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## A FORMAL THEORY OF CONFIGURATIONAL PHENOMENA

TIM STOWELL

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**0. Introduction.**

At an observational level, it is a commonplace that languages differ from each other in terms of the freedom with which constituents may be rearranged within phrases. This has formed the basis of a traditional typological distinction between "free-word-order" languages such as Sanskrit or Latin and "fixed-word-order" languages such as English. The theory of grammar should account for this variation in terms of specific parameters embedded within the deductive structure of the theory, so that the contrast between "free word order" and "fixed word order" can be traced to the options exercised by particular grammars at the points specified by Universal Grammar. In this way, linguistics will approach a goal set by Ken Hale and others, such that observed cross-linguistic typologies of grammars ought to follow in a principled fashion from the constructs of syntactic theory.

Within the scientific tradition of generative grammar, it has generally been assumed that fixed constituent order is determined primarily by the formulae of context-free rewrite rules of the Categorical component of the base. Each phrase structure rule defines the internal structure of a particular type of constituent, specifying the set of constituents which it immediately dominates and the linear order in which these constituents appear. For instance, consider the (simplified) version of the phrase structure rule for VP in (1):

(1)  $VP \rightarrow V - (NP) - (Prt) - (NP) - (PP) - (PP) - (\bar{S})$

This rule states that each occurrence of VP must contain a verb (V) as its leftmost constituent; in addition, it may optionally contain up to two NPs, two PPs, a particle, and an  $\bar{S}$ --while these optional constituents must occur in the linear order specified in (1). The categorical rule

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system is supposed to be responsible for constituent order within all phrases--including sentences (S/ $\bar{S}$ ) and phrases projected from the major lexical categories (NP, VP, AP, etc.).

In some languages, however, constituent order is remarkably free. For instance, Latin, Sanskrit, and Japanese permit the major constituents of the sentence to appear in virtually any order, although the verb normally appears at the end of the sentence. (Japanese adheres to the verb-final restriction more rigidly than either Latin or Sanskrit.) The notation of context-free rewrite rules assumed in most versions of generative grammar (eg. that of Chomsky 1965) required that a fixed constituent order be established for each phrase-type. In order to account for the freedom of constituent order exhibited by "free-word-order" languages, it was necessary to invoke transformational "scrambling" rules of the type proposed by Ross (1967).

More recently, Hale (1979) has suggested that free constituent order may be due to the fact that the inclusion of a component of phrase structure rules in a particular grammar is subject to parametric variation. More specifically, Hale suggests that free constituent order in a language such as Latin or Warlpiri follows from the fact that the grammars of these languages lack phrase structure rules entirely; sentences are assumed to be composed of randomly generated sequences of words. Although these languages do exhibit certain limited restrictions on constituent order, Hale proposes that these follow from requirements imposed by interpretive rules (rules of construal). [1] According to this view, the contrast between "free-word-order" (nonconfigurational) languages and "fixed-word-order" (configurational) languages follows not from the inclusion of scrambling rules in the nonconfigurational grammars, but rather from the lack of phrase structure rules in these grammars. A similar approach is advocated by Pullum (1982), who attributes the configurational/nonconfigurational distinction to the presence or absence of "linear precedence" rules in particular grammars; we will consider this proposal in greater detail below.

All of the theories of phrase structure cited above share one crucial assumption: that restrictions on constituent order in configurational languages such as English are imposed by context-free rewrite rules of type illustrated in (1). [2] Suppose, however, that it were possible to find alternative explanations for phenomena associated with fixed constituent order, in terms of independently-motivated principles of other components of grammar--while simultaneously accounting for the inapplicability of these principles in the grammars of the nonconfigurational languages. We would then be in a position to account for the configurational/nonconfigurational distinction without invoking scrambling rules and without attributing to the grammars of the configurational languages an entire rule system which is completely absent from the grammars of the nonconfigurational languages. In other words, we could assume that the component of categorial rules simply doesn't exist in any language; this would amount to treating languages such as English as being essentially nonconfigurational, from the perspective of the theory of phrase structure. Needless to say, this type of approach to configurational phenomena is in marked contrast to certain recent claims to the effect that the syntactic component of the grammar of every natural language consists of nothing other than a set of generalized phrase structure

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rules. [3] Clearly, the choice between these very different approaches can only be made on the basis of empirical argument.

In the following sections of this paper, I will argue that the program of deducing properties of constituent order from independent principles of grammar is in fact feasible, and that this type of approach has the advantage of relating language-specific configurational phenomena to other aspects of the grammars of the languages in question. In Section 1, I provide a summary of some of the problems associated with other accounts of the configurational/nonconfigurational distinction. I will also review Farmer's (1980) proposal that the base component of the grammar of Japanese is completely category-neutral, a proposal which I shall adopt and extend to the grammars of all languages. In Section 2, I sketch out a relatively simple theory of the category-neutral phrase structure schema in the grammar of English, and show how this combines with the independently-motivated principles of Case theory to derive some of the central cases of categorial asymmetries associated with constituent structure--in particular, the distribution of the subject position across categories and the distribution and order of subcategorized complements. Further, I suggest that certain apparent instances of category-specific properties of phrase structure are really due to the operation of a class of extended word-formation rules. [4] In Section 3, I compare certain analyses that are forced by the theory of a category-neutral base with those that are available in theories of grammar which allow for category-specific stipulations in terms of phrase structure rules. I argue that the accounts of configurational phenomena developed in Section 2 are to be preferred not only on the basis of explanatory adequacy, but also on the basis of superior descriptive coverage.

### 1. Theories of Phrase Structure.

As a point of departure, let us consider briefly the "scrambling" account of free constituent order. As noted above, it was necessary to invoke a transformational scrambling rule within the context of the Standard Theory, since it was assumed that the base component of every language defined a specific constituent order for each phrase at Deep Structure. This type of analysis led a number of critics of generative grammar to charge that the theory was biased in favor of languages like English, since it forced an unnatural account of languages such as Sanskrit. But appeals to "naturalness" only carry weight within the framework of an explicit theory of markedness, and there have been no major refutations of the "scrambling" hypothesis couched in these terms. On the other hand, it is possible to raise objections to this hypothesis from the perspective of the theory of acquisition. If, as some have claimed, there is no unmarked canonical surface order of constituents in certain languages, then it is not obvious how a child learning such a language could induce the correct underlying base order merely from exposure to the primary linguistic data. This objection could of course be answered if the theory of markedness were assumed to provide the child with an unmarked constituent order for the base. Unfortunately, there have been few specific proposals in this domain, so it is difficult to evaluate the viability of such an approach.

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Partly in response to objections of this type, Hale (1979) proposed that the phenomenon of scrambling in languages such as Warlpiri is actually due to the lack of phrase structure rules--an option for parametric variation attributed to the theory of the base. But as Pullum (1982) observes, citing Ross (1967), constituent scrambling is normally constrained so as not to apply across clause boundaries, suggesting that even languages which allow relatively free word order maintain some constituent structure. In addition, certain restrictions on discontinuous NPs and the placement of the Auxiliary receive a natural account in terms of constituent structure, as Hale himself observes. He points out that there are plausible alternative accounts of these restrictions in terms of the operation of parsing rules which provide essential input to rules of construal; but this move introduces a major dichotomy in base component-types which raises nontrivial problems for the theory of acquisition. Finally, scrambling phenomena associated with PP and adverbial expressions are attested even in English, implying that the distinction between the two language types is not absolute. (For discussion of these points, see Stowell 1981; see also fn. [1] below.)

