SOME REMARKS ON NOUN PHRASE STRUCTURE

Elisabeth Selkirk

Department of Linguistics
University of Massachusetts
Amherst, Massachusetts

Perhaps the single most important contribution to the development of linguistic theory in this century has been the demonstration of the inadequacy of phrase structure grammars as a model of linguistic structure. This demonstration, made first by Chomsky in *Syntactic Structures*, and subsequently reiterated by Chomsky, Postal, Lees and others[1] in a number of classic papers, laid the ground for the emergence of a new theory of linguistic structure. According to this new theory, the grammar of a language includes not only a set of phrase structure rules (PS-rules) but, in addition, a set of transformational rules, rules that perform operations on the phrase markers generated by the PS-rules. This theory, the theory of transformational grammar, has come to dominate linguistic work in the United States and elsewhere in the last twenty years.

Transformational rules so captured the interest and the imagination of workers in the field that the greater part of the syntactic investigation carried out in this recent period has focused on the transformational component of a grammar. Attention has primarily been directed toward the discovery of transformations, the study of their formal properties, and the conditions on their application. Constituent structure per se took the back seat.

This is not to say that advances were not made in our understanding of the constituent structure of natural languages. There have been advances in this area, but those aspects of sentence structure that are now best understood are precisely those that have been relevant to the operation of some transformation or other. We may know, for example, that some PP is dominated by NP, if a transformation moves that PP along with the rest of the NP. Or we may discover from the operation of a transformation like VP-deletion whether or not some complement is dominated by VP, or some higher node. For quite a period of time, however, the internal structure of a category like NP went unstudied, for the simple reason that

so few of the better known transformations were relevant to it. Questions of phrase structure were addressed insofar as they bore on the study of transformations.

Chomsky's *Aspects of the Theory of Syntax* (1965) was exceptional in its concern with the role of PS rules in a generative grammar. Indeed, the view soon emerged, under the name of generative semantics, that there was *no* role for PS-rules in a generative grammar. The debate centered on the existence of an underlying level of syntactic structure where significant generalizations about the canonical syntactic form of a language could be captured, by means of PS-rules. The proponents of generative semantics denied the existence of such a level, and claimed instead that all languages have a same underlying structure, one identical to logical form. In doing so they entrusted to the transformations of particular languages the central task of generating the language-specific peculiarities of syntactic form revealed in their surface structure; I mention this debate not to add anything of substance to it, but only to point out the extremes to which some linguists have gone in their zeal to give transformations the leading role in a grammar.

In recent years, many linguists have come to a renewed understanding of the primordial role of PS-rules in a grammar. The base-schema hypothesis, an innovative theory of phrase structure put forth in Chomsky (1970) has provided the impetus for new and original research on the phrase structure of English, in particular, and on the notion "possible phrase structure rule."[2] This line of research has led to a re-evaluation of many earlier transformational analyses, and one has increasingly seen the role of transformations diminished in the derivation of a sentence. It has been shown, for instance, that nominalizations must be generated as such in the deep structure (Chomsky, 1970), that quantifiers, among them comparative elements, should be generated in deep structure in the prenominal position that they occupy in surface structure (Stockwell et al., 1973, Jackendoff, 1968, forthcoming, Selkirk, 1970, Bresnan, 1973), and that prenominal adjectives must be generated in prenominal position in deep structure (Bresnan, 1973). This trend we see unfolding is one of the reaffirmation of the integrity of linguistic form, as expressed in phrase structure rules.

The present paper falls within this trend, and its primary goal is to make a contribution to our understanding of certain aspects of noun phrase structure in English. The investigation of noun phrase structure–the determination of the constituents that compose the noun phrase–is not without its difficulties, for few transformations, those invaluable tools of constituent structure analysis, ever apply within this domain. The investigator of the noun phrase thus has very few of these tools, and so must seatch for other sorts of arguments in articulating his or her hypothesis about noun phrase structure. One of the morals of the story to be told here is that syntactic arguments *can* be found for and against competing hypotheses concerning the hierarchical relations within this phrase category. In this light, an examination will be undertaken of noun phrases of the types *many women, many of the women, a bunch of flowers, a bunch of the flowers*. It is also hoped that the analysis to be offered will permit certain points to be made about the theoretical issues providing the focus of this conference–the thesis of the autonomy of syntax.

The autonomy thesis receives support from any demonstration that there is not a one-one mapping between syntactic form and semantic interpretation. These demonstrations can be made quite readily, if one assumes that the grammar includes a level of deep structure, with a fully articulated theory of phrase structure such as has been developed in recent research. Two examples stemming from some of this research might help demonstrate this point:

(i) *Mary is a* ***more outrageous dancer*** *than Andrea is.*

(ii) ***The presentation of the Palestinian delegation*** *made a big impression.*

In both cases, it is claimed, the boldfaced noun phrases are syntactically unambiguous, with surface structures that are furthermore almost identical to the deep structures. Yet the semantic component must assign two rather different interpretations to these collocations of constituents. In the first case, the adjective phrase *more outrageous* may be describing Mary's qualities as a dancer; here the adjective combines with the noun to make a derived property of sorts. But *more outrageous* may also be being predicated of Mary, in general, independent of her dancing. This distinction in prenominal adjective function has long been recognized, and it has been thought that prenominal adjectives in surface structure may have two different deep structure sources–one prenominal, the other in a relative clause of the form NP *be* AP (cf. Siegel, 1976, for example). However, Bresnan's (1973) demonstration that a NP with a prenominal "compared" adjective in surface structure must also have that shape in deep structure rules out this latter explanation for the source of the ambiguity in (i). One must conclude that two different semantic operations must be performed on that single adjective phrase/noun configuration.

In the second example above, the complex noun phrase in boldface may be given two interpretations depending on what grammatical relations are assigned to *the Palestinian delegation*. The delegation may be either the object of *presentation*, i.e., the Palestinians may be being presented, or the delegation may be the subject of *presentation*, i.e., doing a presentation. It seems clear by now that nominalizations like that in (ii) are not derived from a sentence, but rather are generated in the deep structure. And it seems desirable to argue that both the object and the subject instances of *the Palestinian delegation* are generated in their postnominal position in deep structure. As a consequence, it is up to the semantic component to provide a representation of the two different functions of the delegation.

The subject function must also be assigned to noun phrases appearing in two other structural configurations within the NP, as illustrated in (iii) and (iv).

(iii) *The Palestinian delegation's presentation . . .*

(iv) *The presentation by the Palestinian delegation . . .*

The possessive NP in English may play the role of a subject; the NP contained within a *by*-phrase must play that role. It is quite likely that there is no common deep structure source for *the Palestinian delegation* in (iii) and (iv) and the one with the subject interpretation in (ii).[3] If this is indeed true, then the autonomy thesis receives support once more. A one-one mapping between syntactic form and

semantic interpretation is impossible, this time because one type of semantic function must be assigned to a NP appearing in a number of distinct syntactic configurations.

The noun phrase constructions investigated in this paper do bear on the issue of the autonomy of syntax. It is shown that expressions like *many women* have a structure distinct from that of *many of the women*, and that *a pound of potatoes* has a structure different from *a pound of the potatoes*. Yet it is not entirely clear that the semantic properties of the members of these pairs are all that different. The point is that whatever these similarities in semantic representation are, they will have to be obtained through the operation of the semantic rules to two distinct sytnactic configurations.

1. The QP within NP

English noun phrases may be divided into two types according to the syntactic characteristics of the quantifier and determiner elements specifying the head noun. The first type, that will be called the simple noun phrase, is exemplified by *some people, each woman, an objection*. Here the determiner precedes the head noun directly, or is separated from it only by an adjective phrase, as in *some rich people*. These simple noun phrases are generally thought of as having roughly the underlying structure in (1).

(1) $_{NP}[\ some_{Det}\ _{\bar{N}}[\ people_{N}]_{\bar{N}}\ ]_{NP}$

(Until we have accumulated further information regarding the internal structure of the NP, we will refrain from making precise what other nodes, if any, dominate Det and/or $\bar{N}$ under NP.) The second type of noun phrase is called the partitive noun phrase. Typical examples of partitives are the following: *many of these people, each of the women, some of her objections, three of the chapters*. Common to most every analysis of the partitive noun phrase is the claim that it contains a noun phrase within a noun phrase, i.e., that it has at least the structure of (2).

(2) $_{NP}[\ some_{Det}\ (of)_{NP}[\ her_{Det}\ _{\bar{N}}[\ objections_{N}]_{\bar{N}}]_{NP}]_{NP}$

(Again, we leave any further specification of the internal structure of these phrase types until later.) The simple noun phrase and the partitive noun phrase are thus significantly different in underlying (and surface) structure.

The question I would like to pose is this: how do noun phrases like *many objections, three chapters, the two objections* fit into this scheme? Do they have the deep structure of (3) or of (4)?[4]

(3) $_{NP}[\ many_{QP}\ _{\bar{N}}[\ objections_{N}]_{\bar{N}}\ ]_{NP}$

(4) $_{NP}[\ many_{QP}\ (of)\ _{NP}]\ [\Delta]_{Det}\ _{\bar{N}}[\ objections_{N}]_{\bar{N}}]_{NP}\ ]_{NP}$

The answer is that noun phrases like *many objections* are simple noun phrases like (3); and in this section arguments will be adduced that demonstrate that they cannot be derived from structures like (4). The hypothesis according to which (4) or something like it underlies *many objections* or *two dogs* will be dubbed the Hidden Partitives Hypothesis, or HPH. It has had a number of advocates (Jackendoff, 1968, Selkirk, 1970, Bresnan, 1973).

The hypothesis that will be defended here may be dubbed the Simple Noun Phrase Hypothesis, or SH. The feature of this hypothesis most important for our immediate concerns is the generation of the quantifier phrase containing *much, many, little, few*, and the numerals as sister to $\bar{N}$ within the NP. In contrast to the SH, the HPH asserts that there is no source for QP as sister to $\bar{N}$ within NP, rather that any noun phrase containing one of these QP will have to have the structure of a partitive. With the HPH, identical deep structure configurations will be assigned to *many objections* and *many of the objections*. Compare (4), the HPH-source for *many objections* to (5), the deep structure for *many of the objections*.

(5) $_{NP}[\ many_{QP}\ (of)\ _{NP}[\ the_{Det}\ _{\bar{N}}[\ objections_{N}]_{\bar{N}}]_{NP}\ ]_{NP}$

The first set of arguments that can be made against the HPH and in favor of the SH-analysis of *many objections* involves impermissible combinations of Quantifier plus Noun. These ungrammatical noun phrases can be ruled out in a quite general and natural fashion by the SH, but require the HPH to invoke ad hoc constraints to eliminate them. Compare first the sentences of (6a) and (6b).

(6) a. *She doesn't believe* ***much of that story****.*
We listened to ***as little of his speech*** *as possible.*
How much of the frescoes *did the flood damage?*
I read ***some of the book****.*

b. **She doesn't believe* ***much story****.*
We listened to* ***as little speech* *as possible.*
****How much frescoes*** *did the flood damage?*
****I read some book****.* (as [-count])

The partitives of the (a) sentences allow a mass, i.e., non-count, quantifier phrase to co-occur with a lower noun phrase containing a singular count noun. But the (b) sentences show that mass quantifiers (or determiners) may not directly precede such count nouns. These facts are easily explained within the SH-theory, which assigns different deep structures to the (a) and (b) types. Within the SH-theory we will impose the condition that in a simple noun phrase like those of (1) or (3), all specifier elements (quantifiers, determiners) are required to agree with the head noun in their specificiation of the syntactic feature [count]. In fact, as will become clear, the specifier elements and the head noun of a simple noun phrase must agree for *all* syntactic features–count, number gender, case. Thus agreement for syntactic features is an entirely general condition on the well-formedness of simple noun phrases, and is undoubtedly a syntactic universal, hence not part of the grammar of of English per se. In partitives, like those in (a), this condition on agreement is

inapplicable. No agreement between the higher quantifier and the lower noun phrase is required, and mass and count elements can therefore co-occur.

