COORDINATION

by

TODD SJOBLOM

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Signature of Author.....
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Certified by.....
Thesis Supervisor

Accepted by.....
Chairman, Department Committee

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ABSTRACT

I provide for Deletion under Identity, in the general framework of Chomsky & Lasnik's (1977) theory of grammar, as one rule of phonological interpretation. Identity Deletion is a general, optional, bidirectional deletion rule, subject to a notion of Recoverability of Deletion which guarantees strict identity between the 'trigger' and 'target' of deletion, as well as parallelism of syntactic environment. The output of Identity Deletion must pass a universal well-formedness filter, C-filter, which distinguishes good from bad deletion patterns merely by the position of the Conjunction C. Identity Deletion, subject to C-filter, is able to collapse a variety of sentence-bound coordination rules, including Gapping, Peripheral Ellipsis, Primary Conjunction, respectively-Conjunction, etc. It is unable to account for 'Verb Phrase Deletion', which is neither sentence-bound nor coordinative.

Thesis supervisor: Noam Chomsky, Institute Professor

dedication (with love) to Judy

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0. Introduction

The description of coordination -- as found in English sentences with and, or, but -- has long been an important and complex problem for syntactic theory. Although past solutions within the transformational generative school have been instrumental in developing crucial notions (such as 'constituent', 'generalized transformation', 'recoverability of deletion', and the semantics of plurals and quantifiers), these solutions fail, in my estimation, on the grounds of complexity, vagueness, or narrow applicability. I hope here to provide a transformational generative analysis without such defects, by assuming that coordinate propositions and noun phrases (as (1a) and (1b)) are directly generated by the Base, and that a rule of Identity Deletion (which I place in the deletion component of Chomsky & Lasnik's (1977) theory of the organization of grammar) will give the cases of derived coordination shown in (2)-(6), below.

(1a) John likes rice, and Bill likes beans.

(1b) John and Bill sing.

(2) Jóhn likes ríce, and Bìll ___ bèans.

(3) ?Jóhn líkes ___, and Bìll hàtes, rice.

(4) Jóhn sings, and Bìll ___.

(5) John sings and ___ dances.

(6) Jóhn síngs today, and Bìll dànces ___.

In sentences (2)-(6), the paired and contrastively accented categories are symbolized $\acute{X}$ and $\grave{X}$, while the unaccented string (the 'trigger' for deletion) is paired only with the deletion site, ___. If $\acute{X}$ and $\grave{X}$ are contiguous (separated only by a conjunction), the contrastive accent and its concomitant pause may be neutralized, as in the case of 'Primary Conjunction' (5). In the examples of 'Gapping' (2), 'Secondary Conjunction' (3), or 'Right Peripheral Ellipsis' (4,6), the paired categories are not contiguous; therefore, contrastive accent and obligatory pauses are among the hallmarks of these ellipsis patterns.

Sentences such as (2)-(5) may be contrasted with (2b)-(5b), which are all ungrammatical.[1] My goal, in this work, is to provide an explanation for these, and other, patterns of coordination.

(2b) *John ___ rice, and Bill likes beans.

(3b) *John likes rice, and Bill hates ___.

(4b) *John ___, and Bill sings.

(5b) *___ sings, and John dances.

The organization of this study is tripartite. Chapter 1 presents the role of each component of the grammar's syntactic, semantic, and phonological branches in the description of coordination. Chapter 2 explains, in a detailed study, the permitted Gapping patterns, in various languages, and also

(Section 2.2) includes an excursus on the verb phrase and auxiliaries. (This analysis is important to the study of Verb Phrase Deletion and other phenomena). Chapter 3 is historical, comprising a critical account of three previous representative analyses of coordination. Such an order of presentation facilitates a fuller and more coherent account of syntactic coordination than would otherwise be possible.

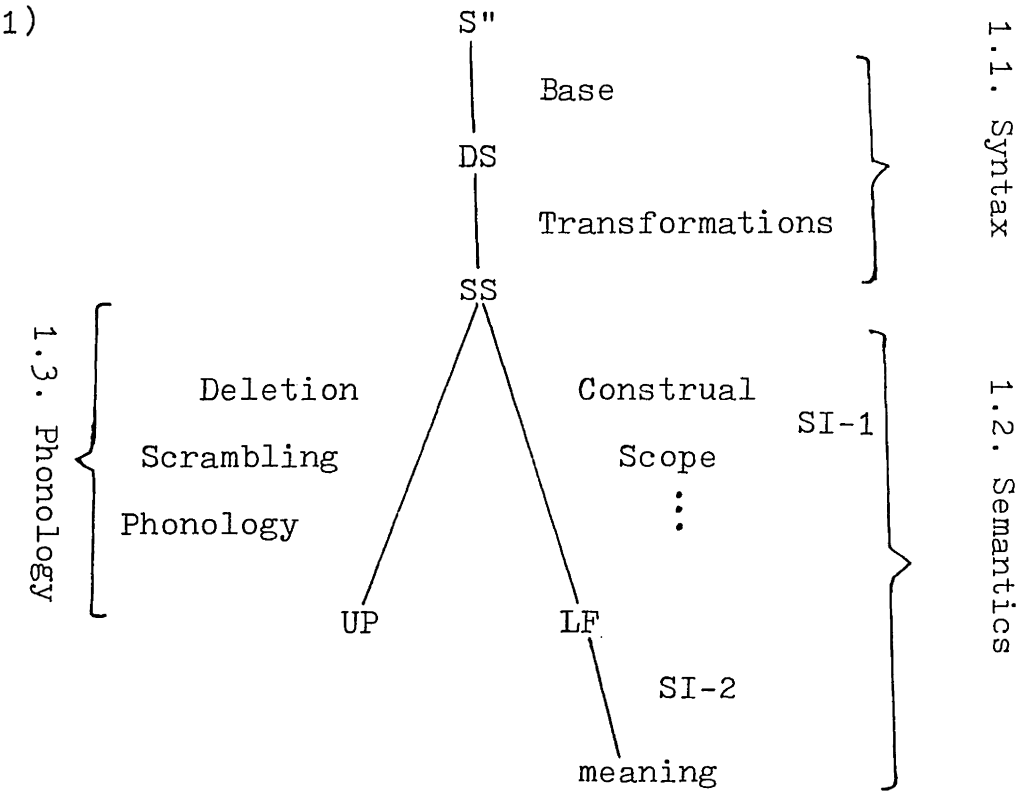
1. Components

1.0. Introduction

The framework I am assuming is that of Chomsky & Lasnik (1977), as schematized in (1), below.[1] In this grammar, the syntactic branch generates surface strucures (SS's) which are interpreted independently by the semantic branch (giving Logical Form) and the phonological branch (which interprets SS into Universal Phonetics). Each of the components of the grammar is reasonably simple and explicit, while their interaction permits a considerable depth of grammatical explanation. In the syntactic branch, for example, the Base is couched in X-bar notation[2] (in figure (1) the initial symbol, S", notates 'proposition'); the X-bar notation greatly simplifies the Base, as well as the transformational and filter components. The transformational component (mapping Deep Structures onto Surface Structures) avoids the reliance of previous analyses on obligatoriness, ordering, and complex notions of analyzability, by requiring that all output (SS) must pass through certain universal or language-particular filters in the interpretive (semantic and phonological) branches -- e.g., the Opacity filter in the former, and the <u>for</u>-<u>to</u> filter in the latter. Furthermore, because the transformational component does not include deletion rules (but leaves these to a component in the phonological branch), the semantic branch will accept somewhat fuller SS's than has been the case in other transforma-

tional generative analyses. In this chapter, I will present the details of each component insofar as they are important to the description of coordination.

(1)



Section 1.1 of this chapter discusses the role of the syntactic branch -- Base and transformations. The Base's categorial component generates Phrase Markers (PM's), through unordered context-free optional Phrase Structure Rules. The PSR for coordination, in my analysis, is the optional and recursive rule (2), where C can either yield a traditional conjunction (and, or, but) or a distributive quantifier (both, either, all, each), and where ( )* denotes unlimited iteration.

(2) $X \longrightarrow (CX)^*$

PSR (2) is clearly recursive; I follow Chomsky & Lasnik's example of restricting recursion[3] in the Base to the two categories proposition and noun phrase. Then (3) and (4) are directly generated as Deep Structures; (5) and (6) must have undergone some later rule of deletion, to delete initial C (and) and some medial string (likes or John)

(3) [Both [John] and [Bill]] are here.
(4) [Either [John is here] or [Bill is here]] .
(5) ___ John likes rice, and Bill ___ beans.
(6) ___ John sings and ___ dances.

The transformational component (also in Section 1.1) is restricted to optional rules of movement, adjunction, and substitution, but not deletion. The deletion in (5) and (6), above, has not yet been performed at the level of Surface Structure, but only arises in the deletion component of the phonological branch. The most important topic in my discussion of transformations will be the claim that the A-over-A principle, but not the Coordinate Structure Constraint, is needed to restrict the application of transformations on coordinate structures.

In Section 1.2 are presented the semantic rules needed

for coordinate structures. Construal and Scope (in Semantic Interpretation -1) are not as important to the semantics of coordination as is an arithmetic component, in SI-2, which maps Logical Form onto sense or meaning, and is thus actually external to the grammar proper. This arithmetic component checks discourses for proper number-matching -- e.g., couple, both, and the dual number require a referent denoting two individuals; trio and the trial number require a set of cardinality three.

Section 1.3 includes the three components of the phonological branch -- deletion, scrambling, and phonology -- which are all important to the description of coordination. My deletion component contains Chomsky & Lasnik's minor rules of deletion, but is extended to permit free deletion under identity, in coordinate structures. This deletion rule is called Identity Deletion (ID).

The second component of the phonological branch is, in my analysis, scrambling, including various stylistic rules of movement or permutation. In English, scrambling is often assumed to include Heavy-Noun Phrase Shift; in languages other than English, scrambling may be freer, optionally permuting any major constituents within a clause. Chomsky & Lasnik assumed, in their schema of the grammar, that scrambling followed the rules of phonology and the filters in the phonological branch, but this ordering is tentative and, so far as I know, is not required by the data. In my analysis, scram-

bling immediately follows deletion, and is itself followed by the rules of the phonological component, which include the filters of the phonological branch.

The phonological filters (including the for-to filter and the doubly-filled COMP filter) are taken by Chomsky & Lasnik as strictly preceding all phonological rules, which interpret Phrase Markers into Universal Phonetics. No argument for this strict ordering is given, not is there any that I know of.[4] In my analysis, phonological filters are among the rules of phonological interpretation; the for-to filter, for example, merely disallows the phonological interpretation of 'for-to' in certain dialects. The doubly-filled COMP filter disallows the phonological interpretation of a wh-phrase in COMP, unless the COMP is otherwise empty. In both these cases, the phonological filters effectively force an earlier rule (free deletion inside COMP) to be obligatory in its application. In the analysis below, I shall suggest that a phonological filter, the C-filter, effectively blocks certain cases of deletion via my optional Identity Deletion rule, and I will also suggest certain filters which examine the output of the scrambling rules to block or require the application of these (formally) optional rules. The formulation of the deletion and scrambling rules can be greatly simplified if their output is ultimately subjected to filters, positioned within the phonological component of the phonological branch. These filters are written to disallow

phonological interpretation of specified categories or lexical items, in specified contexts. In my analysis, then, the filters are found among the phonological rules which actually interpret lexical items into UP, and which apply stress as a function of syntactic category or position. The filters are, in effect, special rules for the interpretation of certain categories or words.

1.1. Syntax

1.1.1. Base

In Chomsky's (1965:225) 'Standard Theory' of grammar, the categorial component of the Base permits recursion only on the level of the proposition. (The proposition is, as well, the initial symbol and the locus of the cycle.) This means that if category A_1 dominates another, identically labeled category A_2 in Deep Structure, then A_1 must dominate some proposition category dominating A_2. An extension of the Standard Theory (Chomsky 1970, Akmajian 1975, etc.) captures certain similarities between propositions and noun phrases -- both, for example, may have a subject -- and takes proposition and noun phrase as the recursive, cyclic categories. Such an assumption is basic to Chomsky & Lasnik's grammar, and I accept it in my framework.

Proposition and noun phrase may be 'indirectly' recursive, as when a proposition includes a sentential complement or a relative clause, or when a noun phrase includes a possessive or prepositional phrase, dominating a lower noun phrase. In my analysis, proposition and noun phrase may also be 'directly recursive', when rewritten by Phrase Structure Rule (2), repeated below.

(2) $X \longrightarrow (CX)^*$

PSR (2) is the only directly recursive rule; the choice of X in PSR (2) is naturally restricted to the recursive categories proposition and noun phrase. In this respect, my analysis is midway between the 'derived conjunction' framework (which would restrict X to proposition or sentence, or, for analyses employing generalized transformations, might disallow (2) altogether) and the 'phrasal' analysis of coordination (which would not restrict X, but would permit Base-generated coordinate adjectives, articles, verbs, etc.). My intermediate position is a natural consequence of Chomsky & Lasnik's restriction of recursion to proposition and noun phrase, and will be shown in Chapter 3 to be preferable to the abovementioned analyses.

The abbreviating convention that I will employ for 'proposition', 'noun phrase', etc., is an amended version of Chomsky's (1970) X-Bar convention. Implicit in the 1970 version (and explicit in Sag 1976) is the restriction of categories to three levels -- lexical X, intermediate X', and major phrasal X". In X-bar feature notation, noun phrase can be written [+noun, -verb, +X"], or N". I follow Sag (1976:263) in taking proposition as major phrasal S", rather than Chomsky & Lasnik's $\bar{S}$. Proposition rewrites as S" $\longrightarrow$ COMP S', while S' (sentence) dominates the subject noun phrase and the verb phrase. There is no lexical category in the S^i family; hence, there is no S category.

The major phrasal categories are proposition S", noun

phrase N", adjectival phrase A", adverbial phrase D", prepositional phrase P", quantifier phrase Q" (how many, etc.), and verb phrase V" (have been being eaten by missionaries, etc). Chomsky & Lasnik analyze Tns as falling outside of the verb phrase. This is possible in my analysis, but I also follow Jackendoff (1977:48) and Akmajian, Steele, & Wasow (1979: 21) in taking the modal auxiliary (can, may, etc.) as outside of verb phrase, and the yield of a constituent medial between its left sister, the subject, and its right sister, the verb phrase. Jackendoff requires that this intermediate constituent be a modal phrase; in my terms M". Then the PSR for rewriting sentence S' is S'$\longrightarrow$N" M" V". (Permitting final adverbials would give S'$\longrightarrow$N" M" V" (D")*).

Employing the suggested notation, I have restricted X in PSR (2) to S" or N". I assume that the lexical component of the Base may insert, as the yield of conjunctive C, either a traditional conjunction (and, or, but) or a distributive quantifier (both, either, all, each). And may cooccur with both, all, each; or cooccurs with either; I propose that the former conjunctives are each the yield of a C node bearing the feature [+plural], while either, or are inserted under a [-pl] C. (This choice of feature will affect the rule of Subject-Verb Agreement, in Section 1.3.3). The iteration of CX, in PSR (2), should repeat the [αpl] feature of C, so that all the C nodes of a compound must be [+plural] or be [-pl]. Then the Deep Structure arising from PSR (2) will include (7)-(9), but not

(10)-(11).

(7) [Either [John] or [Bill]] is here.

(8) [Either [John is here] or [Bill is there]].

(9) [Both [John] and [Bill]] are here.

(10) *[Either [the man] and [the woman]] are here.

(11) *[Both [John] or [Bill]] are here.

Even with this cooccurrence restriction, there are a number of details in which PSR (2) misgenerates. In all the sentences of (12), the arithmetic requirements of the quantifiers are not satisfied. I will employ an arithmetic component (Section 1.2.1), in Semantics, to mark these sentences with #, for numerical anomaly.

(12a) #[Both [John]] are here.

(b) #[Both [John] and [Bill] and [Tom]] are here.

(c) #[Either [the man]] is here.

(d) #[Either [John] or [Bill] or [Tom]] is here.

Misgeneration occurs, as well, when the number on the verb is not in agreement with the subject noun phrase. I will assume that the number on Tns is free in Deep Structure and Surface Structure, but that a concordance rule in the phonological branch throws out sentences where the surface subject does not match Tns in number. It is not till Section 1.3.1 that (13)

is thrown out.

(13) *[Both [John] and [Bill]] is here.

Finally, the rules of the Base may insert conjunctives in positions from which C must later be moved or deleted, or else violate certain filters in the phonological component. For example, the Base allows and as the initial conjunctive of a coordinate (e.g., the DS (14a)), but in English (as opposed to French) this initial and may not be interpreted -- a true conjuntion may not end up initially in a coordination. I propose a conjunction filter to disallow (14a), and thereby to make the formally optional deletion rule effectively obligatory in application.