Pullum (1982) proposes an alternative theory of phrase structure rules which he suggests avoids this difficulty. [5] Specifically, Pullum argues that phrase structure rules of the conventional type are actually defined for each grammar by the interaction of two distinct sets of rules belonging to a metagrammar. Rules of immediate dominance define an unordered set of immediate constituents for each phrase; a distinct system of linear precedence rules imposes a left-to-right ordering on these sets of constituents. Whereas the rules of immediate dominance and linear precedence belong to the metagrammar, the rules which they define belong to the grammar itself, according to Pullum's account. This distinction between "grammar" and "metagrammar" seems curious, at best. Surely the distinction is meaningless, if proposals concerning "grammar" and "metagrammar" are construed as empirical claims about the representation of linguistic knowledge in the mind. In other words, if the proposed rules of immediate dominance and linear precedence are supposed to be psychologically real, then the conventional phrase structure rules which they define are properly interpreted as epiphenomena, unless one is willing to attribute massive redundancy to the language faculty. If we (trivially) reinterpret the rules of "metagrammar" as rules of grammar, it then follows that the freedom of constituent order in languages such as Latin, Sanskrit, or Japanese can be deduced from the assumption that the grammars of these languages lack linear precedence rules in the relevant domains. In the case of Japanese, the only LP rule in the grammar would be that which orders the head term of S or NP at the end of the phrase, after all the non-head terms. The relative freedom of order in VP displayed by PPs and manner adverbials in English would find an analogous explanation. Wherever the order of constituents is fixed, as is true for the postverbal constituents in (1) above, this theory would invoke a language-specific linear precedence rule; thus Pullum proposes that the grammar (or metagrammar) of English contains (2):

(2)  $H < N'' < P'' < V''$  (where H = head, N'' = NP, P'' = PP, V'' =  $\bar{S}$ .)

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Suppose that (1) were reinterpreted as an immediate dominance rule, so that the terms to the right of the arrow form an unordered set; then (2) would combine with (1) to define all the possible ordered sets of constituents that can count as VPs in English. Pullum argues that by attributing configurational phenomena to linear precedence rules such as (2), it is possible to avoid a "bifurcationist" view of grammar, since it is not necessary to assume that languages such as Warlpiri or Japanese lack phrase structure. The lack of restrictions on constituent order in these languages is only of relevance to the (non)existence of LP rules in the grammar; with respect to the hierarchical constituent structure imposed by the rules of immediate dominance, there would be no significant difference between the two language-types. We return to this point shortly.

It seems to me that there are two essential problems with this type of account, problems which are shared by accounts stated in terms of conventional phrase structure rules such as (1). The first problem concerns the linear precedence rules. Although formulae of the type illustrated in (2) may be valid as a means of stating descriptively true generalizations of constituent order at some level of representation, it is far from obvious that rules of this type are actually responsible for the observed orderings. Notice that these rules essentially stipulate the orders in which the terms must appear, and therefore do not explain them. Nothing in the theory of phrase structure provides a principled reason for expecting the order in (2) as opposed to any other arbitrary order; nor is there any formal explanation for why the grammars of English and French make use of rules such as (2), while the grammars of Warlpiri, Latin, Sanskrit, and Japanese eschew them entirely. [6] Because these rules directly stipulate the observed constituent orders, it is impossible to find an independent explanation for them without immediately introducing a redundancy into the system and thereby rendering the LP rules superfluous. This point is of direct relevance to the discussion in Section 2 below, where it is argued that independent explanations for the phenomena accounted for by (2) are in fact available. In addition, there are minor technical problems with any account of complement order in terms of linear precedence rules, which need not concern us here. [7].

The second problem concerns the assumption that the permissible sets of immediate constituents for every phrase are directly specified in the phrase structure component--regardless of whether they are specified in terms of immediate dominance rules as opposed to conventional PS rules such as (1). Chomsky (1981) observes that in the case of complementation, specifications of immediate constituents within the phrase structure component is entirely redundant, since the same information is collectively specified by the subcategorization properties of lexical entries. Since complement order does not vary from one verb to the next, it is reasonable to suppose that subcategorization frames do not specify the linear order of complements within the lexical entry for each verb, and that the order of complements is determined by principles or rules that are external to the lexicon; see Heny (1981) and Stowell (1981) for further discussion. Notice, however, that this still leaves the immediate precedence rules entirely redundant with

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respect to the constituent sets that they specify; they are needed only for the purposes of defining hierarchical structure. Suppose that the redundancy were to be eliminated by excluding such rules from the grammar; then languages such as Japanese and Warlpiri would lack phrase structure rules entirely, and the "bifurcation" would reappear.

A solution to this problem is offered by the theory of Japanese phrase structure developed by Farmer (1980). Farmer proposes that the base component of Japanese is category-neutral; in other words, the phrase structure rules of the language may refer only to the primitives of X-bar theory, and may not make use of categorial features. This innovation has a number of interesting consequences. First, lexical insertion is context-free, abstracting away from subcategorization requirements, since no structural position is reserved for any specific category by the base rules; this derives "scrambling" as an automatic consequence. There is no redundancy with strict subcategorization, since it is impossible for the phrase structure rules to specify which categories may occur as complements in VP or NP. But phrases and sentences must still conform to the hierarchical structure defined by the category-neutral base, and the complements of each verb must appear within  $\bar{V}$  in order to satisfy strict subcategorization; thus the integrity of clausal structure is maintained, and "scrambling" across clause boundaries is ruled out. Finally, phrasal nodes have no intrinsic categorial features, and they acquire a categorial identity only after lexical insertion has placed a particular lexical category in the head position of a phrase. Hence all phrases are of necessity endocentric, and hierarchical structure is constant across categories. (For more detailed discussion, see Farmer 1980, and Stowell 1981.)

Although Farmer's proposal has desirable consequences for the grammar of Japanese, it appears at first glance to be untenable for languages such as French or English. Anyone familiar with the complexities of English phrase structure knows that each major phrase-type has numerous idiosyncratic properties, suggesting that category-specific phrase structure rules are required for each category, even given X-bar theory. In order for Farmer's notion of a category-neutral base to be extended to all languages, it would be necessary to find independent explanations for the phenomena accounted for by rules such as (2), and also for the facts accounted for by immediate dominance rules in domains other than those involving subcategorized complements. If such explanations are unavailable, then language-particular rules such as (1) or (2) must be retained in order to sustain the descriptive coverage of the grammar. But if such explanations are forthcoming, then the rules of immediate dominance and linear precedence are redundant, and can be eliminated from the theory of grammar. It is to this task that we now turn.

## 2. Deriving Constituent Order.

It seems that certain aspects of constituent structure must be accounted for directly by rules which determine hierarchical phrase structure configurations. Within the framework of a theory of grammar which assumes that the phrase structure component is category-neutral, language-particular phrase structure rules are essentially limited to parametric variations on X-bar theory.