Within the HPH, the agreement condition for simple noun phrases will also be required. But this condition would do no work in ruling out the (b) sentences, which are not simple noun phrases for the HPH, but partitives. So, in addition, the HPH requires a constraint ruling out mass–count combinations in some partitives, but not in others. Those where the additional constraint must apply are those where the determiner is null, i.e., those in (b); the constraint would apply nowhere else.

The next set of troublesome facts centers on the difficulties the HPH encounters when it derives Quantifier-Noun combinations where the quantifier is the numeral *one*. The noun phrase *one book* is to be derived from *one (of)* $[\Delta]_{\text{Det}}$ *books*, with a change in number of the head noun from plural to singular, according to Jackendoff (1968). But the results produced are ungrammatical when the lower noun is conjoined, as in (7), is a collective noun, as in (8), or is modified by a semantically plural adjective, as in (9). Compare the (a) and (b) sentences of the sets below.

(7) a. { *One* / *Many* } *of her brothers and sisters was/were arrested for disturbing the peace.*

{ *One* / *Several* } *of the workers and artisans in Via del Corno was/were in the party.*

{ *One* / *Few* } *of the men and women there was/were a fascist(s).*

b. { **One mother(s) and sister(s)* / *Many brothers and sisters* } *was/were arrested . . .*

{ **One worker(s) and artisan(s)* / *Several workers and artisans* } *in Via del Corno was/were . . .*

{ **One men (man) and women (woman)* / *Few men and women* } *there was/were . . .*

(8) a. { *Many of the cattle* / *One of the people* / *Several of the womenfolk* } *was/were dying of thirst.*

b. *Many/*one* { *cattle* / *people* / *womenfolk* } *was/were dying of thirst.*

(9) a. *After* { *two* / *one* } { *of her successive failures on the New York stage,* / *Mary did a short stint in a suburban night club.* }

{ *Two* / *One* } *of the consecutive blasts of the whistle was/were enough to wake her from a deep sleep.*

b. *After* { *two* / **one* } { *successive failure(s) on the New York stage,* / *Mary did a short stint in a suburban night club.* }

{ *Two* / **One* } *consecutive blasts of the whistle was/were enough to wake her from a deep sleep.*

In all cases, the partitives of (a) are grammatical, whether the quantifier is *one*, *two*, *many*, or whatever. But the (b) noun phrases, while allowing plural quantifiers, are ungrammatical with *one*. The head nouns are inherently plural–for a variety of reasons–and therefore cannot undergo the number change that the HPH requires. So the HPH must add some mechanism to the grammar to exclude them. No such additional mechanism is required by the SH, however. With the SH it is simply the agreement condition on simple noun phrases that rules out the (b) sentences.[5]

To summarize, in the sentence sets (6–9) the examples of (b) show ungrammatical combinations of mass quantifier with count noun and singular quantifier with plural noun (or $\bar{N}$). The ungrammatical noun phrases of (6) though (9) can be ruled out by the SH merely by imposing what is undoubtedly a universal condition on simple noun phrases–that the specifier elements and head noun agree for all grammatically relevant syntactic features such as count, plural, gender, case, etc. Such a condition must be available to the HPH as well, for its own simple noun phrases where the specifier is Det. But, the HPH must appeal to an additional mechanism in order to rule out as ungrammatical the (b) sentences, which are generated as partitives, not simple noun phrases. Such a mechanism would have to exclude mismatches in the syntactic features [count] and [plural] between the higher quantifier and lower head noun just in case the lower Det is null, that is, just in case, at surface structure, that partitive would end up looking like a simple noun phrase. Only the SH provides a unified explanation for the ungrammaticality of the (b) sentences. Based on this evidence alone, then, it is to be preferred to the HPH. Further investigation will show additional drawbacks with the HPH while revealing the SH to be eminently capable of accounting for all the data.[6]

Recall that the HPH must allow for the conversion of (10) into (11).

(10) *one (of)* $_{\text{Det}}[\Delta]\ [^{\text{N}}_{+\text{plur}}]$

(11) *one* $[^{\text{N}}_{-\text{plur}}]$

Notice now that the HPH has problems when relative clauses are taken into consideration. As has been pointed out in the literature (Dean, 1967, Jackendoff, 1968, Selkirk, 1970, Stockwell et al., 1973), in partitive noun phrases relative clauses may "modify" both the lower and upper noun phrases. The sentences in (12) where the number agreement in the restrictive relative clauses is not the same, should suffice to demonstrate this point.

(12) *(That) one$_i$ of the politicians$_j$ that were$_j$ arrested together last week who is$_i$ willing to talk thinks he's going to save his skin.*

Each of those liberal candidates who were in favor of ecology who was known to have a compost heap was elected.

What would happen if the lower noun *politicians* or *candidates* had an indefinite determiner? According to the HPH, the *of* would fail to appear, producing the sentences of (13), which are ungrammatical.

(13) **(That) one* ***politician that were arrested together last week*** *who is willing to talk thinks he's going to save his skin.*

**Each liberal candidate who were in favor of ecology who was known to have a compost heap was elected.*

Similar problematic noun phrases are listed in (14).

(14) **One leftist worker that were murdered one by one by the generals*
**One teacher who got to know each other last summer*

The sentences (15) and (16) are not generated at all by the SH-grammar, for since *one politician* is an underlying singular simple noun phrase, it will never be associated with a relative clause with plural number agreement.

Notice furthermore that the HPH would generate the ungrammatical

(15) **Two people that had left the meeting in a threesome*

deriving it from the partitive source in (16)

(16) $_{NP}[$ *two (of)* $_{NP}[$ *people* $_{S}[$ *that had left in a threesome* $]_{S}]_{NP}]_{NP}$

Because both sentences of (17) below are grammatical, it appears the HPH would require some ad hoc surface filtering out of (15).

(17) *The people that had left the meeting in a threesome were rounded up by the DINA.*

Three people that had left the meeting in a threesome were rounded up by the DINA.

A final argument attesting to a structural difference between *many objections* and *many of the objections* is provided by the behavior of the transformation of extraposition from NP in its application to these different phrase types. In (18) and (19) we see examples of partitive noun phrases and what we have been claiming to be simple noun phrases.

(18) *How many of the answers to this classical mechanical problem have been found?*

Two of those reviews of Helen's first symphony have been reprinted.

(19) *How many answers to this classical mechanical problem have been found?*

Two reviews of Helen's first symphony have been reprinted.

In all of these noun phrases, the head noun has a PP-complement. The partitive noun phrases of (18) do not allow extraposition of that PP:

(20) *?*How many of the answers have been found to this classical mechanical problem?*

*?*Two of those reviews have been reprinted of Helen's first symphony.*

But the simple noun phrases of (19) do allow extraposition of PP:

(21) *How many answers have been found to this classical mechanical problem?*

Two reviews have been reprinted of Helen's first symphony.

In this way, the noun phrases of (19) are just like the simple noun phrases of (22), which also permit extraposition, as shown in (23).

(22) {*Answers* / *The answers*} *to this classical mechanical problem have been found.*

{*Reviews* / *Those reviews*} *of Helen's first symphony have been reprinted.*

{*Answers* / *The answers*} *have been found to this classical mechanical problem.*

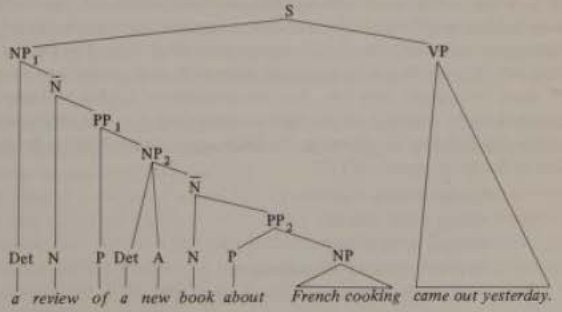
{*Reviews* / *Those reviews*} *have been reprinted of Helen's first symphony.*

The explanation for this difference in extraposability of the PP is to be found in the difference in the internal structure of the noun phrases of (18) and (19). In particular, it lies in the difference in the depth of embedding of the PP-complement within the noun phrases of the two types. As has been pointed out by Ross (1967) and Akmajian (1975), extraposition from noun phrase is upward-bounded. Akmajian formulates the constraint on movement in the following way:

(24) No element may be extraposed more than one cycle up from the cycle containing it. (p. 119)

where the cyclic domain is S or NP. Accordingly, given a structure like that of (25),

(25)



Akmajian points out that only PP_1 and not PP_2, may be extraposed to the end of the main clause:

(26) a. *A review came out yesterday of a new book about French cooking.*
b. **A review of a new book came out yesterday about French cooking.*

To extrapose PP is to move it "more than one cycle up," and this creates ungrammaticality.

Notice now that in a partitive phrase, a PP-complement to the head N will always be "two cycles down":

(27) $_{NP_1}[$*how many of* $_{NP_2}[$ *the* $_{\overline{N}}[$*answers* $_{PP}[$ *to this . . . problem*$]_{PP}]_{\overline{N}}]_{NP}]_{NP}$

Thus, according to the Ross/Akmajian boundedness principle, a PP should never be able to be extraposed out of a partitive noun phrase. With this explanation for the lack of extraposability of the partitive noun phrases, one is obliged to accord the noun phrases of (19), which allow extraposition, a structure where that PP will not be "two cycles down." This structure is the structure of the simple noun phrase:

(28) $_{NP_1}$ [*how many* $_{\overline{N}}$[*answers* $_{PP}$[*to this . . . problem*$]_{PP}$ $]_{\overline{N}}]_{NP_1}$

It seems that the Simple Noun Phrase Hypothesis does indeed account for all the syntactic characteristics of the *many objections* type of noun phrase.

What is it, then, that recommends the HPH to our attention? There is one argument that at first glance may seem to rule in its favor (cf. Jackendoff, 1968). The HPH will not allow for the generation, as a surface structure, of the ungrammatical partitive (29).

(29) **many of objections*

for the structure that would underlie (29) as a surface structure is instead realized by the noun phrase (30).

(30) *many objections*

The HPH seemingly requires no constraint on partitives in order to rule out (29). (29) is simply not generable in an HPH-grammar, which (on the version we are assuming here) would never insert *of* into a partitive that has a lower null Det. The SH-grammar, on the other hand, will require some kind of deep or surface constraint to rule out (29), which will be generated along with all the other partitives.

It must be realized, however, that any grammar of English will require certain constraints to be imposed on partitive constructions, for it is simply not the case that just any Det may be present in the lower noun phrase. Witness the ungrammaticality of the noun phrases of (31).