(14a) [and [John] and [Bill]] are here

(b) ___ John and Bill are here.

Similarly, all must sometimes be moved by a Quantifier Movement (QM) transformation. Although (15a) is Base-generable (and interpretable by Semantics), it must undergo QM, because my later quantifier filter will not allow all in this position. (Both, however, is allowed in initial position). Thus QM is made effectively obligatory in its application, giving (15b).

(15a) [All [John] and [Bill] and [Tom]] are here.

(b) John and Bill and Tom all are here.

In conclusion, my analysis of coordination holds that X in PSR (2) is restricted to the recursive categories S" and N", and that C may yield the [+pl] conjunctives and, both, all, each or the [-pl] or, either. Plurals are Base-generated and only checked for syntactic concordance in the phonological interpretation branch. The semantic interpretation rules check that numerical requirements are met. Transformations, deletions, and scrambling are formally optional, but can be made effectively obligatory in that their output must pass the filters of the phonological component.

We now turn to the transformational component, and then (Sections 1.2, 1.3) to the interpretive branches.

1.1.2. Transformations

Each of the three classes of transformations -- cyclic, root, and minor movement -- in Chomsky & Lasnik's grammar has some importance in my description of coordination. The basic cyclic rule, for example, is Move α (as suggested by Chomsky 1978 and class lectures to conflate Move NP and Move wh-phrase); when Move α would apply inside a coordinate structure, the A-over-A principle prevents movement of a conjunct at the expense of the coordinate structure. The A/A principle is naturally invoked for coordination, because all coordination is in the form of N" dominating N" conjuncts, or S" dominating S" conjuncts. Cyclic Move α is thus prevented from questioning, passivizing, or relativizing a conjunct N" from out of its coordinate N", as shown in the (a-b) examples of (16)-(18). The (c) examples show that Move α is permitted to move the whole coordinate N", which is the maximal category analyzed.

(16a) *What sofa$_i$ will he put the chair between [some table and t_i]?

(b) *What table$_i$ will he put the chair between [t_i and some sofa]?

(c) [What table and sofa]$_i$ will he put the chair betweeen t_i?

(17a) *Bill$_i$ was seen [John and t_i] by Mary.

(b) *John$_i$ was seen [t_i and Bill] by Mary.

(c) [John and Bill]$_i$ were seen t_i by Mary.

(18a) *Look at the woman who$_i$ I saw [a man and t_i].

(b) *Look at the man who$_i$ I saw [t_i and a woman].

(c) Look at the man and woman who$_i$ I saw t_i.

Although Ross (1967b:14,88) observes that (16a-c) and the like "can be successfully accounted for by invoking the A-over-A principle," he finds other coordinate sentences where A/A is inadequate. To prevent the movement rules of Question and Relative Clause Formation from applying in just one conjunct of a coordinate sentence, he suggests the Coordinate Structure Constraint (CSC). CSC, as stated in (19), subsumes the effect of A/A on coordinates, and is further meant to prevent questions and relative clauses, as in (20a-b).

(19) CSC: In a coordinate structure, no conjunct may be moved, nor may any element contained in a conjunct be moved out of that conjunct.

(20a) *Which trombone did the nurse polish and the plumber computed my tax?

(b) *The nurse who polished her trombone and the plumber computed my tax was a blonde.

There are several difficulties with Ross's CSC, and I will argue that in an analysis, like Chomsky & Lasnik's, which retains A/A, the CSC is not necessary. A correctible problem is that Ross's Question and Relative Clause Formation rules, (as they have been formalized (p.65) when he presents CSC) do not in fact move an element out of the sentence, but merely left-adjoin it to the sentence-initial variable; therefore, CSC is not applicable in starring (20a-b). However, a dozen pages after presenting CSC, and on the basis of separate data, Ross suggests that Question and Relative Clause Formation do prepose their elements to a position out of the sentence. With this modification, CSC will work to star Ross's (20a-b).

In my analysis, however, Question Formation and Relative Clause Formation are subsumed under wh-movement, whereby the wh-phrase is moved into the proposition's COMPlementizer position. My PSR for coordination permits conjoined propositions, and not conjoined sentences, so wh-movement, to give (20a-b), wouldn't, in fact, be moving an element out of a conjunct. To star (20a) I would need an independent constraint blocking the conjunction of an interrogative and a declarative proposition. I would be claiming, then, that (20a) does not violate a meta-theoretical constraint on movement rules, but violates the permitted patterns for conjoined propositions.

In fact Ross (1967b:104) gives just this constraint, which in his work must supplement CSC. He notes that there are non-movement violations, like that in Japanese (21), when an inter-

rogative is conjoined to a declarative, and that there are similar non-movement violations in English.

(21) *Zyoozyi wa nani o mi, neko ga nete iru.
*George what see, (and) the cat is sleeping.
*What did George see, and the cat is sleeping.

Ross (1967b: 104) assumes that some (unspecified) semantic constraint on conjoined sentences will "provide the solution in universal grammar of ensuring that only the 'right kinds' of sentences get conjoined." I also assume such a constraint, to be discussed in slightly more detail in Section 1.2.2.

To recapitulate, Ross provides a Coordinate Structure Constraint on movement rules, which, under the proper formalization of the movement rules, will star (20a-b), etc. He must supplement this with a universal semantic constraint on conjoinable sentences. In the analysis of movement rules that I assume, CSC could not block (20a-b), because there was no movement outside of a conjunct proposition. I invoke Ross's semantic constraint to prevent (20a), the conjunction of an interrogative and declarative. It remains for me to block the relative clause in (20b), repeated below.

(20b) *The nurse$_{S''}$[[who polished her trombone]$_{S'}$ and
[the plumber computed my tax]]$_{S''}$ was a blonde.

It seems likely to me that the semantic constraint blocking the conjunction of an interrogative (with [+WH] COMP) and a declarative (with [-WH] COMP) should also block the coordination, at the level of SS, of a relative clause (i.e., a declarative with a wh-filled COMP) and a non-relative declarative. Invoking such a semantic constraint would obviate the need for CSC in explaining (20b). An alternative solution, also avoiding CSC, would be the stipulation that each of the two conjunct propositions of (20b) must be interpreted as a relative clause, but that only [who polished her trombone] in fact meets the (minimal) requirement of containing a relative pronoun in the COMP. This alternative solution would claim that (20b) is bad for the same reason as (22) -- some would-be relative clause is uninterpretable as a relative.

(22) *The nurse $_{S''}[_{S''}[$ John saw Bill] and
$_{S''}[$ the plumber computed my tax]] was a blonde.

For the purpose of this study, I will assume that the first alternative is appropriate, and give a fuller description of this semantic constraint in Section 1.2.2. In any case, I have found no need to invoke the Coordinate Structure Constraint, a constraint on movement outside of a conjunct, in order to star (20a) and (b). In an analysis, like Chomsky & Lasnik's, which assumes the A-over-A principle and (I propose), Ross's universal constraint on conjoinable propositions, there is insufficient evidence for an additional Coordinate Structure Constraint.

It is appropriate at this point to discuss so-called Across-The-Board violations of Ross's CSC. In Ross's analysis, sentences, and not propositions, are conjoined; Question formation and Relative Clause Formation (in his pp. 101-103 versions) are blocked by CSC from forming (20a) and (b), because who is moved out of the first conjunct sentence. But then how are (23a) and (b) generated, under Ross's assumptions?

(23a) When did you get back and what did you bring me?

(b) Students who fail the final exam or who do not do the reading will be executed.

Ross stipulates that a movement rule may violate CSC if it applies simultaneously to all conjuncts of a coordinate structure. Question formation applies to prepose when and what in in (23a); Relative Clause Formation preposes who and who in (23b). In my framework, of course, wh-movement could not be subject to CSC in the formation of (23a-b), because there is no movement outside of each conjunct proposition. There is, in fact, no CSC in my analysis, and hence no ATB violation of CSC in (23a-b).

There has been some confusion in the literature about the ATB application of rules. Ross's formulation of ATB, as proposed in his pp. 96-108, distinguishes impossible relatives, like (20b), from possible relatives, like (23b). Ross does not propose that one ATB application of Relative Clause Formation should derive (24), by preposing who and deleting it "across-

the-board" in each conjunct sentence.

(24) Students who fail the exam or do not do the reading will be executed.

In Ross's analysis, (24) is derived by applying his regrouping-deletion rule of Conjuntion Reduction to (23b), which is the output of Relative Clause Formation. The only effect of ATB, in deriving (23b), was to block the CSC, which otherwise would prevent (23b) just as it prevents (20b). In what I consider a confusion of terminology, Williams (1978) proposes to "develop and formalize Ross's (1967) principle of Across-The-Board (ATB) rule application, and to support the hypothesis that this principle governs the application of all transformations," yet his "ATB" application of wh-movement forms (26) from (25) in one step. Williams' ATB application of relative clause formation thus differs crucially from Ross's.

(25) COMP $[[$John saw who$]_S$ and $[$Bill saw who$]_S]_S$

(26) Who $[[$John saw t$]_S$ and $[$Bill saw t$]_S]_S$

In discussing this type of proposed 'ATB' application of transformations, Chomsky & Lasnik (1977:491) claim that "[o]n general grounds, it would be well to explore the possibility that there is no dual extraction from conjoined clauses; rather, the wh-word that appears derives from the first clause while

some sort of deletion applies in the second" -- to delete the second who in (27).

(27) someone who Mary called an idiot and who June called a cretin.

This is the approach I take -- I do not extend the theory, in the direction Williams takes, to allow simultaneous extraction from each conjunct of a coordination. Rather, I make use of my deletion rule for coordinates to reduce (27) into (28).

(28) someone who Mary called an idiot and ___ June called a cretin.

It should be noted that Williams' assumptions of 'ATB' application of transformation does not allow him to avoid a coordination deletion rule, for he assumes at least three such rules, as well as permitting the PSR for coordination to rewrite any category X as a coordinate.

In my analysis, (27) is reduced to (28) by deletion of objective who(m), under identity with the trigger for deletion. In (29), deletion of nominal who is permitted under identity with nominal who.

(29) someone $[\,[\text{who}_i\,[\,t_i$ saw John$]\,]_{S''}$ and $[\text{who}_i\,[t_i$ heard Bill$]\,]_{S''}]_{S''}$

(30) someone who saw John and heard Bill.

It is an accident, of most dialects of English, that the distinction between subject and object who is lost at the level of phonological interpretation. Some dialects retain the distinction, even in phonological representation, just as they distinguish he from him. Since the realization of objective who(m) as who is a late process, objective who(m) and nominative who are non-identical at an earlier level, for example, the level of Deletion. Then who cannot be deleted in (31), because there is no identical trigger.

(31) someone$_i$ [[who(m)$_i$ [John saw t$_i$]]$_{S"}$ and
[who$_i$ [t$_i$ heard Bill]]$_{S"}$]$_{S"}$

(32) *someone who John saw and heard Bill.

It is my claim, then, that Deletion rules follow the transformations; indeed, they are parts of different branches of the grammar. (31) is a Surface Structure resulting from the independent application of wh-movement in each of the two conjoined propositions. (31) can be interpreted by the rules of Semantic Interpretation, which will find both relative pronouns realized. (31) must be phonologically interpreted as is, without any deletion, because objective who(m) does not equal nominative who.

My explanation is similar, in some respects, to the one Schachter (1973:322) presents for the badness of (33).

(33) *The men and woman are here.

Both Schachter and I assume that (33) would have had to be reduced from a fuller coordinate structure containing the men and the woman, but that "the two occurrences of the ... are only superficially identical, and hence cannot be treated by the conjunction schema as repetitions of the same item." The of the men is [+plural]; the of the woman is [-pl]; one cannot trigger the deletion of the other.

Williams (1978:24-38) adduces three types of data as being difficult to handle in an account which does not permit ATB application (on simultaneous factors) of transformations. The first example is (34).

(34) I know the man who John likes and we hope will win.

Williams' derivation of (34) includes the simultaneous movement of who from the object position (John likes who) of one conjunct, and from a medial subject position in the second (we hope [who will win]). His syntactic constraints, on the ATB application of transformations, reduce, in this case, to the claim that if one who is non-initial in its conjunct sentence, then the other who must also be non-initial in its conjunct sentence. (See Williams (1978:32) on definition of 'factor' -- "if the conjuncts are split, then the left conjunct brackets

must all belong to the same factor").

I believe there is a better explanation of (34), without invoking ATB -- or simultaneous multiple application of a transformation. In my dialect, (34) is not as good as (35).

(35) I know a woman who can win and I hope will win.

Yet in (35), for Williams, who would have to be moved by an ATB application of wh-movement applying to who initial in the first conjunct (who can win) and non-initial in the second (I hope [who will win]). This should be blocked by Williams' definition of factor, but should be allowed if the real requirement is that nominative who be identical to nominative who, in a Surface Structure like (36).

(36) I know a woman who can win and who I hope will win.

In my dialect, then, nominative who deletes nominative who. But how does Williams permit (34), where objective who apparently deletes nominative who? Certainly this is not generally true, for he stars (32), above. I suggest that Williams' (34), derives from unreduced (37), and that for Williams, both who's in (37) are objective, so that the second one may delete.

(37) I know the man who John likes and
who I hope will win.

In Williams' dialect, it is true, neither who in (37) will surface as whom, but there are dialects where both pronouns would be whom. Long (1961:370) notes that "[t]he use of whom as subject of a verb from which it is separated by some such adjunct as the you think of the following sentence can be described as genteel nonstandard.

> I am noting here qualifications for members and suggest that you list for us any persons whom you think will qualify."

I assume that, while Williams does not mark objective who as whom, he does mark each who in (37) as in objective case. Then, for his dialect, the first who can delete the second who, and (34) will be better than (35). I will therefore not take (34) as crucial evidence supporting ATB in the sense of multiple application of transformations.

Williams' second case is also subject to an alternative explanation. Given a rule of wh-movement which moves an X" term [W wh-word Y]$_{X"}$, should it apply simultaneously to the whole coordinate Noun Phrase [who and whose friends], to give (38)?[5]

(38) *John, [who and whose friends]$_i$ you saw t_i, is a fool.

Williams answers "No", because the factorization imposed by wh-movement, into W-wh-word-Y, will be as in (39), where the

wh-word factor contains the left and right conjunct boundaries, for [who], but only the left conjunct boundary, for [whose friends]. This is a violation of his assumption on ATB factorization: if some factor analyzes one complete conjunct, it must analyze all conjuncts completely.

(39)

	[who]		
ø	[whose	friends]	&
W	wh-word	Y	

I agree that (38) is bad, but not for the reason Williams suggest. Who and whose friends is bad just like I and my friends, and is improved if the heavier constituent is first: whose friends and who(m), my friends and I/me. That is, (40) is much better than (38).

(40) John, whose mother and whom I once met, is a fool.

But there is no explanation available in Williams' analysis, for [whom] would be a complete factor, while [whose-friends] would still be two factors.

Thus, while Williams claims it is the factorization of [to whom and to whose friends] that allows (41), I claim that it is mere phonological weight, or heaviness, allowing to whom before to whose friends. Williams observes that his ATB requirements are met, as shown in (42): one factor (W) ana-

lyzes both left-conjunct boundaries, but neither right-conjunct boundary.

(41) John, to whom and to whose friends that letter is addressed, is a fool.

(42)
$$\left[\begin{array}{c|c|c} [\text{to} & \text{whom}] & \\ [\text{to} & \text{whose} & \text{friends}]^{\&} \\ W & \text{wh-word} & Y \end{array}\right]$$

But consider [to whose friends and whom], as in (43). For some (including me), (43) is preferred to (41), even though the factorization would be as in (44), strongly violating Williams' restrictions.

(43) John, to whose friends and whom that letter is addressed, is a fool.

(44)
$$\begin{array}{c} \\ \text{to} \\ \\ W \end{array}\left|\begin{array}{c|c|c} [\text{whose} & \text{friends}] & \\ [\text{whom}] & & \& \\ \text{wh-word} & Y & \end{array}\right.$$

Williams' third case is meant to show that his rule of Conjunction Reduction[6] must apply to conjoined sentences, and not to conjoined propositions, NP's, etc. (Williams allows any X to be rewritten as a coordinate). Conjunction Reduction applies as in (45), with the restriction that the factorization

not break up a proposition, in the following way:

*... $\underset{\overline{S}}{[}$... | ... $\underset{\overline{S}}{]}$ ... .