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Following Farmer (1980), we can assume that the major rule of Japanese phrase structure is the rule which orders the head term  $X$  of a phrase  $XP$  at the right boundary of the  $\bar{X}$  level. English and French adopt the mirror-image of this rule, placing the head term at the left boundary of  $\bar{X}$ . Since the base is category-neutral, this holds constant across all major categories--NP, AP, VP, and PP. [8] (This language-particular stipulation is more or less equivalent to the analogous stipulation in (2) above.) English goes beyond Japanese and draws a distinction between the levels  $\bar{X}$  and  $\bar{\bar{X}}$ . The  $\bar{X}$  level is reserved for subcategorized complements of the head, essentially in the sense of Chomsky (1970). This constitutes a direct (though category-neutral) link between  $X$ -bar theory and the theory of the lexicon. The level of  $\bar{\bar{X}}$  is reserved for specifiers of  $\bar{X}$ , again following Chomsky (1970). However, we can refine the theory of specifiers by assuming two types of specifiers. The specifier to the left of  $\bar{X}$  is the subject of  $\bar{X}$ ; this position is normally reserved for the "external argument" of the head, in the sense of Williams (1981). The specifier position to the right of  $\bar{X}$  is the position for the modifiers of  $\bar{X}$ : PPs and adverbial expressions (where  $\bar{X}$  functions as a predicate), and relative clauses and "reduced" modifiers, where  $\bar{X}$  names an entity or event. It may be that the subject position and the modifier position(s) should be distinguished from each other in terms of hierarchical level. Suppose, for instance, that we adopt a 3-bar version of  $X$ -bar theory, so that subjects appear at the  $\bar{\bar{X}}$  level, while modifiers appear at the  $\bar{X}$  level. Then it would be possible to define the subject position as the non-head constituent immediately dominated by  $\bar{\bar{X}}$ , or perhaps as the sister of  $\bar{X}$ . Then the postverbal subject position in extraposition constructions could itself be characterized as an argument position, thus allowing in principle for the thematic role of the external argument of  $\bar{X}$  to be assigned directly to this position--in effect bypassing the "original" subject position to the left of the head. This has some interesting consequences, which I will not discuss here. [9]

Although it is possible for category-neutral phrase structure rules to define positions for the head, the subcategorized complements, the subject, and the modifiers, it is impossible for these rules to impose any categorial asymmetries in terms of these positions. Thus from the perspective of this theory of phrase structure, every major category must be permitted to contain positions not only for the head, but also for subcategorized complements, modifiers, and a subject. The notion that the positions for the head and its subcategorized complements hold constant across categories is not new; it is explicitly proposed in Chomsky (1970), and has been assumed in much subsequent work. Furthermore, the idea that modifiers generalize across categories is proposed by Jackendoff (1977), who shows that every major category may contain relative clauses; similarly, it can be shown on the basis of "reduced" modifiers that any category may itself function as a modifying phrase. (For more detailed discussion of both points, see Stowell (1981), §4.3.) The status of the subject position is less clear. Chomsky (1970) proposed to generalize the subject position across the categories NP and S, but the other major categories were left out of this system; this assumption has not been challenged in most subsequent work, eg. that of Jackendoff



(1977). However, it turns out that the apparent limitation of the subject position to S and NP is illusory; to the extent that it is descriptively correct, it holds only for the distribution of lexical NPs in some (but not all) environments. In any event, the relevant facts which motivate the assumption of a categorial asymmetry can be independently deduced from external criteria--in particular, from the interaction of the theories of abstract Case and thematic role assignment, within the framework of Government-Binding theory. In order to illustrate this, I will provide a brief exposition of some of the basic principles of GB theory, which I will assume without explicit justification.

The three major principles of relevance to our discussion are the  $\theta$ -Criterion, the "Visibility" Condition, and the rule of Case assignment:

(3) The  $\theta$ -Criterion

- (i) Each thematic role ( $\theta$ -role) must be assigned to one and only one argument-chain (A-chain).
- (ii) Each A-chain must be assigned one and only one  $\theta$ -role.

(4) The Visibility Condition

A  $\theta$ -role  $R$  may be assigned to an A-position  $A$  if and only if  $A$  appears in an A-chain that is headed by an  $A$ -position which has Case or is occupied by PRO.

(5) Case Assignment under Government

In the configuration [...  $\beta$  ...  $\alpha$  ...  $\beta$  ...],  $\alpha$  assigns Case to  $\beta$ , if and only if (i)  $\alpha$  governs  $\beta$ , and (ii)  $\beta$  is adjacent to  $\alpha$ , and (iii)  $\alpha$  is either [-N] or [+Tense].

These principles of GB theory are based on proposals of Chomsky (1981); the precise formulations given here are more or less equivalent to those adopted in Stowell (1981). [10] The  $\theta$ -Criterion is an extension of the conditions of functional uniqueness and functional relatedness proposed by Freidin (1978); it imposes a biuniqueness relation between  $\theta$ -roles and A-chains. A-chains are (maximal) sequences of A-positions (i.e. of argument positions--the subject position and the positions of subcategorized complements in  $\bar{X}$ ), such that each A-position  $A_i$  in the sequence ( $A_1, \dots, A_n$ ) locally binds the adjacent position  $A_{i+1}$ ; the position  $A_1$  which binds all other A-positions in the chain is defined as the head of the A-chain. (Recall that  $\alpha$  binds  $\beta$  if and only if  $\alpha$  c-commands  $\beta$  and is co-indexed with  $\beta$ . [11]) In general, A-chains will consist either of a single A-position or of a series of A-positions consisting of a category that has undergone movement and its co-indexed traces.

We are now in a position to return to the issue of the distribution of lexical NP subjects. According to (5), an NP may be assigned Case only if it is governed by a [-N] category (V or P) or if it is the subject of a tensed clause, where it is governed by INFL, which bears the feature [+Tense]. The theory of Case thus imposes an asymmetry between the subject position of a tensed clause and that of an infinitive: Case is assigned by INFL to the former but not to the latter. Moreover, since S is not a projection of V, the infinitival verb does not govern the subject position of the infinitive, so this position is never assigned Case internal to S. In general, this has the effect of

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preventing lexical NP from appearing in this position, by virtue of the  $\theta$ -Criterion (3) and the Visibility Condition (4), which combine to derive the major empirical effects of the Case filter of Chomsky (1980) and Rouveret and Vergnaud (1980); see Chomsky (1981) for discussion. By (3), every NP functioning as an argument must be assigned a  $\theta$ -role; but (4) requires that any NP other than PRO must bear Case if it is to head an A-chain to which a  $\theta$ -role can be assigned. Hence the subject position of an infinitival  $\bar{S}$  must contain either PRO (if it is the head of an A-chain) or NP-trace. (Since  $\bar{S}$ , like other maximal projections, is a barrier to government, Case assignment to the subject from a position external to the clause is normally impossible.) Actually, there are two cases where lexical NP may occur as the subject of an infinitive. The first involves the infinitival complementizer *for*; since this complementizer bears the prepositional feature [-N], it assigns Case to the subject position across the S boundary (which, unlike  $\bar{S}$ , is not a maximal projection and therefore does not block government). The second case involves the "Exceptional Case Marking" (ECM) construction. Chomsky (1981) suggests that in this case a verb triggers deletion of the  $\bar{S}$  boundary of its infinitival complement; since S does not block government, the verb can assign Case directly to the subject of its complement. [12]