(31) **three of some men*
**many of all women*
**several of no books*
**two of too many acquaintances*
(versus *two of her many acquaintances*)

The HPH-grammar will require some constraint to rule these out, just as the SH-grammar will. Though the precise character of this partitive recursion constraint is not yet known, it may be safely assumed that, along with ruling out the noun phrases of (31), it could also rule out that of (29), which has an indefinite Det in the lower noun phrase.[7] It is this single constraint that the SH-grammar will contain. Since the HPH-grammar also requires this constraint, its superiority over the SH has not been demonstrated.

A further look at possible partitive constructions reveals that the HPH would be inconsistent in the use it made of any partitive recursion constraint(s). The HPH must derive a noun phrase like *many objections* from the underlying partitive (32)

(32) $_{NP}[$ *many* $(of)_{PP}$ $[\Delta_{Det}$ *objections*$]_{PP}$ $]_{NP}$

and must therefore avoid invoking any partitive recursion constraint here, where the lower Det is null. But in other cases some constraint must indeed be invoked by the HPH to rule as ungrammatical partitive constructions with a null lower Det. Contrast the noun phrases in (33) to those in (34).

(33) i. **several (of) twenty of his roses that were sick*
ii. **nine (of) many of the lathe operators who were from Sicily*
iii. **three (of) nine planets of the solar system*
iv. **not much (of) little of Jane's wine that remained*
v. **few (of) many question*
vi. **any (of) many answers*

(34) i. *several of those twenty of his roses that were sick*
ii. *nine of the many of the lathe operators who were from Sicily*
iii. *three of the nine planets of the solar system*
iv. *not much of the little of Jane's wine that remained*
v. *few of her many questions*
vi. *any of their many answers*

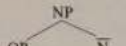
The noun phrases of (33) are ungrammatical, with or without the parenthesized *or*, because *twenty, many, nine* etc., are preceded by a null Det. Deep structures will be generated for the noun phrases in (33), but they have no grammatical surface realization. The HPH must therefore appeal to a partitive recursion constraint to rule these out, and then somehow prevent that constraint from applying to rule out (32).

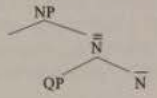
The SH provides a unified approach to the definition of a possible partitive construction, i.e., a unified definition of the possibilities for recursion in partitives, and is hence to be preferred over the HPH.

In concluding this section, I would like to remind the reader that the strongest arguments that have been adduced for choosing a simple noun phrase analysis for *many objections* and the like have been syntactic in character. To review, the arguments were that the SH provides an explanation for (i) the agreement in syntactic features between the Q and the head N, (ii) the number marking on verbs and

relevant adverbials within relative clauses associated with these NPs, and (iii) the extraposibility of PP-complements to the head. The last argument in this section, namely that the SH will allow for the most general statement of a partitive, recursion constraint, may be thought of as a "semantic argument," in that it is based on the application of the simplicity criterion to two solutions that will ultimately be expressed in semantic terms.

Before proceeding to the next section, it must be pointed out that all that has been established here is that the QP of *how many answers* and *two reviews* is sister to the $\bar{N}$ within NP, and not sister to an NP. In other words, we have shown that QP and $\bar{N}$ are dominated by a common node. Whether or not that node is itself NP, as in (35), or yet another nominal node mediating between NP and $\bar{N}$, as in (36), has yet to be decided.

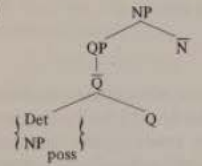
(35) 

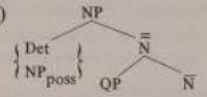
(36) 

This question forms the subject matter of the following section.

2. Determiners and the Possessive in NP

Where do the NP-determiners (e.g., *the, that, those, a, any, some, no, each, every*, etc.) and the possessive NP "hang" within the NP? A number of possibilities present themselves; two promising candidates are depicted below:

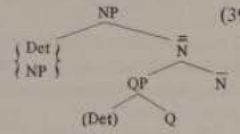
(37) 

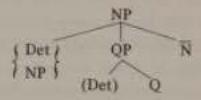
(38) 

According to the first, which I have advocated in earlier, unpublished work,[8] QP and $\bar{N}$ compose the NP, the Det and Poss being generated within the Det-position in the QP. According to the second, which has been proposed by Jackendoff (forthcoming) and K. Ross (1976), the QP and N form a constituent unto themselves, this constituent being sister to Det or Poss under NP. The principle drawback of (37) is that it provides only one source for Det in the NP-specifier (inside the QP). The principle drawback of (38) is that the only Det generable in QP would be the degree determiners *so, too, as*, etc. In what follows, it will emerge that there should be two sources for NP determiners—one inside the QP, and one outside the QP. This means that neither (37) nor (38) provides an adequate representation of the NP specifier.

Instead, the correct analysis is in some sense an amalgamation of these two. (As for the Poss, the discussion below indicates that it should have its source outside the QP.)

The "compromise" solution could be represented as in (39a). It should be kept in mind, however, that the extra level $\bar{\bar{N}}$ which contains just QP and $\bar{N}$ remains controversial, and that arguments must be provided that permit one to choose it instead of (39b), which lacks a level of $\bar{\bar{N}}$.

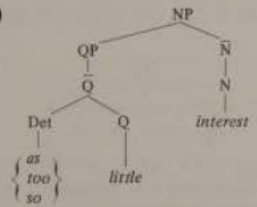
(39a) 

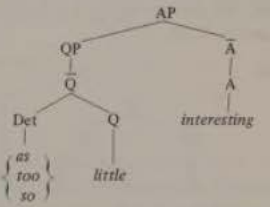
(39b) 

Such arguments are available.

In developing support for either version of (39), we review the reasons for generating noun phrase determiners in QP. In what follows we assume the correctness of the analysis according to which the degree particles *as, so, too, -er, that*, etc., are generated within the QP as sister to the quantifiers *much, many, little*, and *few* (Selkirk, 1970, Bresnan, 1973). The category dominating them will be called $\bar{Q}$, where $\bar{Q} \rightarrow (\text{Det}_{\text{deg}})\ Q$. In addition, following Bresnan's (1973) analysis, the left-branching recursion of QP will be assumed to be generated by the rule $QP \rightarrow \left\{\begin{matrix} QP \\ NP \end{matrix}\right\} \bar{Q}$. The question is whether degree particles and the noun phrase determiner have the same phrase structure source.[9]

One sort of argument of favor of a QP source for NP is based on the fact that the degree particles and noun phrase determiners seem to belong to the same sort of syntactic category, and that they appear to have much the same distribution. Note first that the complement clauses associated with these words (relative clauses, comparative clauses, *that*-clauses with *so*, and *for/to*-clauses with *too*) share a number of important syntactic and semantic properties that distinguish them as a group from other sorts of complement clauses (cf. Selkirk, 1970, Bowers, 1970). Now, it is within the specifier category QP, whether in AP or in NP, that the determiners of degree find their source.

(40) 

(41) 

And it seems entirely plausible to generate the NP determiners here as well. Note that some noun phrase determiners actually must be said to crop up in the QP.

Consider first the *the* that appears with superlatives like those in (42):

(42) *Mary spoke the most convincingly.*
She ran the fastest.
We thought this was the most interesting.

What is this *the*? It does not find its source in the noun phrase, for there is none here in the relevant positions. The most reasonable assumption is that *the* is a (surface) Det of the QP of AP. One might propose that this occupies the position in the tree that in deep structure was occupied by the superlative Det *-est*, and that this *-est*, which we take to be [+Definite], is postposed and encliticized to the Q. In so doing, it leaves behind an empty [+Definite] determiner node; it is into this position that *the* is inserted. This analysis is represented schematically below.

(43) $AP\,[\,QP[\,Det_{+def}[\,\text{-est}\,]\,Q[\,much\,]_Q\,]_{QP}\;A[\,\dots\,]_A\,]_{AP} \Longrightarrow$

$AP\,[\,QP[\,Det_{+def}[\,\phi\,]\,Q[\,Q[\,much\,]_Q\text{est}\,]_Q\,]_{QP}\;A[\,\dots\,]_A\,]_{AP} \Longrightarrow$

$AP\,[\,QP[\,Det_{+def}[\,the\,]_Q\;[\,\underset{\Downarrow}{much}\text{-est}\,]_Q\,]_{QP}\;A[\,\dots\,]_A\,]_{AP}$
$\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\quad most$

Now if this analysis is correct for *the most convincingly*, it could quite likely be correct for *the most conviction*, or *the most money*, which would have the surface structure of (44).

(44) $NP\,[\,QP[\,Det[\,the\,]\,Q[\,most\,]_Q\,]_{QP}\;\bar{N}[\,N[\,conviction\,]_N\,]_N\,]_{NP}$

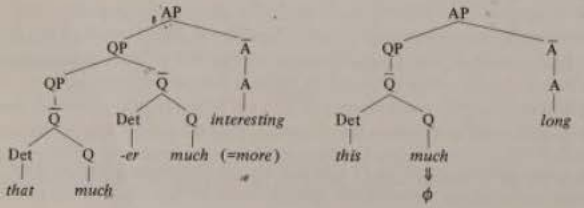
One might reasonably ask why, if *the* is generated in QP in superlatives, it should not be generated there all the time?[10]

Yet another sort of noun phrase determiner—the demonstrative—makes an appearance in the QP specifying AP.

(45) a. *Was it really* ***that much more interesting?***
b. *The board's* ***this long.***
c. *The food isn't* ***that awful.***

Here, the demonstratives are determiners of Q, as in (46), and function in part as degree particles.

(46)



In addition to specifying degree, these demonstratives are still demonstratives, i.e., referential, and in cases like (45b) clearly deictic.

The demonstrative degree determiners are to be found in the QP of NP as well, generated in the same place as *as, so, too*, etc.

(47) *There were* {***these*** / ***that***} ***many fewer people*** *at the meeting this time.*
Is there really ***that little*** *to do?*
I don't want ***that much heat.***

The appearance of these demonstratives in QP lends more credence to the idea of having NP-Det elements generated there.

It seems that those NP-Det that can be reasonably said to be generated within the QP are given a "degree" interpretation, akin to that involved with the determiners *so, as*, etc. Let us suppose that whenever any NP-Det is generated in QP it has a degree interpretation, and that when it is generated outside of QP it does not have this sort of interpretation. A dual source like that allowed by (39) could thus provide an appealing explanation for the puzzling ambiguities displayed by the bold-faced determiners in the following sentences.

(18) ***Those*** *many friends of J. Mensch were there at the meeting.*

(19) *I was amazed at* {***the*** / ***the few***} *people who showed up.*

(30) ***Some*** *people were observed entering through the back door.*

In each case, the determiner may or may not be given a "degree" interpretation. *Those many friends* may mean "those numerous friends" or "that many friends." In the latter case, the determiner is functioning as a degree particle, modifying *many*. And in (49), while one reading may be roughly paraphrased as "I was amazed at something about those (few) people who showed up," the other is something like "I was amazed at how {many / few} people showed up."[12] The *the* itself seems to have a degree modifier function in the latter case. Finally, as is well known, one of the interpretations of *some* in (50) is a quantity-like interpretation. It is this interpretation that will be associated with the QP-source.[13, 14]

The dual-Det hypothesis has one glaring deficiency: it allows for the generation of the ungrammatical sequences *NP_{poss} Det and *Det-Det, e.g.,

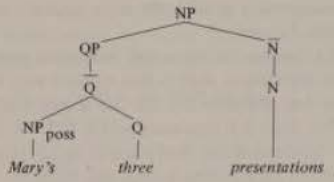
(51) **those how many heroes of bygone days*
**his as few virtues*
**the so little interest*
**the too many kids*

The grammar containing the phrase structure rules generating (39) will have to include a constraint that rules these sequences out. I will not attempt to formulate this constraint here, but only wish to mention that by including a provision in the grammar for excluding *Det-Det sequences, we might at the same time rule out

infelicitous sequences produced when a NP-determiner and the Det that may be generated in the QP of a prenominal AP co-occur in the same noun phrase, e.g., **the as ingenious arguments, *her so much more appealing traits, *any too strenuous efforts*. So there may be independent motivation for this constraint.