(45) $\begin{array}{l} [\ X \mid\ Y]_S\ \& \\ [\ X \mid\ Y']_S \end{array} \longrightarrow \begin{array}{l} [\ X \mid\ Y]_S\ \& \\ [\ \emptyset \mid\ Y']_S \end{array}$

The avowed function of this restriction is to prevent such derivations as *(47) from (46). Wiliams takes <u>than</u> as the COMPlementizer of proposition, $\overline{S}$, and his restriction prevents the inclusion of <u>than</u> alone in X, while the rest of $\overline{S}$ is in Y.

(46) $\begin{array}{l} [\text{John has more cows } [_{\overline{S}}\text{ than} \mid \text{Bill has dogs}]_{\overline{S}}]_S\ \& \\ [\text{John has more cows } [_{\overline{S}}\text{than} \mid \text{Pete wants to have}]_{\overline{S}}]_S \end{array}$

X Y

(47) *John has more cows than Bill has dogs and
$\emptyset$ Pete wants to have.

But Williams is then claiming that (49) should be good, because it derives from (48) without violation of his ...$[_{\overline{S}}$...|...$]_{\overline{S}}$... restriction.

(48) $\begin{array}{l} [\text{John has more cows} \mid \text{than Bill has dogs}]_S\ \& \\ [\text{John has more cows} \mid \text{than Pete wants to have}]_S \end{array}$

X Y

(49) John has more cows than Bill has dogs
and than Pete wants to have.

I find no contrast between (47) and (49), and disallow the 'crossed' interpretations (Bill has QP dogs; Pete wants to have NP) in both cases. Without going at all deeply into the analysis of comparatives (which is orthogonal to my present concern, since than, as are not coordinating conjunctions), I assume Chomsky & Lasnik's analysis of Comparative Deletion and Subdeletion as examples of wh-movement, and I block any deletion of $[\text{wh-phrase}]_{N''}$ in (46) or (48) by Identity Deletion, because the only possible trigger would be a non-identical $[\text{wh-phrase}']_{Q''}$ in the first conjunct.

In conclusion, I dispute Williams' claims that 'ATB' application is permitted, and find insufficient counter-evidence to Chomsky & Lasnik's assumption that "there is no dual extraction from conjoined clauses; rather, the wh-word that appears derives from the first clause while some sort of deletion applies [to the moved wh-word] in the second".

I have found insufficient evidence, too, for Ross's version of ATB violations of his Coordinate Structure Constraint, because I judge the arguments for the CSC uncompelling. Chomsky & Lasnik's grammar, which I assume here, invokes the A/A principle, and should include Ross's semantic prohibition of certain types of conjoined sentences. This semantic prohibition, throwing out (50), is not a constraint on movement, for Japanese and English sentences, with no movement history, may be thrown out by it.

(50) *Who did John see and Bill hit Mary?

Having examined the interaction of cyclic transformations with coordinate structures, we turn now to root and minor transformations.

Emonds (1970) restricts his root transformations to apply "only in the highest proposition or in a proposition immediately dominated by that node." To simplify and generalize this definition, I observe that domination is reflexive, so that one may define a 'root proposition' as any node dominated only by S" nodes. (The topmost S" is dominated only by itself; any of its daughter propositions are dominated only by S"). Subject-Aux Inversion must apply to each conjunct S" of (51), yielding (52).

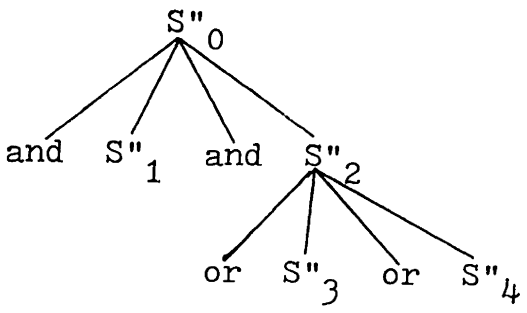
(51) [When you PST get back]$_{S"}$ and [what you PST bring me t]$_{S"}$]$_{S"}$

(52) When did you get back and what did you bring me?

But my definition is more general than Emonds' in that, if one of the daughter propositions is itself a coordination, all of the second generation S"'s will still be root propositions. Thus, my definition of root S" allows SAI in the disjuncts S"$_3$, S"$_4$ of (53), while Emonds' would only allow it in S"$_1$, because only S"$_1$ and S"$_2$ are immediately dominated by the topmost node, but S"$_3$ and S"$_4$ are not. The test case is (54),

where, as predicted by my definition, SAI applies in any S" dominated only by S" nodes.

(53)



(54) [[When did you get back]$_{S"_1}$
and [[did you bring me a present]$_{S"_3}$
or [did you bring Bill a present]$_{S"_4}$]]?

I conclude that the new definition ('only S" dominates a root proposition') is preferable to Emonds' definition, on grounds of simplicity and adequacy.

In addition to the cyclic (structure-preserving) and root transformations, Chomsky & Lasnik require some version of Emonds' (1970, 1976) third class of 'local', 'minor movement', or 'housekeeping' rules. The precise demarcation of these rules is, however, quite problematic. For example, one local transformation which Emonds assumes is Quantifier Postposition, which moves all, both, or each from a NP-initial position to an immediately post-NP position. QP relates (55) and (56).

(55a) All (of) the boys are here.
(b) Both of us can speak Russian.
(c) Each of the boys is here.

(56a) The boys all are here.
(b) We both can speak Russian.
(c) The boys each are here.

Should QP also relate (57a) to (57b)? Emonds (1976:239) assumes that "it may be the same rule", and writes his QP to apply to an NP in any position.

(57a) John gave all (of) them some new clothes.
(b) John gave them all some new clothes.

Emonds notes, but does not attempt to capture, examples like (58).[7]

(58a) *We have been dealing with the problems both.
(b) *She loved the men all.

Schachter's (1973:406,409) observation is that all and each must not postpose over an NP if that NP is non-pronominal and sentence-final. See (59).

(59a) I gave John and Bill and Harry all presents.

(b) *I gave presents to John and Bill and Harry all.

(c) I gave presents to them all.

I suggest, as a preliminary account of all's permitted environments, that Quantifier Postposition applies freely to the [+plural] distributive quantifiers all, each, both, but that a phonological filter prevents the output of Q in the following environments:

(60) *Q / [+stress] ___]$_S$,

I claim that the distinction between *(59b) and (59c) is that only the latter contains the unstressed word them. Thus (59c) becomes bad if them is stressed, as in (61):[8]

(61) *No, that's not what I said; I said "I gave presents to thém all."

The role of filter (60), in my analysis, is to allow a very general statement of Q Postposition; in the formulation I will give below, Q can postpose over pronominal or non-pronominal NP's, whether in sentence-final position or not. Some speakers, according to OED, will accept (62) with both, but apparently not the analogue with all; a reformulation of (60), to make it inapplicable to both in such dialects, is a

reasonable description of the dialectal split. (But see Section 1.3.3 for an alternative explanation).

(62) I have seen your brother and your sister both.

Let us assume, in the hope of permitting a simple formulation of QP, that QP moves Q to a post-NP position, whether the NP is a subject or object. But then why, asks Baltin (1978:184), can't the object NP -- without its following Q -- be preposed by Passivization? Compare (63) and (64).

(63) I gave the kids all some candy to keep them quiet.

(64) *The kids were given t all some candy to keep them quiet.

One proposal might be to claim QP is a stylistic rule, and therefore follows Move α, which gives passives. But sentences like (65) (and similar examples in Baltin 1978:53) would seem best accounted for by having the arithmetic rules of the semantic component assume that Men is generic, in pre-copular contexts, unless it is determined by an extant quantifier ((65b)). Then the 'generic' men of (65c) is at odds with the dual cardinality required by its postposed quantifier -- so (65c) is marked as arithmetically anomalous. If this explanation is correct, then QP must precede semantic interpretation, and hence QP could not be a sylistic rule. (The trace left by QP will be discussed in Section 1.2.1).

(65a) Men are featherless.

(b) Both men are featherless.

(c) #Men both are featherless.

A second explanation would be to order QP, as a minor movement rule, as following the cyclic rules. But, even if such an extrinsic ordering were allowed by the theory, strings like (66) (Baltin (1978:52)) would be counterexamples.

(66) The women who I pretended were all from Boston ...

For if QP followed wh-movement, and wh-movement, in applying to $[\text{all}\ [\text{who}]_{\text{NP}}]_{\text{NP}}$, had to move the maximal NP by subjacency, then a string will be generated where all is outside the lowest clause [t were from Boston]. But then a quantifier-lowering rule would be required, violating restrictions on lexical insertion held by Chomsky & Lasnik, Baltin, and myself.[9] I conclude that QP and wh-movement are unordered, or, at least, that QP need not follow wh-movement. But there then seems little justification in requiring QP to follow Move NP (Passive).

The appropriate explanation, I believe, is that the bad sentence (64) violates Chomsky & Lasnik's (1977:479) output filter (67).

(67) * V adjunct NP

This filter throws out (68), where the 'adjunct' is an adverbial modifier.[10]

(68)* I believe sincerely John.

If the adjunct is taken as postposed Q (i.e., Q undominated by NP), then (69) will be starred.

(69) *The kids were promised all some candy.

If this filter is the right approach, it is likely that the rule of Quantifier Postposition should be generalized to give the cases Dougherty ascribes to Quantifier Movement (Dougherty 1970:877,fn.25), as in (70a)-(d).

(70a) The men all will have been eating steak.
(b) The men will all have been eating steak.
(c) The men will have all been eating steak.
(d) The men will have been all eating steak.

(71) will be generated by QP, but won't pass the template of output filter (67).

(71) *The men will have been eating all steak.

No longer is QP a minor movement rule, in the sense of Emonds (1970, 1976), unless (70a)-(e) are taken as iterative applications of QP over one right-hand constituent. Emonds (1970:241), considers the possibility of collapsing his QP and a restricted Quantifier Movement into a somewhat novel type of minor movement rule, but by 1976 he rejects this approach. It is possible that the definition of 'minor movement rule' must be modified, even within Emonds' framework, for the derivation of (72b) from (a) lets both jump over what may be analyzed as a coordinate structure NP" , and not over a single constituent.

(72a) Both John and Bill are here.

(b) John and Bill both are here.

Indeed, Emonds (1976:19) accepts Dougherty's (1970:872) PSR for coordination, (73).

(73) $X \longrightarrow (Q)\ X^{n}\ (ADV)$

But then both in (72a) would jump over $[\text{John}]_{NP}[\text{Bill}]_{NP}$, which is not the single constituent required in Emonds' definition of minor movement (local) transformations. Emonds ignores such cases; it may be that he would claim the recursive NP node is found under a Prepositional Phrase under NP , as is his us in all of us. His evidence for such a PP, in the case of all of us, includes the insertion of of into the PP [Δ us] , and the

non-subject case of us, even though it is in a subject NP.[11] But no of is insertable before John and Bill in Both John and Bill, and each of the Noun Phrases is marked nominative, in the coordinate subject She and I. If, from this, Emonds must conclude that Dougherty's (73) is indeed relevant in generating (72a) above, then (72b) must be derived by a new type of minor movement rule.

In fact, I think (72b) is derived by Move Q, supplemented by filters in the semantic and phonological components. I must restrict Q to the distributive Q's, and only allow Q to be a [+pl] distributive quantifier. Baltin (1978), in a more general study of extraposed modifiers, suggests that their semantic construal rule is (74),[12] requiring that extraposition of X is postposition over a variable Y.

(74) $\underset{NP}{[} \ldots \quad \underset{X}{[e]} \quad \ldots] \quad Y - X$

If the category X is Q, then Move Q would have to postpose Q to a position following NP. It will apparently be necessary to restrict Q to highest, initial distributive qualifiers each, all, both; this restriction follows in part from the formulation of the arithmetic component (Section 1.3.1) and in part from an ad hoc restriction on the Q's interpretable by (74) (e.g., John or Bill either may not be interpreted). Phonological filters ((60) and (67), above), will prevent 'Y' in (74) from ending with a verb or a stressed sentence-final word. Further work

on this topic is, as always, urgent, but I believe (and will assume) that an unconstrained Move Q rule, followed by filters (as represented above) is the optimal explanation for quantifier movement. The dialectal or ad hoc restrictions are captured by varying the conditions on the semantic and phonological filters (to allow, say, sentence-final both, or to require all to postpose in All John, Bill, and Tom). Such an analysis follows the implicit lead of Chomsky & Lasnik (1977), and tends toward the explanatory.

In the above description of one minor part of coordination, I have attempted to apply Move α to cover distributive quantifier movement, from a position inside NP to a following position. But, in my analysis, distributive quantifiers may also be introduced by the PSR giving coordinated propositions, as in (75). Can these quantifiers also be moved?

(75) [Either [I sent John rice] or [I sent Bill beans]]
S" S" S"

I believe that they can be moved, and that this movement underlies quantified primary and secondary coordination of non-NP strings. Move Q and later Deletion give (76a)-(c) and (77).

(76a) [t_Q [I either sent John rice], or [___ Bill beans]]

(b) [t_Q [I sent either John rice], or [___ Bill beans]]

(c) [t_Q [I either sang] or [___ danced]]

(77) [t_Q [I both sang] and [___ danced]]

The movement of Q in these sentences is from the position marked by t_Q, and into a position in the first conjunct proposition. Deletion and later filters determine which output strings are permitted: either, for example, has a wider range of positions than both. Further discussion of this Move Q will be given in Sections 1.2 and 1.3, where the semantics and filters proposed for NP's Q movement will be extended to account for propositional Q movement.

A second topic which will be deferred, until Section 1.3.1, is Subject-Verb Agreement. Instead of classing it as a housekeeping, or minor movement rule (of [αpl] from the subject to Tns), I treat it as a representative of the Concordance rules in the phonological branch. SVA will not actually copy [α pl] from one node to another; rather, it checks that the [α pl] of the subject NP matches the [β pl] feature which was Base-generated on Tns. SVA is thus a local filter, and not a transformation; it stars strings that do not pass its template. The proposed ordering of SVA, as an 'anywhere' rule in the phonological branch, is part of my explanation of 'Sloppy Identity' which the deletion component superficially allows.

In conclusion, my analysis of coordination has required but minimal machinery in the transformational component. The independently needed A/A principle blocks certain cases of misgeneration, and a proposed semantic constraint disallows the 'wrong kinds' of compound propositions: declarative+interrogative, and relative + non-relative. Root transformations apply to S" dominated only by S", so (matrix) compound propositions may

undergo root transformations. The housekeeping rules do not, in my analysis, include SVA; I collapse various quantifier movement rules into QP, supplemented by Baltin's construal rule and various phonological filters. The transformational component remains quite simple, as regards coordination. We now examine the semantic and phonological branches, to verify that these branches have not received a compensatory complexity.

1.2. Semantics

1.2.0. Introduction

At the level of Surface Structure, which is the input to the rules of semantics, all coordination is in the form of coordinate propositions and coordinate noun phrases. The rules of SI-1 interpret SS into Logical Form (giving structures close to those of standard predicate calculus), while largely ignoring the presence or absence of coordination. Under this analysis, the construal and scope rules of SI-1 apply to singulars or plurals. Chomsky & Lasnik's rule of reciprocal interpretation, for example, requires an antecedent N" to be construed with <u>each other</u>; in (78a), the antecedent N" is <u>the men</u>; in (78b), it is <u>(and) John and Bill</u>.

(78a) [The men] saw each other.
(b) [(And) John and Bill] saw each other.

If the construal and scope rules properly apply, a well-formed Logical Form ensues, which must then be interpreted into 'sense' or 'meaning' by the extra-grammatical rules of SI-2. There are three components of SI-2 which are pertinent to coordination: the arithmetic component, which verifies that <u>couple</u>, <u>both</u> and the dual number have anaphors which refer to two individuals; a conversational component which disallows, e.g., a coordination of an interrogative and a declarative proposition; and a meta-linguistic component which treats the words of a

sentence as orderable objects, to give the interpretations required by sentences like (79) and (80).

(79) John sings and dances, in that order.

(80) John and Bill respectively sing and dance.

I will treat the numerical component in Section 1.2.1, and then (Sections 1.2.2-1.2.3) consider the requirement for the 'right kind' of conjunct S" 's and the interpretation of 'ordering' phrases, like in that order and respectively. Little special analysis is needed to account for the semantics of coordination: the interpretation of both is similar to the independently needed rules for couple; the interpretation of respective(ly) is not tied exclusively to coordinate structures.

1.2.1. Arithmetic

Since Gleitman (1965), it has been observed that a complete description of 'number words' like couple and trio "verges on arithmetic", and has little to do with the grammar proper. There is nothing grammatically ill-formed about (81a-c); rather, the special arithmetic requirements of couple and trio are not met, so the sentences should be assigned '#' for arithmetic anomaly. The examples of (81) are grammatical, though nonsensical or meaningless.