Let us now consider the subject position in categories other than S. According to (5), it should be impossible for NP to contain a lexical subject, since the head noun does not bear the feature [-N] or [+Tense]. However, this position is subject to a special rule of genitive Case assignment; this does not appear to be dependent upon government, since the rule also applies to the subject of a gerund, despite the fact that there is no head noun governing it. We need not concern ourselves with the technical details of this rule; for some discussion, see Stowell (1981). Next, consider the subject position of categories other than NP, such as AP, PP, and passive participial phrases. None of these categories can assign Case to their subjects so by virtue of (3) and (4), lexical NP should not be permitted to appear in such a position. Moreover, if the subject position in AP or PP is governed by the head, it follows that PRO should also be barred from appearing in this position, since it is a theorem of the binding theory proposed by Chomsky (1981) that PRO may never be governed. [13] Hence only NP-trace should be permitted to appear in this position--which, in fact, it can:

- (6) a. John wants very much [ $\bar{S}$  for Bill to be happy]  
 b. John wants very much [ $\bar{S}$  PRO to be happy]  
 c. \*John wants very much [ $_{AP}$  Bill happy]  
 d. \*John wants very much [ $_{AP}$  PRO happy]
- (7) a. John<sub>i</sub> seems [ $_{S}$  t<sub>i</sub> to be clever]  
 b. John<sub>i</sub> seems [ $_{AP}$  t<sub>i</sub> clever]  
 c. John<sub>i</sub> kept [ $_{PP}$  t<sub>i</sub> off the ship]  
 d. John<sub>i</sub> was believed [ $_{PrTP}$  t<sub>i</sub> kidnapped by pirates]

Thus the apparent lack of a subject position in categories such as AP and PP need not be accounted for in terms of category-specific phrase structure rules, since it holds only for lexical NP and PRO (as opposed to trace)

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and follows in any event from Case Theory, which is required independently in order to distinguish the subject position of infinitival S from the subject position of tensed S. (We return to this issue in §3.)

Let us now turn our attention away from the status of the subject position across categories and consider the status of subcategorized complements. As observed above, the category-neutral base hypothesis implies that subcategorized complements should appear within the  $\bar{X}$  projections of all the lexical categories (V, N, and A); this is in fact correct, as observed by Chomsky (1970) and others. However, it also implies that the order in which these subcategorized complements appear should be random, or at least in no way dependent upon the syntactic categories of the complements. But it is well known that this is false, as implied by the rules in (1) and (2). We shall now see, however, that the order of complements can also be derived from the same principles of Case theory which account for the distribution of subjects. Consider first the fact that an NP object must precede the other complements in VP: [14]

- (8) a. [John's having put the book on the table] surprised me  
b. \*[John's having put on the table the book] surprised me

As observed by Chomsky (1981), this can be deduced from the adjacency condition on Case assignment (5ii), given the  $\theta$ -Criterion and the Visibility Condition, since the NP object will only be assigned Case when it appears immediately adjacent to the verb.

In English, the effects of the adjacency requirement are transparent; even manner adverbials may not intervene between a verb and its object NP. In some languages, however, this is possible. For instance, the Italian translation of (9a) is grammatical:

- (9) a. \*Mario has read attentively a book  
b. Mario ha letto attentamente un libro [Italian]

In terms of a theory of grammar which permits category-specific phrase structure rules to directly determine linear precedence relations, this is easy enough to account for: one could simply assume that English orders NP complements before ADV complements by means of a linear precedence rule analogous to (2), while Italian would presumably lack such a rule. The solution is less obvious for the theory advocated here, however. The problem lies in the fact that Italian does require that NP complements precede PP complements (abstracting away from "Focus NP Shift" phenomena; cf. fn. 14). If this is to be accounted for in the same terms as (8b)--i.e. as an effect of (5ii)--then one should expect (9b) to be ruled out, parallel to (9a). We can resolve this paradox by assuming that in Italian, Case is assigned at an abstract level of syntactic representation, where the only constituents of VP are the verb and its subcategorized arguments. We can refer to this level as the argument projection of S-structure, where projection is intended in the technical sense of Vergnaud (1977). Manner adverbials, which may intervene between verb and object at S-structure (as in 9b) do not appear on the argument projection; nevertheless the linear order of those constituents which do appear at this level (NP, PP,  $\bar{S}$ , etc.) is projected from the S-structure representation. In fact there is independent

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evidence for the argument projection in Italian grammar. Rizzi's (1978) Restructuring rule and Longobardi's (1979) Double Infinitive filter, both of which normally apply only to adjacent constituents, appear to overlook intervening manner adverbials; this can be accounted for by assuming that these rules apply on the argument projection as well. Thus it seems that a good case can be made for the universal status of the adjacency condition (5ii), further strengthening the explanatory force of the Case Theory account of (8b) and (9a). [15] The status of the adjacency condition in nonconfigurational languages such as Sanskrit or Warlpiri is discussed in Section 3 below.

Let us now consider the status of PP and  $\bar{S}$  complements with respect to the system of principles in (3-5). PP has the property that it never needs to be assigned Case. This is shown by the fact that PP is free to occur as the subcategorized complement of either A or N, neither of which assigns Case (eg. his dependence on the government, or dependent on the government). Similarly, the fact that PP complements in VP are free to appear in positions not adjacent to the verb implies that they need not be assigned Case--even when they function as arguments. From this it does not necessarily follow, however, that we need to introduce an asymmetry into the theory of  $\theta$ -role assignment, by stipulating that PPs are exempt from the Visibility Condition. Hagit Borer has suggested, on the basis of independent considerations, that verbs do not actually assign  $\theta$ -roles to subcategorized PP complements; instead, she suggests that a compositional  $\theta$ -role is assigned to the NP object of P within PP, by combining the verb's  $\theta$ -role of LOCATION or DIRECTION with the inherent meaning of the preposition. In order to account for  $\theta$ -role assignment in constructions involving pied-piping of PPs by WH-movement, it is plausible to assume that compositional  $\theta$ -role assignment applies to the output of Reconstruction at the level of Logical Form. Note that under this analysis, the preposition will assign Case to NP within PP, thus satisfying the Visibility Condition and permitting compositional  $\theta$ -role assignment to the NP, as required by the  $\theta$ -Criterion.