Turning now to the question of the source of NP_{poss}, recall that either analysis of (39) gives it a source under NP, not within QP. The NP_{poss} functions in no way like a degree modifier, and so it seems semantically inappropriate to give it a source in QP. (The analysis of (37) required such a source, cf. (52).)

(52)



Note that given this analysis, it is an NP embedded way down in the QP that must be given the interpretation of "subject of NP" in an example like (52). This result seems counterintuitive, for there is no resemblance between the configuration upon which the subject relation is defined here within NP and that on which it is defined in S.

In principle, this lack of parallelism between subject in NP and subject in S is not problematic. We have already mentioned that the subject relation must be defined on the post-head N noun phrase *the Palestinian delegation* in the noun phrase *the presentation of the Palestinian delegation*. And there is no comparable post-V parallel in the S to the *of*-phrase in NP. Evidently, the grammar must include a semantic projection rule specific to NP which interprets such *of*-phrases as subjects.

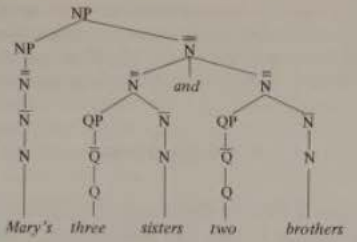
The question to be asked is whether still another NP-specific rule for subject is required in order to give the proper interpretation of *Mary* in *Mary's three presentations*. Just such an additional rule is necessary, if Mary is generated within the QP. If, however, either alternative phrase structure analysis of (39) is adopted, then a semantic rule can be defined that ranges over both NP and S, interpreting as subject that NP immediately dominated by NP or S.

A choice still remains to be made between (39a) and (39b). The grammaticality of a NP such as (53) would seem to indicate that (39a) provides the correct analysis.

(53) *Mary's three sisters and two brothers*

The phrase structure hypothesis of (39a) would allow (53) to be analyzed as an NP containing a conjunction of $\bar{\bar{N}}$, each one composed of a numeral and a head noun, as in (54).

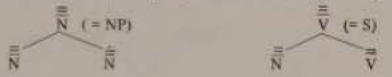
(54)



(the conjunction analysis imposed by (39b) would involve a coordination of NPs and, presumably, a deletion or interpretation of an identical Poss in the second conjunct.)

Now notice that if the category S is indeed merely the verbal category $\bar{\bar{V}}$, as has been argued by Williams (1971), Jackendoff (1973, forthcoming) and others, and if NP is a "three-level" category, as in (39a), then the subject relation in noun phrase and sentence is defined on syntactic structures that are parallel:

(55)



If the analyses of (55) are correct, they permit one to entertain a rather strong hypothesis about the possible phrase structure configurations of a language such as that proposed by Jackendoff (forthcoming):

(56) If parallel grammatical relations exist in two different categories, the categories must be syntactically parallel. pp. 3–18

He calls this the Uniform Level Hypothesis. The formulation of this hypothesis could be elaborated somewhat, so as to allow for rather specific predictions about the structure of the parallel categories. (One could also give the hypothesis a somewhat more perspicuous name, e.g., the Syntactic Parallellism Hypothesis.) It might read as follows:

(57) If parallel grammatical relations obtain in two different categories, and the constituents over which these relations are defined have the same, i.e., parallel, syntactic distribution within those categories, then the categories must be syntactically parallel, that is, the relevant constituents must enjoy the same, i.e., parallel, hierarchical relations within the categories.

This hypothesis lies at the heart of the base schema hypothesis of Chomsky (1970), and has been implicit in most of the work carried out in this framework. We have every interest in adopting it in something like the form above, for it makes extremely strong predictions about the syntax of related categories. It is to be expected that the investigator will, on occasion, encounter situations where no syntactic evidence

is available to permit a choice to be made between two (or more) competing phrase structure hypotheses. In such cases the theory, i.e., the Syntactic Parallelism Hypothesis, could provide the answer. Before this hypothesis can play such as decisive role, however, support for it from a wide variety of languages must accumulate.

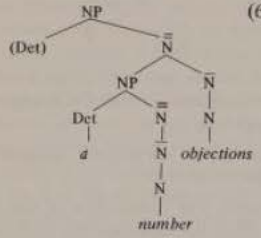
3. Measure Phrases

In this last section, the syntax of partitives and partitive-like constructions will be examined. First I would like to argue that measure phrases like those in (58) are simple noun phrases, not partitives,

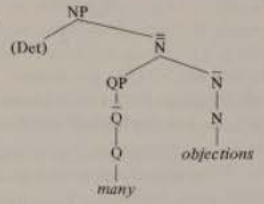
(58) *a number of objections*
three pounds of stew meat
a bushel of apples
loads of time

and that they have the underlying structure of (59), parallel to that of *many people*, in (60).[15]

(59)



(60)



(A transformation will have to insert *of* in the context NP___ $\bar{N}$. The Det under the highest NP will have to be either optionally developed, or null and "indefinite," were this permitted by the constraint on Det in sequence.) The noun phrases of (58) will be called pseudopartitives. It will be shown that much is to be gained by not considering the subsequent *(of) objections* to be a NP composed of null indefinite Det plus N.[16] The claim is therefore that the noun phrases of (58) do not have a structure identical to those of (61), which are partitives.

(61) *a number of her objections*
three pounds of that stew meat
a bushel of the apples
loads of them

Second, a brief review will be made of the evidence, drawn in large part from Akmajian and Lehrer (1975) and K. Ross (1976), that phrases like *a bunch of flowers* and *a bunch of the flowers* are syntactically ambiguous. These phrases are

semantically ambiguous: on one interpretation *a bunch* is a "measure phrase," indicating the amount of flowers; on the other *bunch* functions as a head noun and is further characterized or qualified by the phrase *(of) the flowers*. Were the syntax of these phrase types always the same (as some have thought[17]), then we would have yet another example of the lack of a one-one mapping between syntactic form and semantic interpretation. These phrase types can be shown to have two different syntactic analyses, however, one in which *bunch* is a head N under $\bar{N}$ with a complement *of*-phrase, and the other where *bunch* is a measure noun, generated either in a partitive or pseudopartitive construction. As a consequence they do not provide additional evidence for the autonomy thesis.

Let us turn now to our first question about the distinction between partitives and pseudopartitives. Notice first that by considering *five pounds of apples, a bunch of flowers* and the like, to be simple noun phrases we are able to obtain a completely general statement of the partitive recursion constraint, valid for both measure phrase and quantifier phrase partitives. Recall that the base rules advocated here will generate the following array of noun phrases with quantifiers.

(62) ***Partitive***

a. *many of* { *the* / *those* / *her* } *apples*

b. **many of* { *some* / *all* / *no* / *Δ -indef* } *apples*

Simple

c. *many apples*

The noun phrases of (b) containing the lower determiners *some, all, no*, Δ (=indef), and so on, must be ruled out by a partitive recursion constraint. The very same constraint can apply in measure phrase partitives if *five pounds of apples* is considered to be a simple noun phrase.

(63) ***Partitive***

a. *five pounds of* { *the* / *those* / *her* } *apples*

b. **five pounds of* { *some* / *all* / *no* / *Δ -indef* } *apples*

Simple

c. *five pounds apples* > *five pounds of apples*

This constraint could be given the initial rough formulation of (64). (In its present state it is merely a descriptive statement.)

(64) Rule out as ungrammatical any partitive construction containing *some, all, no,* Δ (= indef), and so on, in the lower noun phrase.

However, it would require some modification if *five pounds of apples* were really a partitive with a null indefinite Det on *apples*; it would have to allow the null indefinite determiner in measure phrase partitives but not in quantifier phrase partitives. I contend that there is no such asymmetry between the two partitive types and would now like to adduce certain types of syntactic evidence showing that *five pounds of apples* is a simple NP.

The first bit of evidence is provided by the transformation of Extraposition from NP, which treats partitives and "pseudopartitives" differently. Extraposition may postpose the *of NP* sequence of partitives, but cannot postpose the *of* $\overline{N}$ sequence of the pseudopartitives.[18] The following examples illustrate this difference.

(65)
a. *A lot of* {*the* / *φ*} *leftover turkey has been eaten.*
b. *A lot had been eaten of* {*the* / **φ*} *leftover turkey.*

a. *Only a handful of* {*those* / *φ*} *questions concerning electromagnetism were asked.*
b. *Only a handful were asked of* {*those* / **φ*} *questions concerning electromagnetism.*

a. *How many pounds of* {*those* / *φ*} *apples did you buy?*
b. *How many pounds did you buy of* {*those* / **φ*} *apples?*

a. *They devoured seven boxes of* {*your* / *φ*} *delicious fudge last night.*
b. *They devoured seven boxes last night of* {*your* / **φ*} *delicious fudge.*

a. *He gave a rather large number of* {*his* / *φ*} *books by famous authors to Mary.*
b. *He gave a rather large number to Mary of* {*his* / **φ*} *books by famous authors.*

If both types of noun phrase are given the structure of partitives then the transformation, which displaces a Prep-NP sequence, should be applicable to both. Note that it is not possible to maintain that extraposition does not move noun phrases whose determiners are indefinite, for sentences like (66), where extraposition has applied to a non-partitive, non-measure phrase construction, are common.

(66) *Atlantic Richfield was originally scheduled to start* ***delivery*** *this month* ***of coal from its Thunder Basin Mine south of town.***

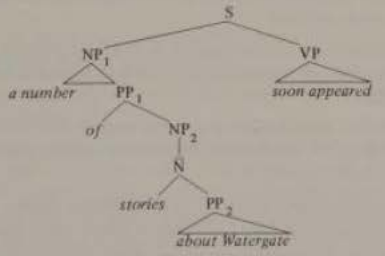
The failure of extraposition to apply to a sequence like *of leftover turkey* must be viewed simply as a consequence of the fact that such sequences do not meet the structural description of the rule. Extraposition displaces a *noun phrase*, i.e., NP, which is preceded by a preposition. It will not apply to *of leftover turkey*, for according to our hypothesis this string has the structure *of*-$\overline{N}$.

Yet another set of facts connected with extraposiiton provides further support for the pseudopartitive analysis. In the (1975) article mentioned above, Akmajian observed that examples such as the (b) sentences of (67) and (68) may be problematical for Ross's upward-boundedness constraint, as long as it is assumed that in those noun phrases the noun *number* is a head noun with a prepositional complement, as in (69).

(67) a. *A number of pictures of John were taken yesterday.*
b. *A number of pictures were taken yesterday of John.*

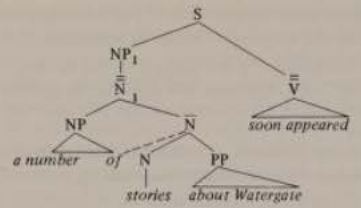
(68) a. *A number of stories about Watergate soon appeared.*
b. *A number of stories soon appeared about Watergate.*

(69)



In these cases the PP_2 does extrapose, and given a structure like (69), it is moving more than one cycle up. Akmajian leaves the problem unresolved, suggesting that (69) may be the incorrect structure for "quantifier-like elements (such as *a number of*)." There is a solution available to this problem, one that allows the generalization in (24) to be maintained. It amounts to giving the noun phrases of (67) and (68) the deep structure I have suggested, that of (70). (Akmajian and Lehrer, 1975, also arrived at this solution.)