(81a) #The Smiths and the Browns are a happy couple.
(b) #Brown, Smith, and Jones are a dubious pair.
(c) #Smith and Brown make a marvelous trio.

This analysis is naturally extended: to number words (two, three); to the dual and trial number (in languages which distinguish more than just [+pl] versus [-pl]); to the requirement of the reciprocal each other for an antecedent denoting two or more individuals; and to verbs of combination -- V_{cmb}, in Gleitman's (1969:102) terminology -- which must take a semantically non-singular[13] subject in their intransitive forms, as in (82a-d):

(82a) Oxygen and hydrogen combine.
(b) The car and the bus collided.

(c) John and Mary met.

(d) These two lines are parallel.

Such verbs also require more than one argument in their transitive forms:

(83a) Oxygen combines with hydrogen.

(b) The car collided with the bus.

(c) John met Mary.

(d) This line is parallel to that one.

The arithmetic requirement of these 'number' words may sometimes be met solely on the basis of the conversational or pragmatic context. For example, (84) is permitted only if two men (but not only one or three) have been linguistically or deictically distinguished as the possible members of the couple.

(84) Those men make a nice couple.

The arithmetic component of SI-2 has been shown above to be necessary to the description of a variety of number words. This component may be naturally extended to analyze coordinate constructions -- in particular, the conjunctions and, or and the distributive quantifiers both, either, all, each. The NP [(and) John and Bill][14] denotes a set of cardinality two, and

is a possible subject for make a couple, but [(or) John or Bill] refers to two sets of cardinality one (namely, the singleton {John} and the singleton {Bill}), and is not a possible subject for this predicate.

(85) [(And) John and Bill] make a nice couple.

(86) #[(Or) John or Bill] make(s) a nice couple.

The arithmetic component of SI-2 must also be invoked to capture the arithmetical requirements of the distributive quantifiers both, either, all, each. These quantifiers may be written under a C node introduced by PSR (2) : $X \rightarrow (CX)^*$. In Section 1.1.1, it was shown that the [+pl] distributive quantifiers may cooccur with and, while the [-pl] quantifier either may cooccur with or. Q may be moved (by Quantifier Postposition, which I treat as an application of Move α), but in moving, Q leaves a trace, so that its original position is always marked. A category Q, or else its trace, will only be found as sister to the conjunct S"'s or NP's introduced by PSR (2): $X \rightarrow (CX)^n$. The arithmetic component of SI-2 must verify that the distributive quantifiers are in an arithmetically appropriate structure -- e.g., if both is introduced under recursive NP, then its sister NP's must have just two referents in total. Both is disallowed in #(87) and #(88).

(87) #[Both [John]] came.

(88) #[Both [John] and [Bill] and [Tom] came.

Even (89) will be disallowed, unless there is sufficient linguistic or pragmatic context to distinguish the necessary referents of the men.

(89) [Both [the men]] are here.

Only if two referents of the men are available will (89) be permitted. ((89) is a case where the PSR (2) : $X \rightarrow (CX)^*$ applies, but does not iterate; it generates only one occurrence of CX under topmost X).

I am far from having available a complete semantics of distributional quantifiers, but I will make a few points concerning the construal of a moved Q with its trace. I have assumed that Q is moved by Move α, and that this movement leaves a trace. Baltin (1978) proposes a special construal rule for extraposed modifiers of NP, to require that the extraposition is rightward. His rule, repeated as (90),[15] requires that Q movement is to the right, as only a postposed Q may be bound to its trace, which I represent as $[e]_Q$, or t_Q.

(90) $[_{NP} \ldots {}_X[e] \ldots]$ Y - X

It is an interesting fact that while Move α is permitted to derive (91b) from (91a), the analogue (92b) is bad.

(91a) Both the men are here.

(b) t_Q the men both are here.

(92a) Both men are here.

(b) # t_Q men both are here.

In earlier work I assumed that men, with no phonologically extant article or quantifier, is interpreted as a generic, and that this generic status is contradicted by the cardinality two imposed by the quantifier both. Baltin had independently suggested a similar explanation for *men all three, and gave a clear formulation of this analysis in Baltin (1978:54), in terms of construal of Q's trace and of Carlson's (1977) treatment of 'bare plurals' as 'natural kinds'. Baltin's explanation would apply to (92b), to disallow the two contradictory quantifications.

If PSR (2) takes X as S", instead of N", the conjunctive both must have exactly two S" sisters, and not one or three. This requirement is similar, but not identical, to the requirement that both have as sisters NP's with a total of two referents; there is no 'referent' of an S", but the requirement for a cardinality of two is uniform in the various uses of both. If Q is moved from its position as a sister to conjunct S"'s, its trace still remains as sister to conjunct propositions.

The interpretation of the trace ($[e]_Q$ left by applying Move α to a proposition-initial Q) will require some modifi-

cation to the construal rule. While X still analyzes Q (as in the case of NP-initial Q movement), and while the movement is still a postposition, it is now no longer the case that the trace is an element of NP, as required by (90). Now the trace is the daughter of S". Possibly (90) should be rewritten to merely require that the trace be daughter to N" or S". Then Q is postposible (i.e., its preceding trace is construable), since Q was introduced as a daughter of N" or S". Extraposed relative clauses leave a trace which is daughter to the matrix N". I have to assume that some such generalization of construal rule (90) is in order, so that Q may be interpreted, whether its trace is daughter to N" or S".

Consider now either as a sister to conjunct S"'s. The requirement for either in a NP was that the NP's have referents divisible into two singletons; the requirement for S"'s is that there be two. Either and both differ, when Base-generated under S", in that my phonological Q filters (Section 1.3.3) effectively require Move α to postpose both, but permit either to remain in its initial position. That is, while Surface Structure (93a) and (b) may each be interpreted into Logical Form, and each will pass the arithmetic component, still (93b) may not pass the phonological Q filters.

(93a) [Either [John sings] or [John dances]]

(b) [Both [John sings] and [John dances]]

These filters require that Move α give a SS like (94a), and that Deletion then apply to give (94b). Only (94b), and not (93b) or (94a), may pass the phonological Q filters of Section 1.3.3.

(94a) [t_Q [John both sings] and [John dances]].
(b) [t_Q [John both sings] and [___ dances]].

The output filters are much freer with either, for no reason that I can explain. Not only can (93a) pass unchanged through the phonological branch, but Move Q and Deletion are independent, so that either may be postposed, with no deletion, as in (95):

(95) [t_Q [Mike will either write] or [he'll phone]].

or either may allow deletion without postposing, as in (96):

(96) [Either [John will sing] or [___ dance]].

(The goodness of sentences like (96) varies, but in any case is better than the both-analogues. Compare (97a) and (b)).

(97a) [t_Q [Mike either will write] or [___ phone]].
(b) *[t_Q [Mike both will write] and [___ phone]].

I will make the pertinent distinction between both and either in Section 1.3.3, but I assume that the filter is phonological, and cannot be explained by the (minor) arithmetic differences of both and either.

In most respects both and either act identically -- as mentioned above, they are introduced only under a C generated by PSR (2), and each requires a set of cardinality two (or two singletons). If generated under N", both and either require that two referents be ascertainable, so that (98a-d) are all arithmetically anomalous.

(98a) #[Both [the man]] are here.
(b) #[Either [the man]] is here.
(c) #[Both [John] and [Bill] and [Tom]] are here.
(d) #[Either [John] or [Bill] or [Tom]] is here.

(99a-d) are permitted only if just two men are understood, from context, to be possible referents.

(99a) [Both [men]] are here.
(b) [Either [man]] is here.
(c) [Both (of) [the men]] are here.
(d) [Either of [the men]] is here.

In (99d), of-insertion is obligatory -- either the men is an ill-formed NP, but I don't know why. Consider also *either

the man, but either man. I assume the man does not allow for the required two referents, but that man does. Move Q is disallowed for either man, presumably because the two quantifications for $[t_Q[man]]$ either are contradictory -- the first is generic, the second, particular. Move Q is also disallowed for either John or Bill, and it is unclear to me whether this should be described by constraining Move Q, or by formalizing the quantification rules to disallow construal of the [-pl] quantifier, either, with a preceding trace inside NP. I leave this matter to await further work.

The two other distributive quantifiers -- all and each -- may only be interpreted if generated under NP. (100a)-(b) are ungrammatical, but I have no explanation for this.

(100a) *All John sang, Bill danced, and Tom played.

(b) *John all sang, danced, and played.

I mark (100a)-(b) as '*', but if it is the arithmetic component which throws them out, the notation should be #. It is possible that (100a) is thrown out for the same reason as (101) -- i.e., I propose that the phonological Q-filter for all, each disallow a coordination-initial all, each.

(101) *All John, Bill, and Tom are here.

But this explanation does not account for *(100b), so I must merely require -- ad hoc -- that all, each are uninterpretable if they, or their traces, are sister to S". I do not know the generality of this restriction, but I suspect that any 'universal'-like quantifiers, in any language, will be thus restricted.

All and each have arithmetic requirements, respectively, for a set of three or more referents, and a set of two or more referents. I will discuss the syntactic [+pl] feature of these quantifiers in Section 1.3.1, under Concordance.

The conclusion I draw from the present section is that any description of conjunctions and distributive quantifiers must be through the joint application of the syntactic, semantic, and phonological branches. The arithmetic component of SI-2 requires two referents for the antecedents of couple, either, and both; two or more for each, each other, and collide; three referents for trio and the trial member; and three or more for all. These numerical requirements are part of the meaning of a sentence, but are not pertinent to a judgment of its 'grammaticality', when that term is differentiated from 'meaningfulness'.

1.2.2. Coordinate S"

Certain coordinate propostitions are not allowed: Gleitman (1969:83) notes that "the conjunction of an interrogative and an imperative sentence is rejected:

...[(102)] What are you doing and shut the door."

Ross extends the class of examples with (103), below:

(103a) *Sally's sick and what did you bring me?
(b) *(You) make yourself comfortable and I got sick.
(c) *What are you eating or did you play chess?

Ross adduces a Japanese example (disallowing a declarative joined to an interrogative) to show that these sentences are not violating a mere movement constraint (like Ross's Coordinate Structure Constraint). I will assume that (102) and (103) violate a semantic constraint, disallowing a coordinate S" formed of different 'types' of propositions, where the 'types' may be listed as: wh-interrogative, whether-(yes-no) interrogative,[16] relative clause, (non-relative) declarative,[17] and imperative.[18] However, an imperative may be followed by a future declarative, as in (104).

(104) Please make yourself comfortable and I'll wash the dishes.

I must follow Ross (1967:105) in stating that: "Exactly what is the nature of ... [these constraints on coordinate propositions] is an interesting topic which has been studied far too little and which I can contribute nothing to at present." The importance of this constraint, in my analysis, is to throw out coordinates like (105) and (106), below, which include, respectively, an interrogative + declarative, and a relative clause + non-relative. By employing Ross' prohibition on compounds, I avoid using his Coordinate Structure Constraint to disallow (105); I extend his prohibition to disallow the conjunction of $S"_1$ with a wh-word in its COMP, to $S"_2$ with no wh-word in its COMP.

(105) *Which trombone did the nurse polish and the plumber computed my tax?

(106) *The nurse [[who polished her trombone] and [the plumber computed my tax]] was a blonde.

As shown in Section 1.1.2, the CSC then becomes unnecessary. Another explanation for *(106) was mentioned in Section 1.1.2; it may be possible to clarify the notion 'possible relative clause', so that the plumber computed my tax in *(106) is treated just like the same string in (107), and starred without invoking a semantic constraint on permissible conjoined propositions.[19]

(107) *The nurse [the plumber computed my tax] was a blonde.

I must leave for future research the determination of which of these semantic filters is appropriate -- i.e., the determination of whether (106) is bad like (105) or like (107). In either case, it is not bad because of a CSC violation of a movement rule -- for in my analysis, there would be no movement out of the conjunct propositions of (105), or (106). The Japanese example of Section 1.1.2 showed, to my satisfaction, that movement is not of main importance here.

1.2.3. Respectively

The interpretation of respectively is, I take it, the province of a metalinguistic component in SI-2 which treats words as items to be arranged in a list. Respectively forces an ordering in (108) which is similar to that forced by the phrase in that order, or by the pair the former/the latter.

(108) John and Bill will sing and dance, respectively.

(109) John will sing and dance, in that order.

In (109), the linear order of sing and dance is interpreted as identical to the temporal order of the actions, under the influence of the phrase in that order. In (108), under the influence of respectively, the first N" (John) is taken as the argument of the first predicate (X will sing), while the second N" is read as the argument of the second predicate (X will dance).

Most analyses of coordination which treat respectively derive (108) from a DS (110) by some Regrouping transformation, but I claim that no such transformation exists.

(110) [John will sing] and [Bill will dance].

I have no regrouping transformation, only a deletion transformation, and I must claim that (108) derives from a DS (111),

where respectively is a distributive quantifier cooccurring with and.

(111) [respectively [[John$_1$ and Bill$_2$] will sing] and [[John$_1$ and Bill$_2$] will dance]].

I believe that respectively-interpretation requires the presence of a non-singular NP, having n referents, uniformly in n conjunct propositions. Respectively-interpretation takes the i^{th} N" referent as the argument of the i^{th} conjunct S". In (111), for example, John is the argument of X will sing; Bill is the argument of X will dance.

Now consider (112), where the non-singular N" is an object.

(112) Respectively [I saw [John$_1$ and Bill$_2$]] and [I heard [John$_1$ and Bill$_2$]].

John is the argument of S"$_1$: I saw X; Bill is the argument of I heard X.

In phonological form, respectively may not be output as left-sister to S"; like both, it must be postposed from such a position. Wherever it goes, however, its trace t_Q remains to signal the rule of respectively-interpretation applying to n conjoined propositions containing a N" with n referents.

The claim that respectively requires a non-singular N" is, I believe, a novel one in transformational generative grammar,

although this claim is supported by OED's definition,[20] and by the preponderance of examples cited in grammars treating respectively. In Schachter (1973), for example, the only respectively sentences not including a N" with n referents are (112) and (113), which I would class as ungrammatical.

(112) John gave, and Bill lent, Mary $5 and Susan $10 respectively.

(113) John will, and Bill won't, sing and dance respectively.

Neither of these sentences could derive from a SS with a conjoined, or plural, N"; neither, in my dialect at least, is grammatical. I claim, too, that (114) is out:

(114) *John will and won't sing and dance, respectively.

because it would have to invoke a rule of Regrouping, and derive from an underlying form like (115).

(115) John will sing and John won't dance, respectively.

In my analysis, with no rule of Regrouping, the claim that respectively requires a SS non-singular NP is identical to the claim that these NP's must exist in DS. How, then, are (116a-b) to be derived?

(116a) John and Bill respectively sang and were sung to.

(b) Mary and her husband are easy to please and eager to please respectively.

The answer is that in DS, John and Bill is the subject of sang and the object of sung to. Application of Passive (Move α) in S''_2 makes John and Bill a surface subject, so that the two propositions are now parallel, as in (117).

(117) [t_Q[[John and Bill] respectively sang] and [[John and Bill] were sung to t]].

This parallelism is immaterial to the semantic interpretation rules, which merely orders the referents of the identical NP, so that John is the semantic argument of X sang and Bill is the argument of X Pst be sung to. The parallelism is, however, required to trigger Deletion, as will be required for respectively to pass the Q filters of Section 1.3.3. (While either could be output in a position like that in (117), both and respectively cannot, but must trigger deletion to give a string like (118)).

(118) John and Bill respectively sáng and ___ were sùng to.

The interpretation of respective is comparable to that of

respectively, but rather than forcing a correspondence between n N" referents and n conjunct S"'s, I believe respective forces a correspondence between two noun phrases. The question is whether (119)-(120) are grammatical; I believe they are not, at least in the desired interpretation.

(119) We saw and heard our respective husbands.

(120) Jane and Mary sat at the table.
Their respective husbands sang and danced.

To me, it seems that respective means nothing here; in (119), each husband may have done both actions. If this is so, then the usual use of respective is in fact its only use: to correlate the referents of two NP's, as in (121). The NP's need not be non-singular,[21] as was the case with respectively.

(120a) Have you and John visited your respective mothers?

(b) Each number is smaller than its (respective) square.

(c) Is either A or B smaller than its (respective) square?