The status of  $\bar{S}$  arguments with respect to (3-5) is somewhat more complicated. Let us first consider tensed clause complements. Despite the fact that these complements usually function semantically as direct objects, they invariably appear after all other subcategorized complements, as indicated in (1) and (2). This is related to the fact that  $\bar{S}$  is unable to occur at S-structure in two argument positions that have traditionally been defined as "NP positions": the subject position in S and the object position in PP. [16] (Recall that the apparent instances of  $\bar{S}$  appearing in subject position at S-structure were shown by Emonds (1976) to involve "obligatory" string-vacuous application of topicalization; cf. Koster 1978.) I have suggested elsewhere that these facts actually follow from the interaction of (3-5) with an additional principle of Case theory which prevents  $\bar{S}$  from appearing at S-structure in a position to which Case is assigned:

(10) The Case-Resistance Principle

Case may not be assigned to a category which bears a Case-assigning feature (i.e. [-N] or [+Tense]).

Unlike NP,  $\bar{S}$  is headed by a category (INFL) which bears the Case-assigning feature [+Tense]. For this reason,  $\bar{S}$  can never be assigned Case, since

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the Case would "percolate" to INFL, in violation of the Case Resistance Principle (CRP). But  $\bar{S}$ , unlike PP, must itself be assigned a  $\theta$ -role in order to satisfy the  $\theta$ -Criterion; there is no question of compositional  $\theta$ -role assignment in this case. From this it follows that direct  $\theta$ -role assignment to tensed clause arguments should be impossible, since the Visibility Condition (4) and the Case Resistance Principle (10) impose contradictory requirements: by (4),  $\bar{S}$  must be assigned Case in order for  $\theta$ -role assignment to proceed, but this would entail a CRP violation. From this paradoxical situation we can derive the major distributional properties of tensed clauses, as we shall now see.

The contradiction arising from the interaction of the Visibility Condition with the CRP can be resolved in one of two ways. Suppose that a tensed clause appears at D-structure in the subject position of S, a possibility implied by the hypothesis of a category-neutral base. The first "saving" strategy involves adjunction of the subject  $\bar{S}$  to the right of VP via application of Move  $\alpha$ , together with insertion of the pleonastic it into the vacated subject position. (This is the it-Extraposition construction.) At S-structure, the pair (it,  $\bar{S}$ ) form an A-chain which is headed by Case-marked it; this satisfies the Visibility Condition without violating the CRP, since the tensed clause is not itself assigned Case. The second "saving" strategy is for the tensed clause to undergo movement to an  $\bar{A}$ -position, from which it can bind its trace as a syntactic variable. At S-structure, Case and  $\theta$ -role are assigned to the variable (more precisely, to the A-chain headed by the variable), in conformance with Visibility and the CRP. (Note that the trace of  $\bar{S}$  must itself be immune to the CRP, suggesting that the CRP only applies to the categorial head of  $\bar{S}$ --INFL.) This second strategy is instantiated in the topicalization construction; in effect, the CRP and Visibility conspire to derive Emonds' "obligatory" topicalization of  $\bar{S}$  subjects that do not undergo it-Extraposition. Consider next structures in which a tensed clause appears as the object of a verb at D-structure. Here, there are two  $\bar{A}$ -positions available as "landing sites" for the tensed clause. The first of these is the familiar Topic position adjoined to the left of the matrix S. The second is the position adjoined to the right of VP (Focus position); this position is unavailable for subject  $\bar{S}$ , perhaps because the variable would not be c-commanded by  $\bar{S}$  if it were adjoined to VP. It is this Focus position at the end of VP which is occupied by tensed clause complements when they do not undergo topicalization; thus the CRP and Visibility also conspire to derive the canonical position for tensed clause  $\bar{S}$  complements specified in (1) and (2) above. [17] Finally, consider the case where a tensed clause appears at D-structure as the object of a preposition. If the  $\bar{S}$  remains within PP at S-structure, then either the CRP is violated (if P assigns Case to  $\bar{S}$ ) or the  $\theta$ -Criterion is violated (if P does not assign Case to  $\bar{S}$  and the Visibility Condition is not satisfied). Hence the clause must move out of PP to one of the  $\bar{A}$ -positions. But rightward movement out of PP is in general impossible, as noted by Van Riemsdijk (1978) in his discussion of "Heavy NP Shift"--a rule which also involves movement to the VP-final Focus position. [18] Thus the only possible derivation is for  $\bar{S}$  to topicalize, a strategy which is marginally possible. [19] Thus the principles (3-5) and (10) derive completely the distribution of tensed clauses.

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Infinitival clauses share some of the properties of tensed clauses, but in other respects behave more like PPs. Like tensed clauses, infinitivals are free to appear in the subject position of S at D-structure, just as long as they do not appear in this position at S-structure; the infinitival must either move to an  $\bar{A}$ -position (topicalization) or adjoin to VP (it-extraposition). When an infinitive appears as the subcategorized complement of a lexical head, it patterns somewhat differently from tensed clause complements. First, infinitives need not appear at the end of VP:

- (11) a. John has promised [to help us] repeatedly  
b. John explained [how to open the jar] to Bill

Second, infinitival complements may not topicalize, as noted by R. May:

- (12) a.\*[To help us] John has promised -- repeatedly  
b.\*[How to open the jar] John explained -- to Bill

Third, infinitival complements may not passivize:

- (13) a. It was expected (by us) [ that John would win the race]  
b.\*It was expected (by us) [ (for John) to win the race]

We can relate these phenomena by assuming that infinitival clauses are intrinsically Case-marked (perhaps by the preposition to), and that verbs never assign Case to infinitival  $\bar{S}$  or its trace. Thus (11) is permitted because the infinitive is intrinsically Case-marked, thus satisfying the Visibility condition on  $\theta$ -role assignment; since the verb assigns no Case to  $\bar{S}$ , the CRP is silent and extraposition to the end of VP is unnecessary. Topicalization is blocked in (12) because the verb does not assign Case to the trace of the infinitive; the trace therefore cannot function as a variable which satisfies (4), and a violation of the  $\theta$ -criterion results. Finally, passivization is blocked in (13b) because passive morphology always involves absorption of a Case-assigning feature, which is absent from the active counterpart to (13b) but present in the active counterpart to (13a).

This concludes our discussion of the effects of the principles of Case Theory on the distribution of NP, PP, and  $\bar{S}$  arguments. Of course these principles are not responsible for every phenomenon of fixed constituent order that has been traditionally accounted for in terms of category-specific phrase structure rules. In fact a number of constructions in the so-called configurational languages have properties of fixed, arbitrary constituent order and cross-categorical asymmetries which appear to be impossible to deduce from general explanatory principles. A paradigm example of this involves clitic constructions in languages such as French, which must appear in the order mandated by Perlmutter's (1971) "surface structure constraint":

- (14) NOM - ne - me/te/nous/vous/se - 3rd ACC - 3rd DAT - y - en - V

We can account for these facts by exploiting an insight which Perlmutter attributes to P. Postal: the arbitrary patterns of fixed constituent order in (14) is related to the fact that a verb and its clitics together form a syntactic word. Suppose, following Aronoff (1976), that words are formed in a distinct component of the grammar by

