{N} \\
\text{C}_m \quad \text{C}_p
\]

Detaching $C_m$ from the tree will break the $T$-node itself, and then all loose branches, namely $T_d$ and $C_N = C_m$, must be reattached at the next higher node, namely, at $NP$, to yield the derived tree:

\[
\text{Nom} \\
\text{NP} \\
\text{T}_d \quad \text{Sb} \quad \text{C}_N \\
\text{C}_p \quad \text{N} \\
\text{the} \quad \text{the} \quad \text{tall man} \\
\text{on the corner}
\]

There are still many subtle details of formal organization in English nominals which this analysis either neglects or formalizes incorrectly, but it at least illustrates a reasonable and explicit framework within which alternative analyses can be evaluated.