There is further respective(ly) data available for study; but I defer this until Sections 1.3.3 and 3.2. I conclude, from this section, that the interpretation of respectively is not unique, and does not force the adoption of a syntactic regrouping transformation. Respectively-interpretation applies to the coordinate structures available at the level of SS in

my analysis -- coordinate S" and N". Respective is like corresponding, in that order, or former/latter in forcing a semantic ordering of words in a sentence, dependent upon their linear order (which is usually immaterial -- John and Bill usually means the same as Bill and John, unless they are involved in a respectively or former/latter construction). The interpretation of all these phrases is left, in my analysis, to an extragrammatical component of SI-2.

1.3. Phonology

1.3.0. Introduction

The three components in this section greatly modify the ultimate (UP) form of coordinate structures. The phonological branch accepts SS as input (as does the other interpretive branch, semantics), and subjects these Phrase Markers to deletion, scrambling, and phonological rules. In my analysis, a simple and powerful Identity Deletion applies in coordinate structures. Deletion is followed by scrambling; in English, scrambling is minor, although in other languages it is much freer. The application of the formally optional deletion and scrambling rules can be made effectively obligatory, or else disallowed, through the phonological filters. I take these filters as rules of the phonological component, which interprets PM's into Universal Phonetics. The and/all filters, for example, disallow and or all in specified syntactic or phonological environments; in this way, the rules of deletion or scrambling are made effectively obligatory or inapplicable, without the use of conditions or rule features.

The most important filter (in this analysis) is my C-filter, which, by requiring an extant conjunction in a specific environment, is able to constrain both the directionality of the Identity Deletion and the remnants it may leave behind. Also in Section 1.3.3 are discussed the stress reduction rules, which simplify the prosodic patterns assigned by each application of the rule of Identity Deletion.

1.3.1. Deletion

The deletion component consists of optional, unordered deletion transformations, applying to Surface Structures generated by the movement, adjunction, and substitution rules of the transformational component. Deletion rules delete categories along with their terminal elements, subject to some recoverability principle which we will discuss below.

Deletion transformations are of four types: (1) free deletion within a specified domain (e.g., deletion of anything inside COMP in English); (2) deletion of a specified item -- i.e., of an item explicitly mentioned in the deletion rule -- (e.g., deletion of SELF); (3) deletion of a specified category (e.g., subject deletion, in Spanish); and (4) a single, universal rule of Identity Deletion which applies in a coordinate structure to delete one string under identity with another string in a parallel syntactic environment. The first three types of deletion are considered standard in Chomsky & Lasnik's grammar; it is the fourth type, Identity Deletion (ID), with which I am solely concerned in this study.

Several examples of the output of ID are listed in (122), with the deletion sites marked '___'.

(122a) [___ [John likes rice], and [Bill ___ beans]].

(b) [___ [John has left], and [Bill ___]].

(c)?[___ [John likes ___], and [Bill hates rice]].

(d) [___[John cáme] and [___ lèft]].

(e) [___[The rice] and [___ bèans]]$_{N''}$ are here .

The deletion sites are marked purely for expository purposes; they are not marked in the output of ID. I assume that deletion rules erase a category along with its yield; this is Chomsky & Lasnik's hypothesis for the minor deletion rules; I have extended it to ID for reasons of uniformity, and certain empirical consequences discussed below.

In (122a-e), the target of deletion has been deleted under identity with the trigger for deletion in a sister conjunct; the trigger for deletion is left unstressed, while the other remnants are assigned heavy (contrastive) stress and a special intonation marker -- rising pitch (acute, or ′) in the non-final conjunct of a series. I am following Gleitman (1969:93) in the assumption that the application of the coordination rule assigns a unique prosodic pattern. Gleitman's prosodic pattern includes 'rising intonation'[22] on all but the final conjunct of a coordination; she takes this intonation as phonologically realized, unless removed by a later reduction rule. The reduction rule would be needed to give the non-contrastive intonation commonly given to (122d) and (e) -- cáme and lèft is reducible to unstressed, non-contrastive came and left. Similarly for (122e).

In a trinary coordination like (123), Gleitman's coordination rule would assign rising intonation to the emphatically

stressed John and Bill, but would leave stressed Tom with no special intonation.

(123) John, Bill, and Tom are here.

Presumably the pitch level of Bill would fall regularly until the end of the sentence. I believe this is an incorrect prosodic contour, and that Tom is the locus of the pitch fall, so that are here is pronounced identically in (123) and (124). The normal sentence contour is reached by the end of the coordination.

(124) The men are here.

That is, I will assume that Tom, as the last element of a coordination, is marked with falling intonation, which I write as in (125).

(125) John, Bill, and Tom are here.

As mentioned above, these accents may be reduced; furthermore, there are various phonetic realizations, in different dialects and languages, of the contrastive intonation allowed in a coordinate structure. I must therefore take the acute and grave accents to be abstract phonological features. In English, acute ´ may have the reflex of contrastive stress and rising

intonation, while grave ` marks falling intonation to the normal sentence contour.

The rule of Identity Deletion which I propose requires identity of trigger Y_i and target Y_j in parallel syntactic environments which are local to (in construction with) each other; ID will mark these environments with contrastive accent, and delete the target Y_j. Many of these restrictions on ID can be viewed as following from a (strengthened) notion of Recoverability of Deletion.

Assume ID applies to a string $X_1\ Y_1\ Z_1\ X_2\ Y_2\ Z_2$, as in (126). (We ignore end variables until somewhat below). The deletion is of either medial term Y_1 or Y_2.

(126) $X_1 - Y_1 - Z_1 - X_2 - Y_2 - Z_2$

ID must not violate Recoverability of Deletion -- in particular, no lexical item may be deleted unless it is recoverable from the output Phrase Marker. The minor deletion rules of Chomsky & Lasnik are so restricted in their application that the pre-deletion PM may be recovered -- e.g., lexical items may be deleted, but only if specifically mentioned by one of a restricted set of deletion rules. In many previous analyses, ROD is assumed to permit non-minor deletions -- i.e., deletion of an unspecified string -- only if that string is identical to, or non-distinct[23] from, another, 'triggering' string in the PM. Further, to disallow deletion to give outputs like (127),

(127) Flying planes are dangerous and ___ is fun.

some analyses require that the target of deletion be of the same category as the trigger. My assumption is that ROD prevents the application of ID unless the target sub-tree is strictly identical to the trigger sub-tree. Since deletion deletes a category along with its yield, this notion of ROD will ensure that the complete deleted sub-tree is recoverable in the output PM. In (122a), repeated below, likes is deletable because not only is the yield likes identical to the trigger's yield, but because the sub-tree $[\underline{\text{likes}}]_V$ is identical to the trigger sub-tree $[\underline{\text{likes}}]_V$.[23]

((122a)) ___ John likes rice and Bill ___ beans.

Thus far ROD has been extended to require that everything deleted is recoverable in the output PM -- i.e., not only the yield, but also the deleted dominating categories. But Identity Deletion, as in (122a), also leaves no clue, in the output PM, as to where the deletion site was located. I propose that this, too, must be recoverable from the output PM by invoking simple parallelism of syntactic structure, for the left and right contexts of Y_1 and Y_2. This notion of ROD blocks ID unless, in (126), above, the environments X_1 and X_2 are 'syntactically parallel', and the environments of Z_1 and Z_2 are syntactically parallel, in the sense that the Highest Proper

Analysis of X_1 is identical to that of X_2, and HPA(Z_1)=HPA(Z_2). (The Highest Proper Analysis of a structure is that proper analysis, none of whose nodes is dominated by a node of any alternative proper analysis. (v. Schachter (1973:350)). This requirement for syntactic parallelism of environments prevents ID from deleting Y_2= [likes]$_V$ to give (128).

(128) ___ John likes rice, and Bill ___ to sleep late.

Here the right-hand environments, Z_1 and Z_2, are respectively N" and S", which are not identical.

The crucial point about such a notion of ROD is that it constrains Identity Deletion to define identity at several levels: not only must the target and trigger for deletion be string-identical, but they must be strictly identical subtrees; the left-hand environments (X_1 and X_2), must be identical, too, at the level of HPA. Similarly with Z_1 and Z_2; there is no requirement that Z_1 =Z_2, but only that HPA(Z_1)= HPA(Z_2).

I repeat ID (in its preliminary formalization) below; the Structural Change is to delete either Y_1 or Y_2, and to assign ´ to $\acute{X}_1$ and $\acute{Z}_2$, ` to $\grave{X}_2$ and $\grave{Z}_2$.

((126)) $X_1 - Y_1 - Z_1 - X_2 - Y_2 - Z_2$

The derivation of (128), above, shows the repeated application of ID. The first application analyzed the coordinate propositon

as in (129a); it can be seen that, at the relevant level of identity, $X_1\ Y_1\ Z_1$ is in fact identical to $X_2\ Y_2\ Z_2$. Thus deletion is allowed, to give (129b); wherein Y_2 is deleted and the HPA of X_i and Z_i receive accents ´ or ` .

(129a) C N" - [likes]$_V$ - N" -
- C N" - [likes]$_V$ - N"
X Y Z

(129b) ´C ´N" [likes]$_V$ ´N" `C `N" ___ `N"

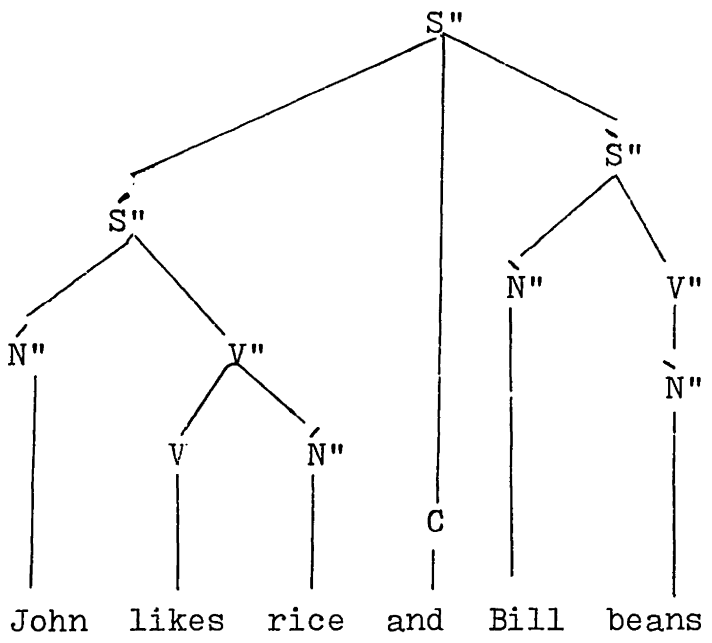
The next deletion is the deletion of initial <u>and</u> (always obligatory in English, though not in other languages; French, for example, allows <u>et Jean et Guillaume</u>). The output (129b) is reanalyzed as in (129c); contexts X_1 and X_2 are null; terms Y_1 and Y_2 are [<u>and</u>]$_C$; contexts Z_1 and Z_2 are each a conjunct S", at the level of HPA. The internal deletion in $S"_2$ will not affect the second application of <u>ID</u>, because, in this application, $S"_1$ and $S"_2$ are taken as contexts, and are identical by the relevant definition of (HPA) identity. <u>ID</u> does not 'look down into' contexts, but merely requires identity of HPA.

(129c) $\emptyset$ - [and]$_C$ - S" -
- $\emptyset$ - [and]$_C$ - S"
X Y Z

Application of ID to the analysis (129c) may result in deletion of either Y_1 or Y_2; a later C-filter, in the phonological component, effectively constrains ID to delete Y_1 in this case. Then the output is (129d), with a structure like (130).

(129d) [John likes rice] and [Bill beans].

(130)



Another example of iterative application of ID is given in (131). (131a) shows the Structural Description, and Structural Change, for deletion of $Y_1 = [\text{rice}]_{N''}$; (131b) is the SD and SC for deletion of $Y_2 = [\underline{\text{John}}]_{N''}$; (131c) is the final application of ID, deleting the intial conjunction and.

(131a)

$[\text{and}]_C\ [\text{John}]_{N''}\ [\text{likes}]_V\ [\text{rice}]_{N''}\ [\text{and}]_C\ [\text{John}]_{N''}\ [\text{hates}]_V\ [\text{rice}]_{N''}$

$$C\ N''\ V - [\text{rice}]_{N''} \overset{\Downarrow}{\emptyset} - \emptyset -$$
$$- C\ N''\ V - [\text{rice}]_{N''} - \emptyset$$

X Y Z

and John likes ___ and John hates rice.

(131b) $[\text{and}]_C\ [\text{John}]_{N''}\ [\text{likes}]_{V''}\ [\text{and}]_C\ [\text{John}]_{N''}[\text{hates rice}]_{V''}$

$$C - [\text{John}]_{N''} - V'' -$$
$$- C - [\text{John}]_{N''} \overset{\Downarrow}{\emptyset} - V''$$

X Y Z

and John likes and ___ hates rice.

(131c) $[\text{and}_C\ [\text{John likes}]_{S''}\ [\text{and}]_C\ [\text{hates rice}]_{S''}$

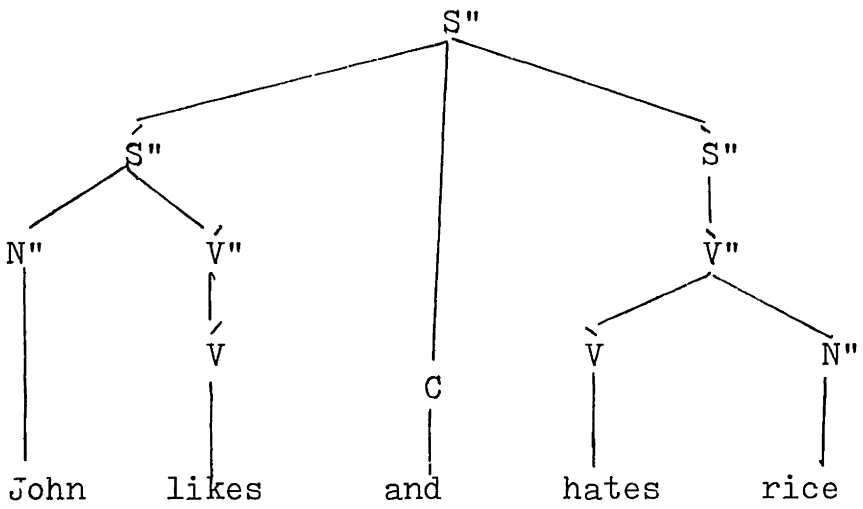
$$\emptyset - [\text{and}]_C \overset{\Downarrow}{\emptyset} - S'' -$$
$$- \emptyset - [\text{and}]_C - S''$$

X Y Z

John likes and hates rice.

The PM for the final output is (132); the assumption that deletion deletes categories as well as their yield gives a much more reduced output than the original SS.

(132)



In my analysis, SS undergoes semantic interpretation and phonological interpretation (including deletion) independently, so that semantic interpretation never applies to reduced structures like (132). Phonological interpretation does apply to (132), to give the contrastive reading (133), or, after a stress-reduction rule (Section 1.3.3), the non-contrastive (134),

(133) John lík̀es and hát̀es rice.

(134) John likes and hates rice.

The reduction of stress in (134) is permitted only because the contrastively accented likes and hates are contiguous in (132). In other sentences of (122a-c), above, the contrastive accent may not be reduced.

In the preceding pages I have given several examples of the application of ID, sometimes as a forward-deleting rule and

sometimes as a backward-deleting rule. I believe that the bidirectionality of Delete should not be built at cost into its formalization (by mentioning both Y_1 and Y_2, and their contexts), but should follow from the principle of Recoverability of Deletion applied to a simpler formalization, such as merely 'Delete'. Such a rule should be able to delete any sub-tree, subject to ROD's requirement that there be an identical sub-tree in a syntactically parallel environment. The only condition which ROD does not give immediately is the requirement that X_1 Y_1 Z_1 be contiguous to X_2 Y_2 Z_2. Indeed, in all the examples of ID cited above, X_1 Y_1 Z_1 is a conjunct (S" or N") with its preceding conjunctive. Sometimes the conjunctive C is part of X, sometimes it is analyzed as the term Y_1 and subject to deletion. But, in any case, X_1 Y_1 Z_1 is 'local' to X_2 Y_2 Z_2, in the sense that X_1 Y_1 Z_1 and X_2 Y_2 Z_2 are dominated by adjacent sisters which are daughters of N" or S".

If this requirement for locality (comparable to the notion of cojacency defined by Koster in "Locality Principles in Syntax") is taken as one of ROD's conditions on Identity Deletion, then there would be no need to mention X_i, Y_i, or Z_i in the Structural Description of ID. ID would be an example of 'Delete', applying to delete some string Y_j under strict conditions of identity with Y_i, in a local and parallel context.

An additional benefit of this suggestion is to obviate the need for end-variables, which would be needed in the 6-term SD of Identity Deletion, as in (126); Identity Deletion, if a

reflex of 'Delete', would no more have to mention end-variables than would 'Move α'.