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rules of word-formation, and that these rules attach affixes to stems of specific lexical categories in fixed and arbitrary orders. We can then attribute the arbitrary clitic orders in (14) to the effects of word-formation rules, rather than to phrase-structure rules per se. The fact that derived nominals and adjectives cannot take clitics suggests that the relevant word-formation rules apply only to verbal stems. In Stowell (1981), I propose that the English Double Object Construction and Verb-Particle construction can be accounted for in essentially analogous terms: English has rules of word-formation which adjoin particles and full noun phrase "clitics" to verbal stems which belong to the Native stem class. These constructions appear to call for the base rules of English to specify a particle position and a second NP position in VP; but there is considerable evidence supporting the hypothesis that these "extra" positions really fall within the substructure of the verbal head, and are generated by rules of word-formation rather than by rules of phrase structure. Similar considerations lead to the conclusion that the position for prenominal adjectives is also created by a rule of word-formation. Perhaps this type of **story might** also be extended to account for the structure of the prenominal determiner system and the preverbal auxiliary system; for some discussion, see Stowell (1981). Obviously, one consequence of this approach is that the notion "syntactic word" must be distinguished from that of "phonological word". The contrast between true phrase structure and word-internal "phrase structure" is not arbitrary, however. Subconstituents of syntactic words are themselves immune to general syntactic rules operating at the phrasal level (such as the rules of movement and binding); they may, however, be related to positions outside the word by special rules, such as those belonging to the theory of clitics (cf. Borer 1981). In addition, subconstituents of syntactic words cluster around the head ( $X^0$ ) positions defined by X-bar theory.

Thus the properties of phrase structure relating to hierarchical and linear ordering turn out to follow from the interaction of a number of distinct components of grammar. The category-neutral phrase structure component defines the hierarchical structure of phrases, and relates specific positions to logical functions defined by the theory of LF. The principles of  $\theta$ -role theory and Case theory combine to account for the distribution and ordering of various types of arguments within each X-bar level; ~~most~~ constituent structure properties that can't be deduced from these principles (eg. the sets of immediate constituents of  $\bar{V}$  or  $\bar{N}$ ) are due largely to properties of the lexicon, such as the subcategorization features associated with the thematic matrix of the governing head. Finally, a residue of structures that fall outside of these systems can be attributed to an extended component of word-formation rules which share essential properties with traditional morphological rules, differing primarily in the relationship of their output structures to the phonological component.

### 3. Comparing Theories

In this section, I will suggest that the theory of the category-neutral base, according to which cross-categorial asymmetries of phrase structure must follow from other principles of grammar, is to be prefer-

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red over any theory which permits the phrase structure component to directly stipulate cross-categorial asymmetries of internal structure and external distribution. For the sake of discussion, I will contrast the account of constituent structure developed above in Section 2 in terms of Case Theory with analyses of the same phenomena that would be most plausible within the framework of a theory which relies instead on category-specific phrase structure rules. I do not consider any "mixed" theory which includes both Case Theory and category-specific phrase structure rules, since this should be excluded on the basis of Occam's razor. In making the comparison between the Case Theory account and the alternative offered by a Phrase Structure Rule (PSR) theory, I will first consider briefly the issue of explanatory adequacy, with particular reference to the effects of the adjacency condition on Case assignment. I then turn to issues of descriptive adequacy, which also provide support for the Case Theory account--a striking result, in light of the fact that this theory is more restrictive in the domain where restrictiveness is of interest, i.e. with respect to language-specific properties of grammar. [20]

The Case Theory account relies crucially on the adjacency condition on Case assignment (5ii), which interacts with the principles of  $\theta$ -role theory to derive the order of complements in VP and the distribution of subjects across categories. The only language-particular stipulation required is the value assigned to the parameter of X-bar theory which determines the placement of the head at the left boundary of  $\bar{X}$ . In contrast, the PSR Theory makes no claims for universality of the constructs which it employs, relying instead on language-particular phrase structure rule formulae. (Recall that it is the alleged absence of (2) from the grammars of nonconfigurational languages which forms the basis of Pullum's (1982) account of free constituent order.) Thus within the realm of language-particular rules, Case Theory makes the more restrictive claim, and is therefore more explanatory from the perspective of the theory of acquisition.

It might appear that the claims of the Case Theory account are actually too restrictive, since in the nonconfigurational languages the various complements of a verb are freely ordered with respect to each other. Here it seems appropriate to draw a distinction between two grammatical systems governing the distribution of Case. Suppose that Case may be assigned to a constituent either in the base (lexical Case) or at S-structure (syntactic Case). Suppose further that syntactic Case is always assigned in conformance with the conditions specified in (5)--in particular, with the adjacency condition (5ii). On the other hand, we might suppose that lexical Case is freely distributed, in languages where it is available, and that verbs and prepositions do not actually assign lexical Case, but rather subcategorize for it. It is plausible to suppose that in acquisition, the theory of markedness will always favor syntactic Case assignment over subcategorization for lexical Case (where either one is a logically possible analysis for a fixed class of data) since Case assignment does not entail a proliferation of subcategorization features in lexical entries. Hence the child learning English will automatically assume that Case is assigned syntactically under (5), in the absence of overt evidence to the contrary.



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But consider the situation of a child learning a nonconfigurational language. It has often been observed that free constituent order typically correlates with rich Case morphology, as is true for instance of Sanskrit. When a verb in such a language appears with a set of two or more NP complements with a particular array of Cases, the verb could not possibly be responsible for assigning all of these Cases without violating the adjacency condition (5ii), since it can be adjacent to at most one NP. From this it follows immediately that verbs must sub-categorize for lexical Case in such a language, rendering the adjacency condition irrelevant to the distribution of these NPs. Since it is the adjacency condition which is responsible for imposing a fixed order of complements in languages such as English, the phenomenon of free constituent order in a language such as Sanskrit is a necessary consequence of the fact that its verbs can occur with several NP complements with a variety of Case markings. Note, however, that this account does not entail indiscriminate free constituent order in these languages. Thus prepositions and postpositions normally occur with just a single NP, so the problem for the adjacency condition posed by multiple Case assignment simply does not arise. This means that P will always be free to assign Case (as markedness theory favors, where possible). This in turn explains the fact that even in otherwise "nonconfigurational" languages, prepositions and postpositions always appear adjacent to their NP objects. The theory thus imposes a principled formal correlation between multiple Case selection and free constituent order, and doesn't have to appeal to some vague functional principle stating the unsurprising and prosaic observation that languages lacking rich Case morphologies need to make use of word order so as to encode meaning. The Case Theory account makes a more interesting and unusual claim, namely that languages having rich Case morphologies "need" free constituent order, insofar as this is an automatic consequence of multiple Case selection.