(70)



Given this structure, where only NP is a cyclic node, the extraposition of PP does not involve moving it more than one cycle up. The PP is contained within the cyclic domain NP_1, and it is moved up into the S. Thus, the behavior of the sentences (67) and (68) does not represent counterevidence to the generalization about boundedness if one adopts the analysis proposed here.

What is significant in this connection is that what are being claimed here to be real partitives in measure phrases like *a number of*, and so on, do *not* allow extraposition. The sentences of (ii) below show a difference in behavior between what I am calling pseudopartitives in (a), and the real partitives in (b). (The examples of (i) are designed to show that in a non-pseudopartitive noun phrase, extraposition is possible in both cases.)

(71) a. (i) *Answers have been rediscovered to this classical mechanical problem.*
(ii) *The answers have been rediscovered to this classical mechanical problem.*
b. (i) *A variety of answers have been rediscovered to this classical mechanical problem.*
(ii) *?*A variety of the answers have been rediscovered to this classical mechanical problem.*

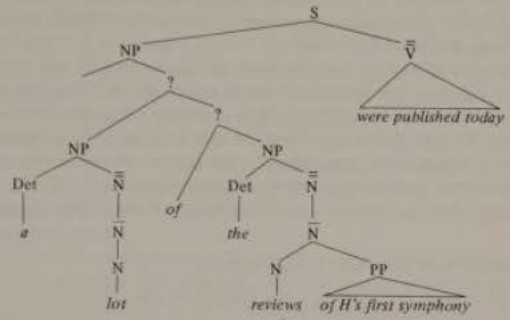
(72) a. (i) *Objections soon emerged against these kinds of tactics.*
(ii) *The (traditional) objections soon emerged against these kinds of tactics.*
b. (i) *A bunch of objections soon emerged against these kinds of tactics.*
(ii) *?*A bunch of the (traditional) objections soon emerged against these kinds of tactics.*

(73) a. (i) *Commentaries have appeared on Anne's latest book.*
(ii) *The commentaries have appeared on Anne's latest book.*
b. (i) *A number of commentaries have appeared on Anne's latest book.*
(ii) *?*A number of the commentaries have appeared on Anne's latest book.*

(74) a. (i) *Reviews were published today of Helen's first symphony.*
(ii) *The reviews were published today of Helen's first symphony.*
b. (i) *A lot of reviews were published today of Helen's first symphony.*
(ii) *?*A lot of the reviews were published today of Helen's first symphony.*

We know that partitives have a structure something like that in (75), with an NP inside an NP. (We will be more specific later.)

(75)



Because of the embedded structure of the partitive, the PP would have to be extraposed more than one cycle up on its way to the end of the sentence. This is not permitted, following (24), and the sentence becomes ungrammatical. So it is that the assignment of the different structures (70) and (75) to the (i) and (ii) sentences allows for a straightforward explanation of the differences in extraposability of the Prep-NP sequences contained within them.[19]

Let us turn now to another sort of argument that noun phrases like *a whole lot of famous paintings* and *dozens of daffodils* are not partitives. The evidence is provided by the interpretation of nonrestrictive relative clauses in association with such noun phrases. Observe first that relative clauses of the sentences (76) and (77) are ambiguous.

(76) *In the Uffizi they saw a whole lot of the famous paintings, several of which were by Sienese artists.*

(77) *She bought him dozens of those daffodils, only two of which were faded.*

In (76) the several paintings by Sienese artists were either among the paintings they saw, or simply among the famous paintings in the museum and not necessarily seen by them. In (77), the two faded daffodils could either have been among the ones she bought, or among the group designated by *those daffodils*, and not necessarily chosen by her. Observe next that the lack of a determiner after *of* is correlated with a reduction in the number of relative clause interpretations available.

(78) *In the Uffizi, they saw a whole lot of famous paintings, several of which were by Sienese artists.*

(79) *She bought him dozens of daffodils, only two of which were faded.*

Each relative clause has only one interpretation. The paintings by Sienese artists were among the "whole lot" seen by them, and two of the purchased daffodils

were faded. The sentences of (76) and (77) are ambiguous because the relative clause may be associated with either of two NPs—the entire partitive noun phrase, *dozens of those daffodils*, or the lower one, *those daffodils*. In (78) and (79) there is no lower NP. The relative clause cannot associate with *of daffodils*, only with the full noun phrase, *dozens of daffodils*.[20]

A final argument in favor of the contention that the category $\bar{\bar{N}}$ may be rewritten as [NP $\bar{N}$] is based on the observation that in certain circumstances the *of* may in fact be absent from "pseudopartitives" while it is never allowed to be absent from real partitives. We take this to mean that the rule inserting *of* in partitives knows no exception, while the rule inserting *of* in the context NP-$\bar{N}$ may be subject to exception. There are lexical exceptions to this latter *of* insertion rule. The measure phrase *a dozen*, when in a pseudopartitive, requires the absence of *of*. Contrast (80) and (81).

(80) *She bought him a dozen (*of) daffodils.*

(81) *She bought him a dozen* { *of* / **ϕ* } *those daffodils*

The measure phrase *a couple* optionally permits *of* to be absent.

(82) *Can I borrow a couple (of) sheets of paper?*

Aside from these lexicalized exceptions, one also encounters locations like the following, expecially in recipes.

(83) *A pound cake is one pound butter, one pound sugar, one pound eggs and one pound flour.*

These too have the air of fixed expressions, so it is perhaps most important that the *of* may disappear in constructions like those below, which are indisputably derived from nonidiomatic noun phrases.

(84) *I met a larger number of high school students than*
I did { *college students.* / *?of college students.* }

They sold as many pounds of apples as they did { *pears.*[21] / *of pears.* }

A word has the same number of tone specifications that it has { *syllables.*[22] / *?of syllables.* }

Note that the absence of *of* is not allowed in the real partitives.

(85) *I met a larger number of the high school students than*
I did { **the college students.* / *of the college students.* }

They sold as many pounds of those apples as they did { **those pears.* / *of those pears.* }

According to my analysis, there is an identifiable structural configuration, [NP $\bar{N}$], where the *of* may sometimes be absent. On the other hand, in the structures associated with partitives, the *of* must always be present.

In sum, a variety of syntactic arguments lead one to the conclusion that *five pounds of apples* is structurally distinct from *five pounds of the apples*. The second is a partitive, so the first must not be. The evidence suggests that the first is a simple noun phrase with the measure noun phrase NP sister to the constituent $\bar{N}$.

Let us turn now to a comparison of pseudopartitives and the noun complement construction. Many of the points to be reviewed have been made by other linguists in their work on the noun phrase, e.g., Jackendoff (1968), Stockwell et al. (1973), Akmajian (1975), Akmajian and Lehrer (1975), and K. Ross (1976), and I hope I will be pardoned if I do not mention the exact source at every juncture of the observation to be made.

As was pointed out above, noun phrases whose *of*-phrase is a complement to the head noun do not have the same behavior with respect to the transformation of extraposition from NP as do noun phrases containing pseudopartitives. To review, compare the pairs (86) and (87).

(86) a. *A review of (certain) answers to your argument was given*
OK

b. *A number of answers to your argument were given.*
*

(87) a. *A review of (certain) answers to your argument was given.*
*

b. *A number of answers to your argument were given.*
OK

This difference is explained by assigning a different syntactic structure to the noun phrase of the (a) and (b) sentences. In the (a) sentences, *review* is the head noun, generated under $\bar{N}$, with an *of*-NP complement. In the (b) sentences, *answers* is the head noun, while *number* is a measure noun generated in an NP sister to the $\bar{N}$ containing the head.

In general, the other tests permitting one to distinguish between pseudopartitives and noun complement constructions involve processes that crucially refer to the head noun of a noun phrase. So, for example, the number agreement of a verb is (usually) determined by the head N of the subject NP. Notice in the sentences in (86) and (87) that the sentences with *review* as a head N have the auxiliary *was* while those with the head N *answers* have *were*.

Some nouns may function either as a head noun or a measure noun. In a sentence such as (88), it is in the number agreement on the verb that one finds a clue to the structure of the noun phrase.

(88) *An assortment of responses to those questions of yours* { *were* / *was* } *considered.*

Notice that number agreement correlates in a rather nice way with the possibilities for extraposition with the two noun phrases underlying (88). In (89), *responses* is the head and thus the extraposition of its complement is permitted; *were* agrees with *responses*.

(89) *An assortment of responses* {*was* / *were*} *considered to those questions of yours.*

In (90), *assortment* is the head, takes *was*, and allows its complement to be extraposed.

(90) *An assortment* {*was* / **were*} *considered of responses to those questions of yours.*

Other phenomena that make crucial reference to the head of a noun phrase are pronominalization and selectional restrictions. First compare the sentences (91) and (92).

(91) *That group of crazies really got* ***itself*** *in hot water, didn't* ***it****?*

(92) *That group of crazies really got* ***themselves*** *in hot water, didn't* ***they****?*

(91) and (92) do not mean the same thing. In (91), *group* is the head N, requiring the reflexive *itself* and the tag pronoun *it*, and may be taken to mean something like "organization." In (92), *crazies* is the head N, requiring the reflexive *themselves* and the tag pronoun *they*; *group* in this sentence is a measure noun, having a meaning more like "bunch" or "lot."

Finally, compare the sentences (93) and (94).

(93) *A cup of sugar was strewn on the floor.*

(94) *A cup of sugar smashed on the floor.*

In the first sentence only the quantity of sugar, equivalent to a cupful, was on the floor (but not necessarily the cup itself); *sugar* is the head noun. In the second, *cup* is the head noun, has itself fallen, and broken into pieces. Notice that a noun phrase cannot allow both interpretations at once. The sentence (95) demonstrates that the noun of an NP determining the selectional restrictions in a matrix sentence must also determine them in a relative clause.

(95) *The cup of sugar that this recipe requires* {**crashed to the floor.* / *was strewn on the floor.*}

Whichever noun is interpreted as the head is fixed for any sentence.

Taken together, then, the transformation of extraposition and the head-sensitive phenomena of number agreement, pronominalization, and selectional restrictions provide evidence that an NP like *a bunch of flowers* may be ambiguous between the pseudopartitive and the noun complement construction. It remains now to show that the real partitives are syntactically distinct from the noun complement

construction. The operation of the extraposition transformation does not give evidence for a syntactic distinction. But the facts available from number agreement, pronominalization, and selectional restrictions indicate that in a partitive the "measure noun" cannot be considered to be the head of the noun phrase, and so I believe we are forced to posit a syntactic distinction between partitives and the noun complement construction.

With respect to extraposition from NP, both these types behave similarly:

(96) a. *Only a handful of those questions about electromagnetism were answered.* OK

b. *Several reviews of those books on the martial arts were published.* OK

(97) a. *Only a handful of those questions about electromagnetism were answered.* *

b. *Several reviews of those books on the martial arts were published.* *

It is not necessary to attribute this similarity to an identity of structure between these two phrase types, however; it would simply result from the fact that both contain an NP embedded within an NP.