The suggestions given above for the definition of ROD are, I believe, natural. Strict identity of trigger and context, parallelism of contexts (at least at the highest level of analysis) and locality between the trigger string and the target string are reasonable extensions, and largely required as conditions on the identity-deletion rules of previous analyses (see Schachter (1973), e.g., for HPA and strict identity).

There is, however, a second effect of my rule ID which does not so naturally follow in the 'Delete'-type analysis. This is the marking of Y_1's context (at the level of HPA) with acute ´, and the marking of X_2 and Z_2 (at HPA) with grave `. My assumption, following Gleitman (1969:93) is that the marking of intonation is a concomitant of the identity-deletion rule responsible for derived coordination. If this intonation is to be captured (and in my analysis, this is crucial), then ID must assign acute and grave to the parallel contexts of the trigger and target of deletion. But if ID does not mention these contexts in its Structural Description (but merely requires, via ROD, that the contexts be parallel in HPA), is it possible to claim that ID can properly assign accents? At present I can merely hypothesize that this is so, and that 'Delete', when applying to give identity-deletion, assigns, as a concomitant of deletion, the contrastive accent on the HPA of the trigger's and target's contexts. Since this accent assignment sets off the (unstressed) trigger, it allows the determination of the

target, which would otherwise be undiscernable in the output PM. In this (functional) respect, the assignment of accent is comparable to the coindexing left by an application of Move α; the effect is to so mark the PM that the site of application of Move α can be determined at SS. It may be, then, that contrastive accent is the 'trace' left by Identity Deletion. I will assume, in this analysis, that Identity Deltion is an example of the simple rule 'Delete', constrained by ROD and concomitant accent assignment.

The principle of ROD, I have assumed, requires strict identity of trigger and target, in all but the minor cases of deletion listed earlier. But the phenomenon of 'sloppy identity', whereby concordance features are immaterial to ROD, seems to belie this claim. For example, most analyses of Gapping derive (136) from (135), allowing likes to delete like.

(135) John likes rice, and his brothers like beans.

(136) John likes rice, and his brothers beans.

Chomsky, in Aspects,[24] suggests that the trigger and target of deletion need not be strictly identical, but only 'nondistinct', in that transformationally assigned concordance features are ignored. But I will assume that the rules of syntactic concordance are not part of the transformational component (hence concordance does not affect semantic interpretation), but, rather, are local output filters in the phonological branch. Concordance rules merely ascertain that freely

Base-generated features of plurality, gender, and person agree between subject and verb, subject and predicate nominal, etc. I am giving weight to Chomsky's (1970) observation that "agreement rules ... have something of the character of phonological rules of matching of feature matrices".

Consider Subject Verb Agreement (SVA) as an example. I assume that a finite verb which is input to SVA must agree with its subject. Example (136), above, could be taken to suggest that Gapping precedes SVA, so that at the level of deletion, (136) has the form of (137).

(137) John likes rice, and his brothers likes beans.

(137) would certainly be starred by SVA, but if ID deletes the second likes, to give (136), then there is no extant verb in the second clause, and SVA is not violated. The conclusion would be that SVA follows ID, perhaps as a filter in the phonological component.

Similar to (137) is (138), which (by ROD) must derive from (139).

(138) John is here, and his parents ___.

(139) and John is here, and his parents is here.

If SVA had to apply before ID, then (139) would be starred and could not underly (138).

But now consider (140). In my analysis (and in all other transformational analyses), (140) derives from a structure including two propositions.

(140) John sings and is sung to.

My rule of ID derives (140) from (141).

(141) and John sings and John is sung to.

Assume SVA follows ID. Then (142) is derived, but is sung to has no subject, so its concordance cannot be ascertained within its sentence.

(142) John sings and ___ is sung to .

(142) thus provides counterevidence to my tentative ordering of ID and SVA (or to the formulation of these rules). But now assume that SVA is an anywhere rule in the phonological branch, and that it must apply to any verb which receives phonological form. That is, a verb which is deleted need not have undergine SVA; thus (136) and (138) are OK. But an undeleted verb must undergo SVA, and it must, of course, undergo SVA when its subject is extant. Thus, in (142), is sung to undergoes concordance with John, before John is deleted (along with its NP node) from the sentence.

It may be asked what happens to (139) if SVA applies, as

it may, before ID. In such a case, (139) is starred on that derivation, but there is another derivation, with the opposite ordering (whereby ID bleeds SVA) which gives the desired (138). Similarly, consider (143).

(143) John is here, and his parents are here.

(143) will indeed pass SVA, but cannot undergo ID, because is here is not strictly identical to are here. All of the desired SVA-ID interactions are thus accounted for, and ROD need not be modified to allow 'sloppy identity' in these cases. Such 'sloppy identity' is actually the result of ID bleeding SVA, so that a verb is deleted which otherwise would not pass SVA.

There are further cases of 'sloppy identity', as in (144), which will be considered in my discussion of Sag's analysis, in Section 3.3.

(144) One man cut his hand yesterday, and the other man, today.

It may be relevant, at this point in my brief account of SVA, to discuss concordance in questions and concordance with coordinated NP's. Consider first (145).

(145) Is the man here?

(145) is the output of Subject-Aux Inversion, in the transformational component, and hence preceding the rule SVA in the phonological branch. It is unclear what exactly the structure of SAI's output may be, but I think it natural to assume that the subject remains daughter to its sentence. Then agreement between 'subject' and its verb will remain well defined, even after SAI.

Clarification is also in order to determine the plurality of coordinate NP's. I assume that a noun phrase is [+plural] if and only if (one of) its daughter is [+plural]; since N" can be rewritten as (CN")*, or Det N', or N" S", this N" can be [+pl] because it has as daughter a [+pl] C (and, both, all), or a [+pl] N" (the men), or a [+pl] N' (men). Such examples are given in (145).

(145a) [[John] and [Bill]] are/*is here.
- + -

(b) [[John] or [the men]] are/*is here.
- - +

(c) [[The men] or [John]] are/*is here.[25]
+ - -

(d) [[The men] (or) [John] or [Bill]] are/*is here.[25]
+ - - - -

(e) [The men] are/*is here.
+

(f) Are/*Is [[John] and [Bill]] here?
- + -

A N" is singular only if none of its daughters is [+plural]; a coordinate structure must therefore include [-pl] or, and each of the conjuncts must itself be [-plural].

(146a) [John] is/*are here.

(b) [[John] or [Bill]] is/*are here.

(c) Is/*Are [[John] or [Bill]] here?

A final point is that, since either of the men is [-pl] and both of the men is [+pl], the NP the men must not be a daughter of topmost NP. Perhaps, in such cases, of the men is a PP complement to an empty nominal $[\Delta]_{N'}$, as suggested by Emonds (1976:240). In any case, it is the [±plural] feature of either and both that is relevant in determining the concordance in (147). Note also that the [+pl] of both correlates with its cooccurrence with and, while [-pl] either cooccurs with [-pl] or.

(147a) Both of the men are here.

(b) Either of the men is here.

Further work, on each and all for example, is needed; I will mention some further distinctions among the quantifiers in Section 1.3.3.

1.3.2. Scrambling

The stylistic rules of Scrambling, which permute elements within a clause, have been considered important to the analysis of coordination since Ross's "Gapping and the Order of Constituents". Ross holds that Scrambling may increase the number of distinct patterns which have undergone verb-deletion through 'Gapping'. In my analysis, Scrambling is a component of the phonological branch which follows the deletion component; Identity Deletion may, for example, delete the first verb in (148) to give (149), and subsequent Scrambling may give any of eleven more patterns, inlcuding (150). (English does not have the major Scrambling rule, which freely permutes major constituents within a clause, but English does have minor Scrambling rules).

(148) C Subject Object Verb C Subject Object Verb.

(149) ___ Subject Object ___ C Subject Object Verb.

(150) Subject Object C Subject Verb Object.

One minor rule in the English Scrambling component is often assumed to be Heavy Noun Phrase Shift, which postposes an English verb's complement if the following string is, in some obscure sense, 'lighter' or 'less complex'. This 'heaviness' involves, at least, syntactic heaviness: [NP S"] is heavier than bare NP, no matter what its phonological length. This rule is not important to the description of coordination, except insofar as it clarifies the nature and ordering of the

Scrambling component. I do not wish to mark a particular stylistic Scrambling rule as obligatory, yet Heavy NP Shift must apply to a 'heavy' NP followed by a 'lighter' constituent. I suggest (following Fiengo's (1977:49) analysis), that Heavy NP Shift is an optional Scrambling rule which reorders strings, and that it is followed by "a filter that evaluates the output for relative heaviness." In the framework I am assuming, the evaluation of phonological heaviness must be a function of the phonological component, the last component of the phonological branch (Section 1.3.3). I assume that the phonology will not interpret a Scrambled phonologically light NP, or a phonologically heavy NP which has not been Scrambled over a following lighter string. The phonological component thus makes Scrambling (in the case of Heavy NP Shift) an effectively obligatory rule, and one which is (effectively) dependent on relative heaviness. Shift remains, however, formally an optional stylistic rule, postposing NP without reference to weight.

The ordering of Scrambling before the phonological filters permits Scrambling to (a) refer to structure which would apparently be erased by the phonological interpretation rules, and (b) be subjected to filters which can make the optional and simple Scrambling rules effectively obligatory, or blocked, in a baffling range of cases. Such an ordering will be important to my analysis of Gapping, in various languages, in Section 2.1; Gapping remains a simple, optional reflex of ID. Scrambling is unconstrained and optional, but the subsequent application of

a few independently needed filters permits the beginning of an explanation for an otherwise baffling array of data.

1.3.3. Phonology

In Chomsky & Lasnik's grammar, the filters of the phonological branch[26] are largely concerned with the S"-initial COMPlementizer node. This is appropriate, the authors argue, since filters play an important role in facilitating the processing of a string, by determining the boundaries of its component propositions. Inasmuch as conjunctions are only inserted (in the Base) as sisters to propositions or noun phrases, it is reasonable that filters should also play a part in determining the well-formedness, or processability, of coordinate structures. Chomsky & Lasnik have suggested that "filters seem to be designed to permit grammatical outputs corresponding to 'reasonable' base structures." In my analysis, the filterable requirement for coordinate structures is that, after deletion, the final (grave) conjunct in a compound still retains its conjunction C. (Hence, *and John ___ Bill are here).

I propose a filter, the C-filter, to star much of the overgeneration of Identity Deletion, according to the presence or absence of C before a string of grave accented nodes. This string I will call s̀. Following the normal format for filters, as in Chomsky & Lasnik, I will state C-filter as starring a string s̀ unless preceded by a conjunction C.

(151) C-filter:

*s̀ unless / C ___

C-filter has a variety of effects; the most obvious is to throw out (152a-c), where the final conjunct's conjunction has been deleted by ID, leaving the ˋs string preceded by a node (N" or S") marked ´, instead of by a conjunction.

(152a) *And [John´ came] ___ [Bill` went].
*C s´ s`

(b) *[And [John´] and [Bill´] ___ [Tom`]] left.
*C s´ C s´ s`

(c) *I saw [and [John´] ___ [Bill`]].
*C s´ s`

A second effect of C-filter is to disallow certain cases of backward coordination -- such as 'backward Gapping' and 'backward Left Peripheral Ellipsis'. (153a-b) are disallowed because an ˋs remnant, beans`, has been stranded after a non-conjunction -- in this case, the unstressed verb likes˘.

(153a) *___ John´ ___ rice´, and Bill` likes beans`.

(b) *___ ____ rice´, and John likes beans`.

In (153a), one ˋs string (Bill`) is preceded by C, but a second, separate ˋs string is preceded by likes˘, so (153) is starred.

It is now necessary to examine the permitted cases of forward 'Gapping' and 'Right Peripheral Ellipsis', and make a slight clarification of C-filter. Consider a standard 'Gapping' output, like (154).

(154) ___ John likes rice, and Bill ___ beans.

The deletion sites in (154) are the initial site where and was deleted, and the medial site, where likes was deleted. (154) must pass the C-filter; therefore, Bill beans must be taken as the maximal grave s string. These right-hand remnants (Bill, beans) in a Gapped sentence must (as Sag 1976 has shown) be restricted to major X" constituents. Similarly for 'Right Peripheral Ellipsis'. Bad cases are given in (155a) and (b), where the right-hand remnants are V=hates and N"V=Bill hates, respectively.

(155a) *___ John likes rice, and ___ hates ___.

(b) *___ John likes rice, and Bill hates ___.

I propose a modification to C-filter (151), so that multiple remnants must all be of category X", and so that Right Peripheral Ellipsis (which gives outputs like s u C s, where the u is a maximal unaccented string) only allows X" remnants in s. I now state C-filter as (156):

(156) *s unless / u C __

where $s = \begin{cases} X^i \text{ and } u = \emptyset \\ (X")^* \end{cases}$

Four examples should clarify this definition. So-called primary conjunction is always permitted, giving ... $\acute{s}$ C $\grave{s}$, where $\acute{s}$ and $\grave{s}$ are single categories, but if some u$\neq\emptyset$ precedes C, giving $\acute{s}$ u C $\grave{s}$, then $\grave{s}$ must be composed of major constituents: ($\grave{X}$")*. Both (155a) and (b) are thus disallowed, because in these u is non-null (u=<u>rice</u>), but $\grave{s}$ is not composed of accented X" categories. Right Peripheral Ellipsis is allowed in (157a) and (b), because in (157a), the grave string $\grave{s}=\grave{N}$", and in (157b), $\grave{s}=\grave{N}$"$\grave{V}$".

(157a) ___ John likes rice, and Bill ___.[27]

(b) ___ John hit me on Sunday, and Bill kicked me ___.
N" V" u C N" V"

Gapping, which leaves multiple grave remnants, is permitted if and only if all these remnants are $\grave{X}$". This follows because multiple remnants are only allowed via the $\grave{s}=(\grave{X}")*$ provision; an accented category other than $\grave{X}$" is permitted only as the single remnant in the patterm $\acute{X}^i$ C $\grave{X}^i$ -- i.e., in the pattern of Primary Conjunction.

The condition on the analyzability of grave $\grave{s}$, in (156), may well serve to aid processing of coordinate structures, in that one need not go below the level of the major phrasal categories X" in determining the deletion site of a coordinate structure. To process *(155b), one would have had to analyze a remnant as X" X to determine the deletion site. C-filter (156) permits one to work only with major remnants, in Gapping and Right Peripheral Ellipsis patterns.

'Gapping', as in (158), is permitted when the maximal grave string $\grave{s}$ is composed of $\grave{X}$" remnants. In each of the sentences of (158), $\grave{s}$ is $(\grave{X}")^*$. In (158a), $\grave{s}=\grave{N}"\ \grave{N}"$.

(158a) ___ Peter loves Betsy, and Betsy ___ Peter.
C N" N"

In (158b), $\grave{s}=\grave{N}"\ \grave{A}"$.

(158b) ___ Alan seemed more reluctant than Peter,
and Peter ___ more reluctant than Betsy.
C N" A"

In (158c), $\grave{s}=\grave{N}"\ \grave{D}"$.

(158c) ___ Tom ran extremely quickly,
and Alex ___ more slowly than anyone I'd ever seen.
C N" D"

In (158d) and (e), $\grave{s}=\grave{N}"\ \grave{S}"$.

(158d) ___ Alan claimed that he was cheated,
and Sandy ___ that she was the one who cheated him.
C N" S"

(158e) ___ Alan prefers for Tom to do it,
and Sandy ___ for Bill to do it.
C N" S"

In (158f), $\backslash s{=}\backslash N''\ \backslash P''$.

(158f) ___ Betsy stood in left field.
and Sandy ___ in right field.
C N'' P''

In (158g), $\backslash s{=}\backslash N''\ \backslash S''$, or $\backslash N''\ \backslash N''$; three variants are permitted by C-filter (156).

(158g) ___ John tried to begin to write a play,
and Harry ___ to begin to write a novel.
C N'' S''
___ _____ to write a novel.
S''
___ _____ _____ a novel.
N''

In (158h), there are three remnants: $\backslash s{=}\backslash N''\ \backslash P''\ \backslash P''$.

(158h) ___ Peter talked to his boss on Tuesday,
and Betsy ___ to her supervisor on Wednesday.
C N'' P'' P''

These sentences are based on those of Sag (1976), to support the important conclusion that the multiple remnants of Gapping must all be X". Further examples of good (and bad) Gapping will be given in Section 3.3, where it will be shown that this pattern of multiple X" remnants can be generalized to include 'Modal Gapping', '$\overline{N}$-Gapping', and other cases of deletion, as well as standard 'Gapping', 'Right Peripheral

Ellipsis', and 'Left Peripheral Ellipsis'. All of these result from Identity Deletion and C-filter, with s̀ taken as (X̀")*.