Let us now turn our attention to matters of descriptive adequacy with respect to the empirical predictions implicit in the Case Theory account of English constituent structure developed in Section 2. Consider first the status of the subject position, in categories other than S and NP. According to our account, the lack of lexical NP subjects in categories such as AP follows from the fact that A is unable to assign Case to its subject; according to the PSR theory, this is due to the fact that the phrase structure rule for AP does not provide this category with a subject position. The theories differ empirically insofar as Case Theory predicts that in structures where there is some special means for assigning Case to the subject position in AP, a lexical subject should be possible. In fact such structures exist; there are direct analogues to infinitival ECM (NP-to-VP) constructions, where a verb governs and assigns Case to the subject position of an AP complement:

- (15) a. I consider [<sub>AP</sub>John - very intelligent]  
 b. We wanted [<sub>AP</sub>him - alive]

The constituent structure assigned to the postverbal NP+AP in (15) is controversial, but it is also well-founded. The standard arguments for the clausal status of infinitival ECM constructions apply to these examples with equal force. [21] Must we assume, however, that the "small

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clauses" in (15) are APs rather than Ss? The answer seems to be: yes. This conclusion is forced by the principle of locality of strict subcategorization, i.e. that a verb can subcategorize only for the category of a complement to which it assigns a thematic role. Now it is a fact that the governing verbs in constructions such as (15) subcategorize for the category of the small clause predicate; thus consider takes AP or NP (but not PP), while want takes AP or PP (but not NP). If the small clause has the categorial label of S, then the locality principle is violated; verbs must be permitted to subcategorize for the substructure of their complements. But if the small clause is a projection of the category of its predicate, the apparent violation evaporates. Thus we can conclude that AP does contain a syntactic subject position and that this position may be filled by lexical NP when it is assigned Case--consistent with the prediction of Case Theory, but contrary to the prediction of the PSR theory. Note that this account of small clause complements has the further advantage of rendering the "PRED" position in VP superfluous, since this position is none other than the predicate within a small clause complement. This is a welcome result, since it resolves an apparent violation of the autonomy of syntax noted by Jackendoff (1977); see Stowell (1981) for discussion.

Let us now compare the two theories with respect to their accounts of constituent order in VP. Recall that the Case Theory account claims that tensed clause complements appearing at the end of VP are in an  $\bar{A}$ -position adjoined to VP, binding a trace which functions as a variable. In contrast, infinitival complements intrinsically satisfy the Visibility condition and need not (indeed, may not) move to an  $\bar{A}$ -position, since no verb assigns Case to infinitival  $\bar{S}$  or its trace. Hence infinitival complements, unlike NP and tensed clause complements, are freely ordered in VP. The PSR theory would presumably account for these facts by exempting infinitivals from the linear precedence rule which orders  $\bar{S}$  after PP and ADV, in terms of the version of a PSR theory proposed by Pullum (1982). (Note that this would force (2) to be split into two rules, since infinitival  $\bar{S}$  must still follow NP.) Quite apart from the fact that the PSR theory would have to find some other way of accounting for the passivization and topicalization facts cited above, there is further empirical support for the Case Theory account. In the infinitival Exceptional Case Marking construction (and in the related "small clause" constructions), the entire clause must immediately follow the governing verb. This is precisely what Case Theory predicts, since the verb must assign Case to the subject of the infinitive, and adjacency is a prerequisite for Case assignment. (The integrity of the clause prevents other complements of the governing verb from intervening between the subject and predicate of the infinitival.) The facts are illustrated in (16):

- (16) a. \*We showed to the men [the solution to be trivial]  
 b. \*We showed [the solution - to the men - to be trivial]

Thus the freedom of constituent order displayed by infinitival complements breaks down in precisely the domain predicted by Case Theory. By contrast, there is no natural explanation for this in the PSR theory, regardless of whether the NP-to-VP sequence is treated as a single constituent. (If NP is part of the infinitive, then matrix PPs and adverbs should be able to intervene between V and  $\bar{S}$ ; if not, then they should be

able to intervene between NP and the infinitive, as in true control structures. Neither option is available, however, as shown in (16).) Significantly, there is a principled exception to the exception; the adjacency requirement breaks down in the passive ("Raising") counterparts to the Exceptional Case Marking construction:

(17) [The solution]<sub>i</sub> was shown to the teacher [ t<sub>i</sub> to be trivial]

This is again what we expect, given the Case Theory account; since the trace of NP-movement need not be assigned Case, the adjacency condition on Case assignment has no effect in (17). I know of no obvious account for (16) and (17) in terms of a PSR theory.

When a tensed clause complement follows a PP complement in VP, the Case Theory account claims that it is binding a trace as a variable. The trace must appear adjacent to the governing verb, in order to be assigned Case, as required by the Visibility Condition. In such constructions, the prepositional head of the PP intervening between  $\bar{S}$  and its trace cannot be stranded by WH-movement. In terms of the Case Theory account, the relevant structures are (18a,b):

(18) a. He said [e]<sub>i</sub> to the general [that the battle was over]<sub>i</sub>

b. \*Who<sub>j</sub> did he [<sub>V</sub> say [e]<sub>i</sub> to] [e]<sub>j</sub> [that the battle was over]<sub>i</sub>

The structure in (18b) assumes, following Weinberg and Hornstein (1981), that V-P Reanalysis is always a prerequisite for preposition stranding. Given this assumption, it follows from the account of tensed clause complements developed in Section 2 that (18b) is ruled out, regardless of whether Reanalysis applies before or after extraposition of the clause. Depending on the order of application, either  $\bar{S}$  or its trace will find itself inside the derived verb created by Reanalysis, and both syntactic movement (Move  $\alpha$ ) and syntactic binding are unable to apply to a position within the substructure of a word. Exactly the same facts hold true for "Heavy NP Shift", which has an essentially equivalent structure (see fn. 18):

(19) \*Who<sub>j</sub> did you [<sub>V</sub> give [e]<sub>i</sub> to] [e]<sub>j</sub> [a new book about India]<sub>i</sub>

Note that the Case Theory account of (19) and (18b) relies crucially on the assumption that the trace of  $\bar{S}$  must be assigned Case by the governing verb, since this is what forces the trace to appear adjacent to the verb at S-structure. This predicts that when the governing verb does not assign Case to the trace of  $\bar{S}$ , the trace should be free to appear anywhere in  $\bar{V}$ ; then if the trace of  $\bar{S}$  is free to follow PP rather than precede it, stranding should be possible. This prediction is borne out. In the passive version of (18b), the  $\bar{S}$  complement appears in an A-chain headed by the nominative pleonastic *it*--presumably via "NP-movement" and *it*-Extraposition. Since the pleonastic bears Case and heads the A-chain, the original trace of  $\bar{S}$  need not be assigned Case; hence the trace can follow PP, and stranding is possible:

(20) Who<sub>j</sub> was it<sub>i</sub> [said to ] [e]<sub>j</sub> [e]<sub>i</sub> [that the battle was over]<sub>i</sub>

The contrast between (18b) and (20) is of particular interest in that it shows that there can be no single D-structure position for tensed clause complements in VP:  $\bar{S}$  must precede PP at D-structure in (19a), while it must follow PP at D-structure in (20). In other words, all complements must be free to appear at D-structure in any order that ultimately proves

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to be compatible with other rules of grammar--in particular, with the requirements imposed by the rules of movement, binding, Reanalysis, and Case assignment. It is interesting to contrast (18b) with a structure where the  $\bar{S}$  complement following PP in VP is an infinitive:

(21) Who<sub>j</sub> did you [plead with ] [e]<sub>j</sub> [to shut the door]

Since the infinitival complement is intrinsically Case-marked, it does not bind a trace adjacent to the verb; hence nothing prevents V-P Reanalysis, and (21) is grammatical.