The other tests may be taken to show that noun phrases of the type Det-N *of* Det-N are syntactically ambiguous:

(98) ***Number Agreement***

A bunch of those flowers {*was* / *were*} *thrown out on the back lawn.*

(99) ***Pronominalization***

A bunch of those flowers could be put in the vase, couldn't {*they* / *it*}*?*

(100) ***Selectional Restrictions***

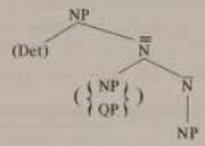
She {*broke* / *drank*} *a bottle of that good wine.*

From this we conclude that the measure noun of the partitive construction, be it *handful*, *bottle*, or *bunch* is not to be considered the head N of NP, and thus that partitives are syntactically distinct from the noun complement construction. (I am assuming that "head N of NP" is a *syntactic* notion, defined perhaps as that first N dominated by $\bar{N}$ dominated by $\bar{\bar{N}}$ dominated by NP. (This definition will be modified below.) As a consequence of this assumption, NPs having different heads must have different syntactic structure.)

Our last task is to offer some hypothesis about the structure of partitives. We know that the partitive construction (i) contains an NP within an NP, (ii) is recursive, and (iii) is right-branching. Furthermore, it has been shown that partitives like *three of the women* or *some of the women* cannot derive from a source like **three*

women of the women or *some women of the women* (cf. Selkirk, 1975). We would like to suggest that the structure in (100), which resembles a structure proposed by K. Ross (1976), best represents the properties described.

(101)



The phrase structure rules we have developed so far for noun phrase are gathered together in (102).

(102)

$$NP \rightarrow (\begin{Bmatrix} Det \\ NP_{poss} \end{Bmatrix}) \bar{\bar{N}}$$

$$\bar{\bar{N}} \rightarrow (\begin{Bmatrix} NP \\ QP \end{Bmatrix}) \bar{N}$$

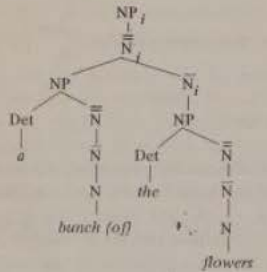
$$\bar{N} \rightarrow N \begin{Bmatrix} PP \\ S \end{Bmatrix}$$

To allow for the generation of partitives, we have only to add the rule (103).

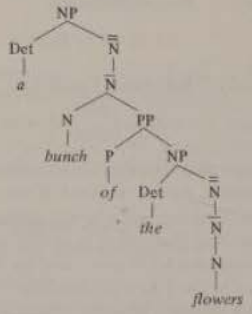
(103) $\bar{N} \rightarrow NP$

To sum up, *a bunch of the flowers*, which may be either a partitive or a noun complement construction, will be assigned one of the two following structures:

(104) *Partitive*



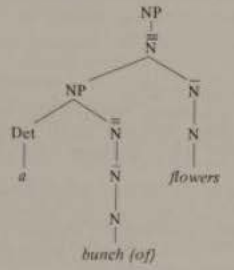
(105) *Noun Complement*



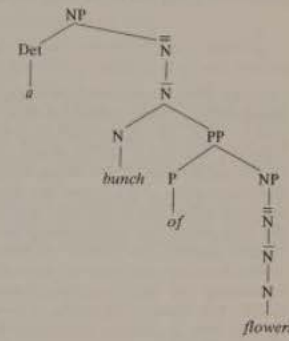
(Note that given the rules (102) and (103) "head N" will have to be defined in the following way (roughly): the *head noun* N of NP_i is that N that is dominated by $\bar{N}_i$ and $\bar{\bar{N}}_i$, both dominated by NP_i, and that is not dominated by any category PP, VP or AP which is dominated by NP_i. A look at (104) will satisfy the reader that

this definition allows *flowers* to be picked out as the head N of NP in (104). *A bunch of flowers* on the other hand, has the syntax of either a pseudopartive of a noun complement construction:

(106) *Pseudopartitive*



(107) *Noun Complement*



I would like to conclude by remarking that the demonstration that there are three distinct syntactic structures associated with partitives, pseudopartitives, and noun complements is of some relevance to the issue of the relation between syntactic form and semantic interpretation. It seems quite likely that we will find that NPs in English with a structure like that of partitives will always be interpreted as partitives, or that NPs in English with the structure of pseudopartitives will always be interpreted as pseudopartitives. In other words, with these phrase types the semantic interpretation may be fixed; here there may be a one-one mapping between form and meaning. It certainly is not the case that head nouns and the complements under $\bar{N}$ that follow them are always given the same sort of semantic interpretation, however. A whole variety of grammatical relations may obtain, and so a one-one mapping between form and meaning is not possible at this level. It would be nice to know whether it is an accident of English that partitives and pseudopartitive constructions each have a single type of interpretation, or whether this limitation follows from deeper principles concerning the types of interpretation that can be assigned by the semantics at the various levels (X, $\bar{X}$, $\bar{\bar{X}}$, XP) inside the major phrase category. Hopefully, continued research on the constituent structure of natural languages will provide an answer to this question.

Acknowledgments

I would like to thank Joan Bresnan, Ray Jackendoff, Dick Oehrle, Jean-Roger Vergnaud, and Edwin Williams for discussions and commentaries that contributed to the development of this paper. All deficiencies are, of course, my own.

Much of the research for this paper was carried out during the tenure of a NATO Postdoctoral Fellowship in Science, in Paris, January 1973–January 1974. I am grateful to the Laboratoire d'Automatique Documentaire et Linguistique, and in particular to Maurice Gross, for providing me with research facilities during this time.

I would also like to extend my deepest thanks to Sally Hollens and Terry Sachs, who were responsible for typing and reproducing an earlier version of this paper.

Notes

1. Chomsky (1964, for example), Postal (1964a, 1964b), Lees (1957).
2. Bowers (1970, 1968), Selkirk (1970, 1972, 1974, forthcoming), Williams (1975), Bresnan (1973, 1975, 1976), Jackendoff (1974, forthcoming), Vergnaud (1973), Stockwell, Schachter and Partee (1973), Ronat (1973), Halitsky (1975), Hornstein (1975), Milner (1975), and Emonds (1976), among others.
3. Given an analysis of the Passive like that of Bresnan (1972), the agent originates and stays in the *by*-phrase that is generated in postverbal position in deep structure. Carried over to the noun phrase this analysis would have the *by*-phrase generated with the agent in postnominal position. The "subject" in Poss-position in NP would be generated in that position in deep structure, and would not be postposed, according to this analysis.
4. In asserting that there is a syntactic category Quantifier Phrase, I am drawing on Bresnan (1973). This fundamental insight of Bresnan's, that there exists a QP distinct from NP and AP, has been of immense importance in my work on the structure of Noun Phrase and Adjective Phrase.

   It should be pointed out that the analysis of Noun Phrase, Adjective Phrase, and Quantifier Phrase being proposed here differs in certain ways from that of Bresnan (1973). The reasons for these differences will become clear below. I would like to emphasize, however, that the research reported on in this paper owes a very great deal to Bresnan's work, and continues much in the same vein.
5. Notice also that the boldfaced noun phrase of (i) is problematical for the HPH.

   (i) *She didn't do one single thing.*

   The alleged source for this, according to Jackendoff (1968) is (ii),

   (ii) *She didn't do one of* ϕ_{Det} *single things.*

   where the lower noun phrase in the partitive is plural, yet containing the adjective *single*. In general, though, *single* is prohibited from appearing with plural nouns, cf. (iii)

   (iii) **two of the single things*
   **single things*

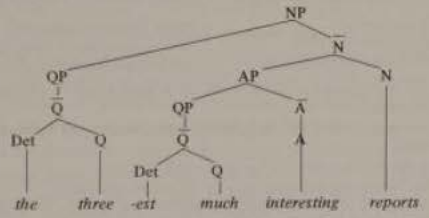
   So it is puzzling that lexical insertion of *single* into an underlying structure like (ii) should even be permitted.

   For the SH, the derivation of (i) presents no such puzzles. The noun phrase *one single thing* is simple generated as such, as a simple noun phrase, with the requirement that *single* have a singular head noun being met.
6. The proponent of the HPH might conceivably argue that the conditions for agreement among quantifiers, determiners, and head nouns should be stated at surface structure, after the transformation that determines the presence (or absence) of the *of* operates. The claim might be that the Q N combinations derived from underlying partitives are made to agree because of their juxtaposition in surface structure. Such a claim would be based on the assumption that agreement would be determined only by the linear arrangement of the elements in surface structure, not by their hierarchical relations, for, according to the HPH, the Q N sequence is still a partitive of the form $_{\text{NP}}[\ _{\text{QP}}[\ \text{Q}\ ]_{\text{QP}}\ _{\text{NP}}[\ \text{N}\ ]_{\text{NP}}\ ]_{\text{NP}}$ in surface structure, not a simple noun phrase. This account is unsatisfactory, for it seems highly unlikely that the mere absence of the *of* should cause agreement to be defined over a syntactic configuration totally different from the Simple NP where agreement usually obtains.
7. It does seem to be possible for the lower noun phrase of a partitive to contain a null determiner, as (i) shows.

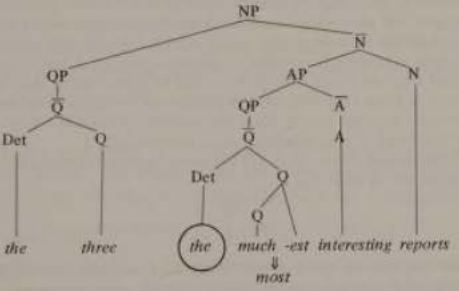
   (i) *I heard too much of one speech and not enough of the other.*

   This possibility is only available when that noun phrase is interpreted as [+specific].
8. Cf. Selkirk (1975) and talks delivered at University College London and Cambridge University in December 1973. Cf. also Bresnan (1976).
9. This is Bresnan's (1973) posititon, which I think is correct. For a dissenting view, see Jackendoff (forthcoming), whose proposal is more in the spirit of Selkirk (1970) and Bowers (1970) in that it involves a rule AP → Det A, where Det is not introduced under QP. Unfortunately space does not permit me either to pursue the discussion of this dispute or resolve it.
10. The *the* generated in the QP of AP in superlatives is undoubtedly deleted when the AP is generated within the NP, as in *the three most interesting reports*. According to the *Det in QP* hypothesis, such a noun phrase would have the underlying structure of (i), which is transformed into (ii).

(i)



(ii)



The circled *the* in (ii) is deleted.

Notice also that, according to this analysis, the noun phrases of (iii) would derive from those in (iv), by *the*-deletion in the QP of AP.

(iii) $\left\{\begin{matrix}\textit{Jane's}\\ \textit{the}\end{matrix}\right\}$ *most interesting contribution*

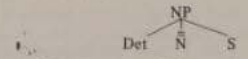
(iv) $\left\{\begin{matrix}\textit{Jane's}\\ \textit{the}\end{matrix}\right\}$ $_{\text{AP}}[\ _{\text{QP}}[\ \textit{the most}\ ]_{\text{QP}}\textit{interesting}\ ]_{\text{AP}}$ *contribution*

11. Many speakers allow only the singular *that* to be used as a degree determiner: *that many people*. For others, myself included, the forms *these, those*, and *this* may also be used, deictically, in pointing out the quantity being discussed. I can put out four fingers of my right hand and declare "There were only these many people there!"
12. See Carlson (1975) for an extremely interesting account of "amount relatives" such as *We were surprised at the water that there was in the streets*.
13. In Selkirk (1975), I proposed that the "quantitative" *some* be generated as a Det in a QP whose head Q was underlying *much* or *many*. This *much* or *many*, whose interpretation would be similar to the *much/many* of *how much/many*, was argued to be deleted after *some, any* and *no*.