Three effects of C-filter have been described above: to disallow 'final conjunction deletion', while permitting 'initial conjunction deletion' and 'medial conjunction deletion' (e.g., *and J́ohn ___ B̀ill; OK __ J́ohn and B̀ill); to throw out backward Gapping in English, because a grave remnant, s̀, would be preceded by V̌erb instead of by C (also, other patterns, like backward Left Peripheral Ellipsis, are disallowed); and to require that the s̀ string either be a single constituent (in the environment / ś C __) or else be composed of major phrasal (X") categories. Gapping and Right Peripheral Ellipsis allow this multiple X̀" pattern.

A fourth effect of C-filter is to automatically restrict Identity Deletion to coordinate structures. Reference to (126) shows that ID nowhere mentions conjuncts or conjunctions. But if ID were to apply to a string which was not composed of conjuncts, it would give as output a grave string s̀ which is not in the environment / C __. C-filter would throw out such a string. Thus the fourth effect of C-filter is to permit a minimal statement of ID, and (importantly) to leave ID free to use the conjunction, e.g., and, as either the target of deletion (giving initial or medial conjunction deletion), or as part of the left context for deletion (giving all cases of reduced coordination). Therefore ID is a very general rule, and can replace (as I will continue to show) Gapping, Left and Right Peripheral Ellipsis, Node Raising, Primary Conjunction, etc., as well as

Initial/Medial Conjunction Deletion. (These rules, which play an important role in previous analyses, will be studied further in Chapters 2 and 3).

At this point, the major rules of coordination have been presented: the recursive PSR (2) for coordination (Section 1.1.1); the bidirectional deletion rule Identity Deletion (Section 1.2.1); and C-filter (156); the latter two are in the phonological branch of the grammar. C-filter, in my analysis, disallows phonological interpretation of a grave string s̀ unless it is in the proper phonological and syntactic environment -- / u C ___. There are other, minor filters which further determine the permitted patterns of coordination, by making earlier movements or deletions effectively obligatory. These filters, too, refer to the conjunctives C.

In English (but not, e.g., French) a true conjunction (and, or) must be deleted if initial in a coordination. Only the suppletive forms (both, either) are allowed in such a position. There is perhaps a hierarchy of strength, or heaviness, for conjunctives C, such that the suppletive forms are heavier than the true conjunctions, and may introduce a coordination. To disallow and, or as initial conjunctives, I will suggest that the phonological rules interpreting the non-quantifier conjunctives (i.e., and, or, but) may not apply in the environment / $X''[$ ___.

(159) $*_{[-Q]}^{C}$ / $X''[$ ___

Environment (159) arises by taking the first C in (CX)* as and, or, but. Identity Deletion is then effectively obligatory for initial conjunctions, so that (160) must give (161). (Note, also, that independently of the semantics, filter (159) would disallow [and [the men]] as a complete NP, while permitting [both [the men]].)

(160) $_{N''}$[And $_{N''}$[John] and $_{N''}$[Bill]] are here.

(161) $_{N''}$[$_{N''}$[John] and [Bill]] are here.

Among the distributive quantifiers, similar apparently ad hoc restrictions apply. Both may not conjoin two propositions, at the level of the phonological component, but must either be inside an N", or else have been scrambled into a position immediately before an acute stressed string ś: (163) is derived from (162) by an effectively obligatory application of Quantifier Postposition (Section 1.1.2). Since both (unlike either) must then be output preceding a string ś, ID is obligatory to give (164).

(162) $_{S''}$[Both $_{S''}$[John sang] and $_{S''}$[John danced]].

(163) [t_Q [John both sang] and [John danced]]

(164) John both sáng and dànced.

One proscription on both's environment may be stated as (165) -- which is comparable in format to (159) above. Filter (165) -- as perhaps all output filters (see Emonds 1976:242)-- must be local, in that an intervening $[_{N''}$ bracket blocks the application of filter (165). Thus (166) is permitted.

(165) * both / $_{S''}[$___

(166) $_{S''}[_{S}[_{N''}[$ Both [the men]] are here]].

The conjunctives prohibited in / $_{S''}[$___ actually include all conjunctives except the [-pl] distributive quantifier either. And and or are already prohibited by filter (159) (note the similarity to filter (165)), while all and each are never permitted to conjoin propositions, whether at DS, SS, or the level of the phonological component. Thus there is no sentence (167) comparable to (164). This restriction on all, each was considered briefly in Section 1.2.1, as being semantic in nature.

(167) *John all sáng, dánced, and plàyed.

I have stated filter (165) to prevent both from coordinating propositions in SS; only the trace t_Q of both is allowed in such a position. But the movement of both, by QP (or Move α) is problematic, in that while (168a) is permitted, (168b) is apparently not.

(168a) John will both sing and dance.
(b) *John both will sing and dance.

Compare the position of either, which I believe is much freer -- not only is either not subjcet to filter (165), but it need not be moved to a position immediately preceding the string s.

(169a) John will either sing or dance.
(b) John either will sing or dance.

In what way should QP be (effectively) constrained by the later filters? I believe either-movement should not be constrained (other than to require, as is natural, that either may only be postposed into the adjacent S", and not jump over that S" to give, e.g., (170)).

(170) $[t_Q$ [John will sing] or [___ either dance]].

Let me suggest the derivations of (169a) and (b). QP, or Move α, postposes either to give (171a) or (b).

(171a) t_Q [John will [either sing]] or [John will dance]
(b) t_Q [John [either will] sing] or [John will dance].

In (171a), either is moved into the Verb Phrase; Identity Deletion may apply to delete the second John will, whose left

context is C and right context V". (172) is derived.

(172) John will either sing or ___ dance.

In (171b), the movement is into the Modal Phrase, preceding the modal will. One application of ID deletes the second John, with left context C and right context M" V"; the second application of ID deletes the modal will, which has as left context C (either / or) and right context V" (sing/dance). The double deletion gives (173).

(173) John either will sing or ___ ___ dance.

Although either-movement is rather free, both-movement is more constrained; both outside of N" must immediately precede s. Thus (168a) is permitted, but, the analogue (168b) to (173) is starred. The particular filter for both may be something like (174), to replace filter (165) and describe *(168b).

(174) * both , unless / $\left\{ \begin{array}{l} [_{N"}\_\_\_ \\ \_\_\_ sCs \end{array} \right.$

Either has no such restrictions; it is permitted in the environment / $[_{S"}\_\_\_$, and may be separated from s by an intervening unstressed string, as in (173), above. Both and either differ, then, in respects ascribable to the both-filter, (174).[28]

All, however, is probably the most problematic conjunctive. As Schachter (1973:406) notes: a "further constraint on all, at least when it [arises from] ... an NP involving conjunction," is that it must be postposed, but that "the NP of which it is a constituent cannot be sentence-final (or clause-final)." Thus (175) is permitted, but (176) is not.

(175) I gave John and Bill and Harry all presents.

(176) *I gave presents to John and Bill and Harry all.

But "all does occur [arising from] ... a sentence-final NP headed by a personal pronoun"; e.g.,

(177) I gave presents to them all.

A preliminary formulation of the proscribed environment for all may be given as (178), which disallows sentence-final all unless it follows a pronoun. I believe the relevant fact is that them in (177) is unstressed,[29] so that all is disallowed in $/[+\text{stress}]\_\_\_]_S$, .

(178) * all / [+stress] $\_\_\_]_S$,

This environment, in which all may not be realized, includes syntactic as well as phonological features; some such level of complexity is required. But why is all further proscribed

inside a coordinate NP? I can only suggest that the constraint is semantic, and related to the fact that all may modify a singular mass NP (all the gold) as well as a non-singular (all the men; [t_Q John, Bill, and Tom] all). Perhaps all, when preceding a singular NP, is sematically interpreted as giving the mass NP reading, so that all John, Bill, and Tom would require that all John be a well-formed string. This suggestion is comparable to the explanation provided for the badness of [t_Q Men] both are here; I have assumed the semantic component errs in reading Men as a generic, and hence finds Men incompatible with the quantification imposed by both. If this tentative suggestion for all can be developed, there will be no need for providing a phonological filter to star all John, Bill, and Harry -- and, indeed, I am not sure such a filter could be formulated. The proper route, I assume, is to invoke a semantic explanation, like that for #Men both.

There is one more interaction between the rules of the phonological component and coordinate structures -- in addition to the C-filter and the Q-filters -- for it is here that the contrastive stress and intonation assigned by ID will be phonetically realized. I follow Gleitman (1969:93) and Schachter (1973) in assuming that the acute-accented string ś may be read with rising intonation; I have extended their analyses to provide a falling intonation on the symmetric grave string s̀. In some cases of coordination (e.g., when there are only two conjuncts, ś and s̀, each analyzed as a single category), the contrastive stress and intonation may be completely nullified, to

give outputs like (179) and (180). Contrastive intonation is possible for (179)-(180), but it is not necessary.

(179) Red and green men have arrived.

(180) John will sing and dance.

A formulation of the reduction rule may be as in (181); if the output string includes $\acute{s}\ C\ \grave{s}$, where $\acute{s}$ and $\grave{s}$ are the maximal stressed strings, and are each composed of a single category, then reduction is permitted.

(181) $\acute{s}\ C\ \grave{s} \longrightarrow s\ C\ s$, where $s=X^{i}$

Then (179)-(180) may receive reduced accent, but John, Bill, and Tom will not, because $\acute{s}$=John, Bill, which is not a single category. This observation derives from Schachter's (1973:417) claim that contrastive stress is obligatory in coordinations having undergone medial conjunction deletion (to give John adjacent to Bill).

There is perhaps no need to assume that rule (181) actually erases ´ and `; rather, $\acute{s}$ and $\grave{s}$ may have non-contrastive reflexes in certain environments (see (181)) without requiring erasure of the abstract accent markers. If erasure does in fact exist, then such erasure must follow the C-filter (156) and the both-filter (174), which crucially refer to $\acute{s}$ and $\grave{s}$.

2. Excursus

2.0. Introduction

The two topics in this chapter are in the nature of an excursus, utilizing the resources of Chapter 1, and analyzing two phenomena that will be pertinent to the studies in Chapter 3. Section 2.1 is an attempt to explain the facts of Gapping and word-order possibilities, within the present framework of a free, bidirectional rule of Identity Deletion, followed by later output filters. The independent application of two or more necessary filters can have surprising effect on the permitted range of output structures.

Section 2.2 describes the verb phrase, and the auxiliaries, in an analysis largely avoiding special transformations for the auxiliary. I attempt to show that auxiliary verbs can be freely ordered in the V" (even under V', as the head verb), and that independent ordering restrictions will throw out the disallowed structures. I avoid the use of an Aux node or a recursive V' node; this matter is important to my analysis of Verb Phrase Deletion, in Section 3.3.

2.1.1. Gapping and Word Order

One basic effect of C-filter (*ˋs unless /u C___) was to prevent Identity Deletion from deleting a final conjunct's conjunction,[1] while permitting 'initial-conjunction deletion' and 'medial-conjunction deletion'. C-filter effectively constrains the application of the formally bidirectional and optional Identity Deletion rule, making it inapplicable in certain cases.

Consider now the deletion of a transitive verb with its auxiliary. Since Ross (1967a), the resultant pattern has been ascribed to 'Gapping', and the relationship between Gapping and word order has been the subject of extensive but inadequate analysis. In this section, I will present a table of the permitted (and disallowed) Gapping patterns, and explain them within my framework of a bidirectional deletion rule, Identity Deletion, and a following C-filter.

In an SVO language like English, ID may apply forward in (1) to generate 'Gapped' (2), which will pass C-filter because the maximal grave string, Bill beans, is preceded by C. (I'll write this C as +, to simplify the notation in this section).

(1) and [John likes rice], and [Bill likes beans].
+ S V O + S V O

(2) ___ John likes rice, and Bill ___ beans.
S V O + S O

C-filter disallows backward 'Gapping' when the resultant pattern has a maximal grave string not preceded by C. Backward Gapping is starred in English, under my analysis, because grave $\grave{O}$ is preceded by $\breve{V}$, not by C, in (3).

(3) *___ John ___ rice, and Bill likes beans.
* $\acute{S}$ $\acute{O}$ + $\grave{S}$ V $\grave{O}$

In an SOV language like Hindi, both forward and backward Gapping are allowed because both patterns pass C-filter (i.e., in both, $\grave{\grave{S}}\grave{O}$ is in the environment /C___).

(4) $\acute{\acute{S}}OV$, + $\grave{\grave{S}}O$__.

(5) $\acute{\acute{S}}O$__, + $\grave{\grave{S}}OV$.

I now want to systematically discuss the permitted Gapping patterns in languages with verb-initial, verb-medial, or verb-final word order; with or without Scrambling; with or without C-filter; and with or without additional filters such as Subject-Verb Agreement or a proscription of word order OS. Ross (1967a), Maling (1972), and Rosenbaum (1977) each present some portion of the table in (6), p.113 below, but their notations, data, and framework differ from each other's and from mine. Each uses an alphabetic notation to distinguish the Gapping patterns, but the patterns which Ross symbolizes as A, B, C, and D are called B, D, G, and F by Rosenbaum. I shall avoid

this confusion by reverting to a notation suggested by Greenberg's (1963) study of word order: a type I language is verb-initial (VSO/VOS); a type II language is verb-medial (SVO/OVS); and a type III language is verb-final (SOV/OSV). If a language has forward (rightward) Gapping, I will put a rightward arrow $\rightarrow$ on its roman number; similarly for backward Gapping. Hindi, for example, is a type $\overleftrightarrow{\text{III}}$ language, with both forward and backward Gapping ((4)-(5)). English is a $\overrightarrow{\text{II}}$ language, having forward Gapping only. In the table (6) below, I list these Gapping types (and some of the non-occurring types) in the first column; the second column gives an example attested in the literature. (Discussion of each Gapping type follows the table).

Column three states which Gapping patterns exist, for a given language, after ID but before Scrambling and filters. Since ID is bidirectional, any type 'J' language will have both $\overrightarrow{\text{J}}$ and $\overleftarrow{\text{J}}$ (symbolized as $\overleftrightarrow{\text{J}}$) as outputs of ID. Not all of the patterns listed in column three, however, may pass the subsequent filters. C-filter, for example, disallows $\overleftarrow{\text{I}}$ and $\overleftarrow{\text{II}}$ (because, in both of these, some grave string is preceded by $\overset{\vee}{\text{V}}$, not by C; $\overleftarrow{\text{I}}$ would be $\acute{\text{S}}\acute{\text{O}}$+V$\grave{\text{S}}\grave{\text{O}}$; $\overleftarrow{\text{II}}$ would be $\acute{\text{S}}\acute{\text{O}}$+$\grave{\text{S}}V\grave{\text{O}}$). English has both $\overrightarrow{\text{II}}$ and $\overleftarrow{\text{II}}$ in cloumn three, but $\overleftarrow{\text{II}}$ will be starred by C-filter in column five, leaving only $\overrightarrow{\text{II}}$ (SVO+SO).

Column four distinguishes freely Scrambling ('yes') from non-Scrambling ('no') languages. English does not have this optional rule permuting major constituents within their clause, but Russian does. If Scrambling obtains, it will generate all

6 Gapping patterns. For example, Russian has a basic type II word order, from which bidirectional Identity Deletion derives II→ and ←II (symbolized as ←→). Scrambling can permute the forward Gapped II→ into I→ or III→, and can permute ←II into ←I or ←III. Thus if Scrambling applies ('yes'), it must generate all 6 patterns. Subsequent filters may throw some of these patterns out; otherwise, as in Tojolabal, all six patterns are translated into Universal Phonetics (UP).

The effect of C-filter is given in column five. In all languages, except those of class (6f), C-filter throws out *←I and *←II. In (6f), Tojolabal Mayan apparently has no coordinating conjunction and, so C-filter may be assumed inoperative (Does Not Apply) in that language; in Zapotec (another (6f) language), C-filter is bled by a stress-readjustment rule. Thus, in (6f), C-filter will pass ←I and ←II, although one or both may be starred by some other detail filter. In English (not a (6f) language), the input to C-filter from ID is ←→; C-filter stars ←II, leaving just II→ (SV́O+SO̗). C-filter nominally also stars ←I in English, but this pattern was never input to the filter, so I place this vacuously starred pattern in parentheses for English -- (*←I).