It is difficult to imagine how a PSG theory could account for the constellation of facts in (18-21) in any natural way. Since tensed clause complements always occur at the end of VP, there is no reason for such a theory to prevent  $\bar{S}$  from being directly generated in this position; but then there is no reason whatsoever for the presence of the  $\bar{S}$  complement to interfere with Reanalysis (or whatever process this theory claims is responsible for preposition stranding). In order to be able to account for the correlation between (18b) and (19), this theory would have to arbitrarily invoke an intervening base-generated trace (or a notational variant thereof) in (18b). Furthermore, this trace would have to be invoked only for tensed clause complements of active verbs, in order to allow for (20) and (21). In the absence of any explanation for the distribution of trace of the type provided by Case Theory, these base-generated traces would be arbitrary stipulations for the PSG theory. Evidence for the grammatical equivalence of Heavy-NP-Shifted NPs and tensed clause complements of active verbs is not limited to stranding constructions; facts associated with Ross's (1973) "Same Side Filter" provide further support for the claim; see Stowell (1981) for discussion.

As a final argument for the Case Theory account of constituent structure, consider the fact that  $\bar{S}$  cannot normally occur as the object of a preposition. Recall that this follows from the fact that rightward movement out of PP is impossible, so  $\bar{S}$  cannot be "saved" from a CRP violation. (See fn. 18.) In contrast, the PSR theory would presumably account for the fact that  $\bar{S}$  cannot occur as the object of P simply by stipulating that the object position within PP is reserved for NPs. We can distinguish the two accounts empirically by considering structures in which  $\bar{S}$  is headed not by INFL, but rather by a WH-phrase appearing in COMP, as in an embedded interrogative complement. In such structures,  $\bar{S}$  is permitted to occur as the object of P, just as long as the WH-phrase in COMP is a category to which Case may be assigned without violating the CRP:

(22) a. \*We talked about [that John went to Paris]  
 b. We talked about [which city John went to]  
 c. \*We talked about [to which city John went]

In (22b), the NP which city absorbs the Case assigned by about, preventing a CRP violation; but Case assignment to the PP to which city in (22c) violates the CRP, since P is a Case-assigning category. (See also fn. 16.) Once again, the PSR theory has no natural story to tell. The theory must somehow allow interrogative  $\bar{S}$  complements to appear in positions that are reserved by the base rules for NP; but there must be an exception to the exception in order to block (22c). Thus in this domain as well, the theory which relies on category-specific phrase structure rules to determine categorial asymmetries of distribution proves to be descriptively inadequate.

It is always possible for a theory with a sufficient degree of descriptive power to expand its empirical coverage by complicating its account of a particular range of data. Thus any PSR theory of the grammar of English could probably be adjusted so as to describe the facts discussed in this section. The point, however, is that such a theory would have to resort to language-particular stipulations in virtually every case, since a PSR grammar would be simpler if these facts didn't exist. In contrast, the account of constituent structure developed in Section 2, which attributes the categorial asymmetry to the constructs of Case Theory rather than to the theory of phrase structure, derives these facts as necessary consequences of the interaction of the relevant principles of UG. This theory therefore provides explanations for a set of superficially exceptional phenomena in precisely the domains where the two theories differ empirically.

#### FOOTNOTES

<sup>1</sup>In a later version of this paper, Hale revises his account, so as to attribute some degree of X-bar structure to all languages.

<sup>2</sup>Actually, Pullum makes use of rules such as (1) indirectly; in his theory, these rules are derived from rules of metagrammar. (See §1 below.)

<sup>3</sup>See, for instance, Gazdar (to appear), Pullum (1982), and references cited there.

<sup>4</sup>A detailed discussion of these points appears in Stowell (1981), Chapters 4 and 5.

<sup>5</sup>I am very grateful to Geoff Pullum for making his paper available to me prior to publication. His paper is based on research done in collaboration with G. Gazdar.

<sup>6</sup>The Case Theory account developed in §2 predicts a necessary correlation between multiple Case selection and free constituent order; see §3 for discussion. In contrast to this type of formal explanation, it is easy to imagine various functional explanations. If one thinks of word-order restrictions and morphological Case distinctions as "competing" grammatical mechanisms which serve the same semantic function, then the criterion of simplicity in the evaluation metric would favor exclusion of one system or the other. See Pullum (1982) for a suggestion of this type.

<sup>7</sup>For instance, an LP rule could not place the Prt (particle) position between two NPs, as in (1), unless LP rules are permitted to distinguish between direct object NPs and indirect object NPs.

<sup>8</sup>I do not discuss the status of S and  $\bar{S}$  here with respect to endocentricity. For discussion, see Hornstein (1977), Stowell (1981).

<sup>9</sup>See Stowell (to appear, b) for discussion.

<sup>10</sup>Note that (4) claims that Case must appear on the head position of the A-chain; this represents a complication of the version proposed by

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Chomsky (1981). No definition of government is provided here; for discussion of this, see Stowell (1981) and references cited there.

<sup>11</sup>By "binding", I intend "binding from an A-position", in the sense of Chomsky (1981).

<sup>12</sup>The claim that these constructions involve Case assignment across S rather than Control or Raising is forced by the Projection Principle, given standard assumptions about the operation of Move  $\alpha$ . For supporting arguments, see Chomsky (1981), Stowell (1981), (to appear, a).

<sup>13</sup>This observation is due to Chomsky (1981).

<sup>14</sup>Here we abstract away from the effects of "Heavy NP Shift".

<sup>15</sup>Dutch and German also appear to violate the adjacency condition; for a possible explanation, see Stowell (1981).

<sup>16</sup>In copular constructions, it seems that  $\bar{S}$  may be permitted to appear in "true" subject position at S-structure; see Stowell (1981). Some examples of  $\bar{S}$  appearing as the object of P are discussed below in §3.

<sup>17</sup>Actually, neither Topic Position nor Focus Position is reserved for  $\bar{S}$  per se: PP and NP may also move to each of these positions. But for NP and PP, movement to an  $\bar{A}$ -position is not forced by any principle of core grammar, and therefore tends to be used for particular stylistic effects. This is probably responsible for the limited distribution of "Heavy NP Shift" constructions (and perhaps of Topic constructions); cf. Emonds (1976) and Hooper and Thompson (1973).

<sup>18</sup>Rochemont (1978) argues persuasively that rightward movement of "heavy" NPs is really just a subcase of a more general "Focus NP Shift". In Stowell (1981), I argue that this in turn is simply a subcase of Move  $\alpha$ . The fact that rightward movement out of PP is prohibited can be attributed to the interaction of the Empty Category Principle with an "antecedent condition" on Reanalysis; see Stowell (1981), Chapter 7.

<sup>19</sup>The marginal status of this construction probably derives from the fact that topicalization is the only possible derivation based on  $\bar{S}$  as the object of P. Since Topic constructions appear to have a constant stylistic effect, which supercedes the distinction made for Focus constructions in fn 17 above, the actual occurrences of examples of this type would be exceedingly rare in the primary linguistic data.

<sup>20</sup>The issue of restrictiveness is of significance primarily because of the problem of language acquisition. It therefore does not arise with respect to alleged properties of Universal Grammar.

<sup>21</sup>See Stowell (to appear, b) for discussion.

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