    Cf. Carlson (1975), where it is argued that an abstract quantifier is generated (and deleted) after *the* and other determiners in amount relatives.
14. Consider the following sentence, in which *those* has two possible sources: *Did only those few black people get to go?* Pronounced with more prominence than *few* (not contrastively), *those* is interpreted as the degree determiner. When *those* and *few* have comparable prominence, *those* is interpreted as a normal demonstrative, i.e., as an NP-Det. We can expect that such facts will help provide arguments for syntactic analyses like those being discussed here, when the intonation of English noun phrases is better understood.
15. In his work on the specifier system of the noun phrase in French, Milner (1975) gives an analysis similar to this pseudopartitive analysis to measure phrases in constructions like:

Trois kilos de pommes	'three pounds of potatoes'
une grande quantite de vin blanc	'a large quantity of white wine'
un nombre incroyable de spectateurs	'an incredible number of spectators'

    In this analysis, too, the measure phrase is generated as sister to the $\bar{N}$, and the particle *de* is inserted by transformation.
16. This latter view is commonplace (cf. Jackendoff, 1968, Selkirk, 1970, Stockwell et al., 1973, Bresnan, 1973).
17. This for example is the position adopted by Jackendoff (1968).
18. This observation has been made independently by Akmajian and Lehrer.
19. A possible counterexample to this extraposition analysis was brought to my attention by Dick Oehrle: *How much of a proof actually exists of this theorem*. Assuming that *How much of a proof of this theorem* is a partitive construction, exptaposition should not be allowed to move *of this theorem* up and out of the NP. I might point out that another, similar sort of counterexample is provided by sentences such as: *A hell of a report came out on the secret activities of the CIA*. In both cases we have a noun phrase that, semantically speaking, is not like a partitive, and it is perhaps not unreasonable to imagine assigning them a syntactic structure distinct from real partitives. Time will tell. (For some discussion of the *how much of a . . .* construction, cf. Bresnan, 1973.)
20. Jackendoff (forthcoming) and K. Ross (1976) assign to nonrestrictive relatives a source immediately under the NP node, e.g.,



    It follows from this analysis that a simple NP can have only one nonrestrictive relative, while a partitive, which is an NP containing yet another NP, could have more than one.
21. The sentence below is actually ambiguous:

    They sold as many pounds of apples as they did pears.

    It may mean that the number of pounds of apples sold was equivalent to the number of pounds of pears sold, or simple to the number of (individual) pears sold. Only the first interpretation is of relevance here.
22. This example is due to Mary Clark, its unwitting utterer.

COMMENTS ON THE PAPER BY SELKIRK

Richard T. Oehrle

Department of Linguistics
Stanford University
Stanford, California

1. As the structural configurations of various syntactic constituents provide the requisite level of generality at which to state conditions on syntactic well-formedness, the question of what internal structure to assign to English noun phrases is an important one. Selkirk demonstrates effectively in her paper that the choice of one structure over another for certain classes of NPs has interesting consequences with respect to an optimal account of such grammatical phenomena as mass/count/ concord, subject-verb agreement, various issues concerning selectional restrictions, and the proper applicability of the rule known as Extraposition from NP. In the three main sections of her paper, Selkirk puts forth several hypotheses which involve distinctions between various structural configurations. Although by and large I agree with her on where such distinctions are to be drawn, there are a number of cases in which I think the distinctions at issue should be expressed in a fashion somewhat different from that she suggests. In the discussion to follow, while I shall touch briefly on her basic points, I wish to demonstrate a conflict between two of her implicit assumptions and to offer some speculations on how this conflict might be satisfactorily resolved.

1.1 Selkirk's first point is that in such phrases as *how many answers* and *two reviews*, the QP (i.e., *how many* in the first case, *two* in the second) is sister to N^1 and not sister to an NP.[1] In other words, they have the structure illustrated in (1):

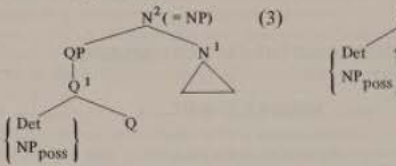
(1) $\quad {}_{NP}[\ {}_{QP}[\ \textit{how many}\ ]_{QP}\ {}_{N^1}[\ \textit{answers}\ ]_{N^1}\ ]_{NP}$

Her arguments concerning the mass/count distinction and various problems concerning number agreement provide sufficient evidence to favor this conclusion over the alternative "Hidden Partitive Hypothesis" found in Jackendoff (1968) and elsewhere.

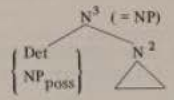
1.2 In the second section of the paper, Selkirk discusses two ways of generating the possessive NP determiner and various other elements of the NP specifier system.

On one account, these elements are to be generated in the left branch of the QP generated under N^2. On another account, there is a higher node N^3, which dominates the source of these specifier elements as well as N^2. These two alternatives are illustrated below in (2) and (3).

(2)



(3)



Although Selkirk presents two arguments based on distributional evidence which seem to favor (2) over (3), she ultimately opts for (3), partly on the basis of the Syntactic Parallelism Hypothesis due to Jackendoff. Insofar as we assume that for any given well-formed syntactic constituent (under a given interpretation) there is a unique structure, Selkirk is certainly correct in urging that we endeavor to develop general principles that will settle questions of constituent structure in cases where the correct choice is underdetermined. This assumption is open to question on a variety of grounds, however. For example, diachronic changes in the syntactic structure assigned to certain sentences suggest that the structure assigned is not always uniquely determined. Hence either we may find cases in which more than one structure is compatible with whatever general principles we adopt, or we must allow the possibility of indeterminacy in some cases.[2] In the case at hand, however, there is evidence to settle the relevant aspect of the constituent structure independently of the Syntactic Parallelism Hypothesis.

Selkirk notes in her first section that "the specifier elements and the head noun of a simple noun phrase must agree for *all* syntactic features–count, number, gender, case." If this is true,then it is difficult to see how the hypothesis embodied in (2) could account for the distinction between phrases like *a bare 50 people* and **a people*. On the other hand, structure (3) allows us to express the required distinction just as long as we allow the agreement rule to express compatibility between the heads of phrases and the determiners of that head–not between determiners of one phrase and heads of another. In other words, in *a bare 50 people*, the word *a* is a determiner element in a QP headed by *50*, whereas in **a people*, *a* acts as the determiner of a phrase whose head is incompatible with it. The same phenomenon can be seen, I believe, in the distinction between *these many people* and *that many people*. Contrary to what Selkirk suggests, I find these phrases unambiguous and nonequivalent.

If this argument is correct–and it has roughly the same form as some of the arguments in Selkirk's first section–there is good reason to choose (3) over (2) as the source of the class of specifier elements Selkirk is concerned with. That this decision is in conformity with the Syntactic Parallelism Hypothesis provides some independent evidence in its favor, of course–a more interesting result than one that merely employs it as a methodological principle.[3]

1.3 In the final section of the paper, Selkirk shows that such phrases as *a bunch of flowers* and *a bunch of the flowers* can be analyzed in two ways: in one structure *bunch* is the head of the phrase as a whole, and *(the) flowers* is its complement; in the other structure, *a bunch* is analyzed as a measure phrase and is generated in exactly those positions in which we find quantifier phrases in such expressions as *some flowers* and *some of the flowers*. Selkirk presents a variety of arguments in favor of this analysis, yet certain difficulties arise with respect to the structures Selkirk chooses to express the distinctions at issue. The conflict in assumptions discussed in the next section will clarify in part exactly what these difficulties are.

2.0 Throughout her paper, Selkirk draws on conclusions inferred from the behavior of the rule of Extraposition from NP (hereafter 'E-NP'), a rule discussed recently by Akmajian (1975). The fact that this rule, like other rightward movement rules, is upward-bounded, makes it an obvious choice for analyzing the complexity of constituents from which material can be extracted: a natural way of accounting for the failure of the rule to apply in certain cases is to assume that the upward-bounded property prevents the rule's application, i.e., that the phrase to be extracted is too deeply embedded.

There is a difficulty in this sort of reasoning, since from a purely syntactic point of view, there are a variety of constraints on the applicability of E-NP. Among these we note: 1) the shape of the determiner of the matrix NP; 2) the relation between the matrix N and its complement; and 3) the predicate of the S into which the extracted PP is to be extraposed. These three properties are illustrated in the following examples.

(3) a. *A review of Claudia's book was sent to me.*
b. *A review was sent to me of Claudia's book.*
c.?**The review was sent to me of Claudia's book.*

(4) a. *A proof of this theorem would be easy to develop.*
b. *A taste for figs would be easy to develop.*
c. *A proof would be easy to develop of this theorem.*
d. **A taste would be easy to develop for figs.*

(5) a. *No proof of this theorem will ever be found.*
b. *No proof of this theorem will ever be sound.*
c. *No proof will ever be found of this theorem.*
d. **No proof will ever be sound of this theorem.*

The nature of these constraints–their substantive character and the difficulty of stating them as syntactic conditions on E-NP–suggests that we attempt to subsume at least some of them under a single semantic condition. It is an interesting and instructive exercise to try to formulate such a condition, an exercise I shall forego for the present since the exact statement of the constraints on E-NP is irrelevant to the argument that follows.

What is clear, however, is that while a certain phrasal constituent structure provides a necessary condition for the applicability of E-NP, it does not constitute a sufficient condition: the inapplicability of E-NP in a given case may be due to other factors than the depth of embedding of the target subconstituent. Hence from E-NP's failure to apply acceptably in a given case, we cannot jump to conclusions about the constituent structure of the phrase from which extraction was to take place.

Of particular interest for our purposes here is the interaction of the upward-bounded character of E-NP with one other critical assumption, embodied in the following passage from Selkirk's paper:

(6) Common to most every analysis of the partitive noun phrase is the claim that it contains a noun phrase within a noun phrase, i.e., that it has at least the structure of (2).

(2) $_{NP}[\ some\ _{Det}\ (of)\ _{NP}[\ her\ _{Det}\ \bar{N}[\ objections\ _{N}]\bar{N}]_{NP}]_{NP}$

It would seem, then, that the presence of the determiner following *of* is taken as an indication of the presence of an embedded NP. If the rule E-NP is in fact upward-bounded, however, this assumption cannot be correct.

Consider first noun phrases containing a quantifier phrase which have a 'predicative' interpretation, such as *(not) much of an argument, quite a fool, a hell of a drummer*. In certain cases, at least, such phrases admit the application of E-NP, as the following examples show:

(7) a. *How much of a proof of this theorem actually exists?*
b. *How much of a proof actually exists of this theorem?*

(8) a. *One hell of a review of Mary's book has just appeared.*
b. *One hell of a review has just appeared of Mary's book.*

In line with (4), we might expect that the analyses in (9) would be unobjectionable:

(9) a. $_{NP}[\ (how\ much\ of)\ _{NP}[\ a\ proof\ of\ this\ theorem]_{NP}\ ]_{NP}$

b. $_{NP}[\ (one\ hell\ of)\ _{NP}[\ a\ review\ of\ Mary's\ book\ ]_{NP}\ ]_{NP}$

Yet on the assumption that E-NP is upward-bounded, such a structure is untenable, since E-NP may clearly apply in spite of the infraction that its application would incur in moving the subconstituent *of this theorem* out of more than one cyclic domain.

This problem is not limited to cases in which the noun phrase as a whole has a 'predicative' interpretation." Thus, in the following pairs of sentences, there seems to be little difference in acceptability between the case in which the subject NP contains a quantifier and the case in which it doesn't, although on Selkirk's assumptions, there should be a sharp distinction since in the former case the application of E-NP should violate the upward-boundedness condition.

(10) a. *Have all of the commentaries appeared already on Mary's work?*
b. *The commentaries have finally appeared on Mary's work.*

(11) a. *None of the reviews have appeared yet of this important work.*
b. *The reviews are finally beginning to come out of Mary's new book.*

Again, given the well-formedness of these examples, we cannot maintain both that E-NP is upward-bounded and that the expressions *all of the commentaries on Mary's work* and *none of the reviews of this important work* both constitute cyclic domains as a whole and properly contain cyclic domains in which the expressions *on Mary's work* and *of this important work* (respectively) are embedded.

In short, the assumption embodied in the passage quoted in (6) conflicts with the assumption that E-NP is upward-bounded.

2.1 There are several ways to attack this dilemma. One is to maintain the sort of structure given in (6) and deny the upward-bounded character of E-NP. Of the ways I can think of, however, this is by far the least attractive: it denies us a reasonable account of the inapplicability of E-NP to a class of structures for which there is otherwise no obvious treatment, while at the same time segregating E-NP from the class of other rightward movement rules, all of which have the upward-bounded property.

The basic problem is to present an analysis of the expressions in question which is consistent, then, with the assumption that the expression moved by E-NP is contained within only one cyclic domain. There are many conceivable ways of doing this: I shall concentrate here, however, on two broad approaches to the problem.

2.1.1 One possibility is to leave the form of the constituent structure given in (9) relatively untouched and merely change the category symbol around *a proof of this theorem* in such a way that it does not constitute a cyclic domain. In particular, if N^k represents the cyclic domain NP and N^0 is the lexical category noun, we need available some intermediate level of structure lying between N^0 and N^k, call it N^j, where $0 < j < k$. Since by hypothesis, N^j is not a cyclic domain, our reanalysis poses no barrier to the application of E-NP. In short, what this solution attempts is to exploit the inherent power of the bar notation, a theory of categorial substructure which allows us to draw distinctions that are impossible in a theory that distinguishes only between the lexical node N ($=N^0$) and the phrasal node NP ($=N^k$).

As noted, the crucial aspect of this first proposal is that it allows constituents of the form *Det . . . N . . .* to be generated in ways which do not involve considering the full expression a cyclic domain: they are not immediately dominated by N^k. This is a somewhat radical departure from current practice, but not one that lacks historical precedent. In fact, the proposal is analogous to the question of whether it is possible to generate the node VP ($=V^2$) elsewhere than immediately under S ($=V^3$). Whether the difficulties and prospects involved in the two cases are precisely the same is unlikely, however: a more thorough study of this question than I am able to provide here would have to investigate in some detail the precise role of the categorial hierarchy in subcategorization, to cite just one obvious problem.

Whatever the empirical status of this proposal may turn out to be, however, it

does have points of interest. For instance, we can apply it in an interesting way to certain problems that arise with respect to Chomsky's subjacency condition (cf. Chomsky, 1973, this volume). As Chomsky notes, *wh*-movement, constrained by the subjacency condition, is unable to extract material from within cyclic domains to COMP position. Hence in order to account for the (grammatical) sentences in (12) below, Chomsky proposes that a lexically governed restructuring rule applies to the complements of certain noun phrases (in certain contexts), thus placing the NP to which *wh* is attached within the domain of *wh*-movement as constrained by the subjacency condition. (The symbol *t* identifies the position from which the constituent moved by *wh*-movement is extracted.)

(12) *Who did you see a picture of t?*
What were you watching movies about t?
Which sets did Zermelo deny the existence of t?

An alternative to Chomsky's proposal is to regard such phrases as *a picture of t, movies about t, the existence of t* (at least in the contexts in which they appear in (12)) as not constituting cyclic nodes (i.e., N^k) but rather as instances of N^1. Note that if possessive determiners and demonstratives are generated only along a left branch stemming from N^k, then one consequence of this proposal is that extraction is automatically excluded from nominal expressions specified by these elements.

More generally, however, the proposal sketched here is worth exploring independently of this particular application merely because it attempts to apply the resources of the bar notation to certain long-standing syntactic problems.

2.1.2 A second way out of the conflict described in section 2.0 also denies that the subexpression *a proof of this theorem* is a full noun phrase—in fact, this way out is consistent with a variety of assumptions concerning the (derived) constituent structure of the full expression *how much of a proof of this theorem*; For example, we might suppose that the structure underlying this expression is roughly that of (13):

(13) $_{NP}[\,a_{Det}\ _{QP}[\,how\ much\,]_{QP}\ N\ ]_{N}\ [proof\ of\ this\ theorem]_{N}\ ]_{NP}$

On this account, the QP *how much* shifts to the left of the article, with a concomitant insertion of *of* between Q and Det. A more interesting theory of the structure of this expression involves construing *how much of a* as a kind of complex determiner, reminiscent of the treatment found in Chomsky (1970). Hence the constituent structure would be grossly as in (14).

(14) [[*how much of a*] [*proof of this theorem*]]

Although the first way out sketched above suggests a possible solution to the problem of extraction from (apparent) noun phrases, the second way out suggests a syntactic account of a rather different set of problems: namely, the rather special behavior of singular count nouns in a variety of "comparative" structures. Consider the following paradigms:

(15) *How much of a doctor is he exactly?*
How much (of) water is that? [amount interpretation only]
**How much (of) doctors are they?*

(16) *How good a doctor is she?*
**How pure water is that?*
**How good doctors are they?*

(17) *Angelica is quite a doctor.*
**That stuff in your sink is quite water.*
**Angelica and Mathilde are quite doctors.*

The point of these examples is that they illustrate some of the ways in which the degree/kind interpretation of QP is intimately associated with the article *a*. It is by no means inconceivable, of course, that we could find some sort of semantic account of this. Yet the problems in doing so are almost self-evident. For example, it seems perfectly possible to construe plurals "predicatively" (whatever this may mean exactly) in such sentences as

(18) *Mary and Max are lawyers.*

On the other hand, suppose that the degree interpretation is available only when the QP forms a syntactic constituent with the article, along the lines suggested above. In this case, we need not concern ourselves with such problems, and at the same time we find, happily enough, that there is no bar to the operation of E-NP.

2.2 Reviewing the discussion in this section briefly, we have seen that the assumption embodied in (6)—namely, that the presence of an article indicates the presence of an NP whose left bracket is immediately to the left of the article—leads to certain difficulties if we accept the upward-bounded character of E-NP. I have tried to suggest several possible reanalyses, which seem to warrant further investigation.

3. Returning now to the difficulties alluded to in section 1.3 and their relation to the problem discussed in section 2, let us examine how the grammar Selkirk proposes generates partitive constructions. We have at our disposal the following set of phrase structure rules:

(19) $(N^3=)\quad NP \rightarrow \left(\left\{ \begin{matrix} Det \\ NP_{poss} \end{matrix} \right\} \right) N^2$

(20) $N^2 \rightarrow \left(\left\{ \begin{matrix} NP \\ QP \end{matrix} \right\} \right) N^1$

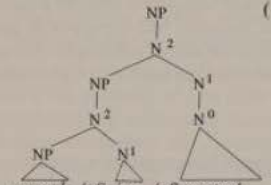
(21) $N^1 \rightarrow NP$

The major source of difficulty here is rule (21), since it is by this rule that the troublesome aspects of the phrases discussed in section 2 are introduced. For example, the phrase *none of the reviews of Mary's book* is assigned the structure:

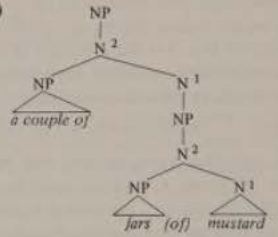
(22) $_{NP}[\ _{QP}[none]\ _{QP}\ (of)\ _{N^1}[\ _{NP}[\ the\ reviews\ of\ Mary's\ book]\ _{NP}]\ _{N^1}]_{NP}$

A further indication of the infelicity of this way of generating partitive constructions is the fact that it allows of ambiguities in analysis. Consider such a phrase as *a couple of jars of mustard*, on the interpretation on which both *a couple* and *jars* are construed as measure phrases. (That this is possible is shown by the existence of such sentences as *A couple of jars of mustard would spice up your sandwich considerably*, at least if the selectional relation between *mustard* and *spice up* is a reliable indication of which noun is the head of the phrase as a whole.) In accordance with the rules Selkirk suggests, this phrase can be assigned the following two structures (on this interpretation):

(22)



(23)



It is difficult to see any noticeable empirical consequence of this distinction in structure, and the existence of such dual structures has the unfortunate theoretical consequence of forcing a complication of Selkirk's definition of head, since according to her definition, the head of the highest NP in (23) is not uniquely identifiable.

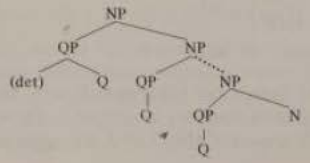
Thus, phrase structure rule (21) seems to have little to recommend it. As for possible reanalyses of the structure of partitive constructions, I suspect that the choice among competing solutions will depend in part on a deeper understanding of the problem of recursion in partitive constructions.

In regard to expressions like *none of the reviews*, if we introduce the quantifier by means of a rule such as (24),

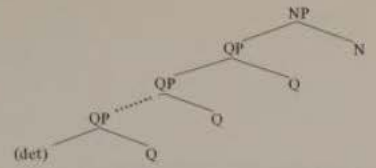
(24) NP → QP NP

then we only complicate matters as far as the upward-bounded property of E-NP is concerned. An alternative is to accomplish the recursion through the left branch of QP itself. Thus, instead of generating structures like (25), we will have structures like (26).

(25)



(26)



One interesting aspect of (26) is that it has closer affinities than (25) to Bresnan's (1973) proposals concerning the expansion of QP in comparative structures.

The interesting question, however, is how to state the recursion restriction in an exact way. If (25) is correct, we might expect that the recursion restriction would be expressed through dependencies between each QP and its sister NP as a whole. On the other hand, if (26) is a better model, then we might expect the dependencies to involve each Q and the QP to its left. I believe that this is the more promising approach, but the problem deserves a more complete treatment than is possible here.

4. In the preceding discussion, I have tried to explore one way in which Selkirk's analysis is open to improvement. My remarks have been somewhat speculative. Yet this is not altogether inappropriate, since Selkirk's work suggests several other lines of potentially fruitful research: it provides not only a foundation for future research, but a model of careful and detailed investigation as well.

Notes

1. Like Selkirk, I shall employ a somewhat mixed notation. I use superscript numerals, rather than the typographically inconvenient bars, to represent various levels of categorial structure. Since it is not altogether clear, however, what numeral to assign to the maximal major phrasal categories, I employ the symbol 'NP' as well.
2. The utility of Jackendoff's principle is, of course, also dependent on such factors as how broadly we construe the notion "grammatical relation."
3. Actually, if our argument is correct, we have only provided evidence that the class of determiners involved is not generated inside the QP generated under N^2.