Most languages have some additional detail filter. Turkish and Cherokee (which have Scrambling to give all six Gapping patterns) disallow verb-initial sentences. This proscription will apply to the Gapping patterns to throw out any I sentence -- in particular, I→ and ←I. Chinese disallows a verb-less

clause; thus Gapping is totally proscribed in Chinese, because all 6 Gapping patterns include a verb-less clause. There are more than a dozen attested paradigms; I discuss these in six classes (a-f): the Chinese-type languages (6a) which filter out verb-less clauses, hence disallowing all Gapping; the Mam (6b), English (6c), and Hindi (6d) classes, which are representative, respectively, of type I, II, and II languages with no Scrambling. Two classes ((6e) and (6f)) have Scrambling; the Russian class (6e) invokes C-filter (disallowing $\overleftarrow{I}$ and $\overleftarrow{II}$); in the Tojolabal class (6f), C-filter does not apply, either because there are no C's, or because C-filter is bled. Each class includes some languages with further restrictive filters; the languages cited above have the most general patterns.

	Pattern	Language	ID	Scramble	C-filter	Other Filter
(6a)	none	Chinese		---	(*I, *II)	*V-less clause
(6b)		Mam		no	*I (*II)	no
		*	"	"	"	"
		*	"	"	"	"
(6c)		English		no	(*I) *II	no
		*	"	"	"	"
		*	"	"	"	"
(6d)		Basque		no	(*I, *II)	SVA:*III
		Japanese	"	"	"	V-final:*III
		Hindi	"	"	"	no
(6e)		Russian		yes	*I, *II	no
		Turkish		"	"	*I
		Kanobal		"	"	*OS:*II, *III
		Cherokee		"	"	*I; *OS:*II, III
(6f)		Tojolabal		yes	DNA	no
		Zapotec	"	"	DNA	Focus:*I
		Quiche	"	"	DNA	*OS:?

Chinese, in (6a), is representative of a large class of languages which allow neither verb deletion not object deletion. The basic word order is immaterial, as are any effects of Scrambling or C-filter, because any Gapping is disallowed by a subsequent filter which requires a verb in each clause, and an object for each transitive verb. These languages do allow deletion of the subject N" to give conjoined predicates, e.g., SVO+__VO, so it would be incorrect to disallow all applications of Identity Deletion. It is interesting that conjoined transitive verbs are disallowed -- as in Chinese *SV́__+__V̀O -- because the first clause is missing its object. The list of Chinese-type languages was compiled by Koutsoudas (1971) out of a data sample of 32 as[2]: Akuapan (Twi), Chinese, Hausa, Indonesian, Lebanese, Maninka, Susu, one dialect of Swahili, Tenne, Thai, Toba Batak, one dialect of Turkish, Wolof, and Yoruba. Koutsoudas claims Mam as a Chinese-type language, but Furbee (1973), in an extensive analysis of Mayan Gapping, lists Mam as a $\overrightarrow{T}$ ((6b)) type language.

The classes (6b)-(6f) all allow Gapping -- i.e., these languages do not have the Chinese verbless clause filter. Classes (b), (c), and (d) do not allow Scrambling. Because of C-filter, there can be no $\overleftarrow{T}$ or $\overleftarrow{TT}$ patterns which pass the filters, thus column five contains *$\overleftarrow{T}$, *$\overleftarrow{TT}$ for each of these classes.

Mam (Furbee 1973)[3] is a class (6b) language, an example of type $\vec{I}$: Mam only allows VSO+SO. Any language in class (6b) will allow $\vec{I}$, and not $\overleftarrow{I}$, because $\overleftarrow{I}$ (ŚÓ+VS̀Ò) is blocked by C-filter. Arabic (Koutsoudas 1971) appears to fall with Mam into type $\vec{I}$. Types $\overleftarrow{I}$ and $\overleftrightarrow{I}$ are unattested, since the pattern $\overleftarrow{I}$ would only surface in a language where C-filter does not apply; such Scrambling languages are considered in (6f), and shown to allow a wider range of patterns.

Class (6c) includes English, French, and German in main clauses (according to Ross 1967a. Note that German main clauses have the II word order). These are the type II languages without Scrambling, which therefore allow only $\vec{II}$ (SVO+SO). ($\overleftarrow{II}$ will be starred by C-filter, since Ś́Ó+S̀V̀Ò contains a stranded Ò). See the examples cited in (2)-(3), above. Koutsoudas gives a number of II languages which permit forward Gapping ($\vec{II}$), but does not state if these are, or are not, Scrambling languages. The list includes: Croatian, Estonian, Finnish, Latvian, Norwegian, Rumanian, one dialect of Swahili, Swedish, and Zulu. Type II languages which permit Scrambling are consisdered in (6e); some examples appear to be Hungarian, Latin, Modern Greek, Quechua, and Russian.

Class (6d) is interesting in that the basic type is the bidirectional $\overleftrightarrow{III}$, exemplified by Hindi (see (4)-(5)); to obtain the more restricted types $\vec{III}$ (Basque: SOV+SO) or $\overleftarrow{III}$ (Japanese: SO+SOV), some additional filter must be added. Hindi has basic, or dominant SOV order, or III; ID will thus give $\overleftrightarrow{III}$, and C-filter passes both patterns $\vec{III}$ and $\overleftarrow{III}$, because, in each

case, the maximal grave string, $\grave{S}\grave{O}$, is preceded by C (see discussion on p.109). Hindi (cited by Ross 1967a) is representative of a class containing Amharic (Bach 1970), German in subordinate clauses (Ross 1967a; the word order is III in subordinate clauses), and perhaps Persian (Kuno 1971, 1973). An example of German $\overrightarrow{III}$ is given in (7a), and $\overleftarrow{III}$ in (7b).

(7a) (Weil) ich das Fleisch aufass, und meine Mutter
(Because) I the meat ate-up (sg.) and my mother
den Salat, (wurden wir beide krank).
the salad, (we both got sick).

(7b) (Weil) ich das Fleisch, und meine Mutter den Salat
(Because) I the meat, and my mother the salad
aufass, (wurden wir beide krank).
ate-up (sg.), (we both got sick).

Ross gives Turkish as a $\overleftrightarrow{III}$ language, but Koutsoudas (1971:371) suggests that Turkish may also have Scrambled Gapping patterns, to be considered in (6e).

Basque and Japanese (also in Class (6d)) have further restrictions. Both Basque and Japanese are basically Hindi-type languages, wherein ID generates both (8a) and (b), but Basque throws out (8b) $=\overleftarrow{III}$ unless the final verb agrees with both subjects, while Japanese throws out (8a) $=\overrightarrow{III}$ because in Japanese, and other 'strict SOV' languages, some verb must follow each string of non-verbals. These languages are analyzed below.

(8a) $\overrightarrow{\text{III}}$: $\acute{S}OV+\grave{S}O\_\_$

(b) $\overleftarrow{\text{III}}$: $\acute{S}O\_\_+\grave{S}OV$

Gastañaga (1975) shows that Basque allows pattern (8a) to be derived from (9). The 'Gapped' output is given in (10).

(9) Lindak ardau edaten du ta Anderek esnea edaten du.
S O V + S O V
Linda wine drink-3sg. and Ander milk drink-3sg.

(10) Lindak ardau edaten du ta Anderek esnea.
S O V + S O
Linda wine drink-3sg. and Ander milk.

In (9) and (10), the Auxiliary (du) marks third-person singular (third plural would be dabez). Basque allows 'forward Gapping', to give $\overrightarrow{\text{III}}$, as in (8a) and (10), but disallows the case of 'backward Gapping' given in (8b) and *(11).

(11) *Lindak ardau ta Anderek esnea edaten du.
S O + S O V
Linda wine and Ander milk drink-3sg.

One would have expected backward Gapping to be able to delete the singular verb edaten du from the first clause of (9), to give (11), just as backward Gapping applies in Russian ((12), from Ross (1967a)), and in German subordinate clauses ((13), from Ross (1967a) and Kuno (1971, 1973)).

(12) Ja vodu, i Anna vodku pila.
S O + S O V
I water and Anna vodka drank-3sg.feminine

(13a) (Weil) ich das Fleisch,
S O
(because) I the meat,
und meine Mutter den Salat aufass
+ S O V
and my mother the salad ate-up-Pst sg.

(b) (Wilhelm sagt, dass)
(William says that)
Johann Maria und Peter Anna schlug.
S O + S O V
John Mary and Peter Anna hit-Pst sg.

In Basque, the expected 'Gapping' output (11) is disallowed, but another pattern is permitted: SO+SOV is permitted in Basque when the verb agrees with both subjects, in the sense of normal concord -- if the subjects are Lindak and Anderek, the final verb must be third-person plural (dabez); if the two subjects are nik (first person singular pronoun) and berak (third person singular pronoun), the verb must be first person plural. I suggest that Basque is a standard SOV (TII) language, allowing bidirectional ID but no Scrambling; the C-filter applies vacuously, but is followed by another filter, a concordance filter, which requires agreement between a verb and any

preceding subjects (unless another verb intervenes). In the 'forward Gapping' pattern, SOV+SO, the verb will agree only with the first subject, as in (10); in SO+SOV, the final verb will agree with both subjects at once; i.e., with Lindak + Anderek (to give third person plural) or with nik + berak (to give first person singular). This number agreement filter in Basque must be late, and follow ID, and is not, as in English, an anywhere filter in the phonological branch. It is intriguing that Basque's concordance rule, relating subject to verb, must ignore the intervening Object when checking the agreement in a simple clause SOV; perhaps an extension of this allows the agreement rule to ignore both objects in SO+SOV, to force agreement betweeen the verb and both preceding subjects. Examples of the permitted SO+SOV (~~III~~) patterns are given below, to be contrasted with *(11).

(14) Lindak ardau ta Anderek esnea edaten dabez.
S O + S O V
Linda wine and Ander milk drink-3pl.

(15) Nik ardau ta berak esnea edaten doguz.
S O + S O V
I wine and he milk drink-1pl.

In conclusion, Basque allows forward and backward deletion, but the classical backward Gapping pattern (expected in (11)) is not extant, because of an unusual concordance rule. The fact that (11) is starred would be enough, in some analyses, to

disallow Basque as an example of backward Gapping, and to require that (14) and (15) be derived from Right Node Raising, or some other rule of coordination. In my analysis, the bidirectional Identity Deletion rule gives (10), (11), (14), and (15), while the subsequent concordance filter stars (11). Basque is thus a Hindi-type language ($\overleftrightarrow{III}$) with some examples of $\overleftarrow{III}$ (including the standard test case for Ross's 'Gapping' rule) thrown out by concordance.

Bach (1970) also claims that there is a language (unspecified) allowing SOV+SO, but starring SO+SOV. I assume that this language is a Hindi-type language, but that some filter throws out some or all of the SO+SOV patterns, to result in a Basque-type language. Such a language could well fit within my framework of ID followed by filters, of a type (e.g., concordance) independently needed in the language.

In Japanese (also a member of class (6d)), the expected forward Gapping pattern SOV+SO is starred by a filter which is needed in all 'strict Verb-final' languages, to disallow any rule from postposing a non-verbal to a position following the verb. In SOV+SO, the elements SO are not followed by any verb, so this pattern must be starred, just as SVO would be starred in Japanese. I assume a surface filter requiring that a maximal string of non-verbals be starred unless in the environment /__V . My requirement is similar to the one Kuno (1971, 1973) suggests for Japanese (and Korean): "In Japanese, sentences must end with a verb ... and ... the gapped pattern SOV SO, which ends with an object, would violate this constraint."

My filter is preferable, however, because in both Kuno's analysis[4] and mine, there is a medial clausal boundary in the permitted ⟨III [SO]+[SOV]. SO is the total yield of a sentence, and yet that sentence does not end with a verb. Following Kuno's constraint literally would disallow all Gapping in Japanese, making Japanese a Chinese-type language. Following my proposed filter literally will throw out SOV+SO, but allow SO+SOV. (In the former, SO is not followed by V; in the latter, the maximal string SO+SO is followed by V). Thus, in my framework, Japanese is a type III, Hindi-like language, in which a late filter, which constrains word-reorderings, also disallows the forward Gapping pattern SOV+SO. Relevant examples taken from Kuno (1971), are given below.

(16) *John ga Mary o but-i, Tom ga Martha o.
* S O V-+ S O
John Mary hit-and, Tom Martha

(17) John ga Mary o, Tom ga Martha o butta.
S O S O V
John Mary, Tom Martha hit.

To recapitulate, Japanese and Korean are III languages; ID gives ⟨III⟩; C-filter stars neither III⟩ nor ⟨III, but the 'strict verb-final' filter throws out any maximal string [-V]* not followed by a verb. One such string would be III⟩: SOV+SO; hence III⟩ is disallowed.

Siouan was taken by Ross (1967a) as a Japanese-type language, allowing ←III but not III→. However, Maling (1972), citing G.H. Matthews, claims that Siouan's imperative pattern is OVS. In the imperative, the Japanese-type filter does not hold true, since the S is not followed by a verb. How, then, do we disallow SOV+SO in Siouan? One way would be to relax the Japanese filter, and merely require that every Object be followed by a Verb. Then OVS is permitted, but the forward Gapping pattern SOV+SO is disallowed, because of the stranded Object. Backward Gapping SO+SOV is permitted -- each Object has a verb in its right-hand environment. I do not know that my proposal is the correct one for Siouan, but I assume that some filter (as motivated as the Japanese filter is, for Japanese and Korean) which is necessary for Siouan will also explain why Siouan is ←III, and not III→.

We have considered, at some length, ten Gapping patterns. These were the patterns of non-Scrambling languages. A language which has Scrambling will generate, as input to the filters, all 6 Gapping types: I→, II→, and III→. After the application of various filters, seven distinct patterns are attested -- all Scrambling languages have forward Gapping I→, II→, and III→, except for some which disallow any verb-initial clause (thus *I→); most also have the backward Gapping type ←III (because ←III will pass C-filter); some languages (in which C-filter does not apply, for various reasons) also allow ←I and/or ←II. I will attempt to make sense of this plethora

of data in the discussion below.

Class (6e) includes the Scrambling languages wherein C-filter stars *$\overleftarrow{\text{I}}$ and *$\overleftarrow{\text{II}}$. We expect all the forward types $\overrightarrow{\text{I}}$, $\overrightarrow{\text{II}}$, and $\overrightarrow{\text{III}}$, as well as backward $\overleftarrow{\text{III}}$. This is the pattern exemplified by Russian, Latin, and Quechua. Additional filters (such as that starring Verb-initial sentences) give the Turkish, Kanobal, or Cherokee patterns.

Russian is an SVO language (type II), which Ross (1967a) analyzed as a Scrambling language allowing merely $\overrightarrow{\text{II}}$, $\overrightarrow{\text{III}}$, and $\overleftarrow{\text{III}}$. Since, however, Russian (and Latin and Quechua) also allow VSO in simplex clauses, we would expect VSO+SO, or type $\overrightarrow{\text{I}}$. That this is the case has been attested by Kuno (1971) for Russian, Panhuis (1979) and Ross for Latin, and Pulte (1972) for Quechua. I will cite the relevant data, since the tables in Ross and Rosenbaum are at variance with the emended facts.

The deletion facts in Russian (Kuno (1971), citing Mark Pivovonsky as an informant, but also suggesting caution) are given in (18), which tabulates results like those of (19).

(18)			
	$\overrightarrow{\text{I}}$	VSO+ SO	VOS+ OS
	*$\overleftarrow{\text{I}}$	* SO+VSO	* OS+VOS
	$\overrightarrow{\text{II}}$	SVO+S O	OVS+O S
	*$\overleftarrow{\text{II}}$	*S O+SVO	*O S+OVS
	$\overrightarrow{\text{III}}$	SOV+SO	OSV+OS
	$\overleftarrow{\text{III}}$	SO +SOV	OS +OSV

(19) $\overrightarrow{II}$ Maša čistila kartošku, a Ania morkovku.
S V O + S O
Mary peeled potatoes, and Annie carrots

In Russian, C-filter stars $\overleftarrow{I}$ and $\overleftarrow{II}$, because some maximal grave string is not preceded by C, but rather by $\check{V}$. That is, the patterns $\overleftarrow{I}$ and $\overleftarrow{II}$ include the strings +V$\grave{S}\grave{O}$, +V$\grave{O}\grave{S}$, +$\grave{S}$V$\grave{O}$, or +$\grave{O}$V$\grave{S}$.

In Latin, Panhuis (1979) has examined certain classics for Gapping patterns. (It may be noted that literary Chinese (Sanders and Tai 1972) and literary Persian (Kuno 1971) have freer deletion patterns than do the spoken languages). Ross had claimed that Latin had the patterns $\overrightarrow{II}$: SVO+SO, $\overrightarrow{III}$: SOV+SO, and $\overleftarrow{III}$:SO+SOV. Panhuis examines Caesar's Gallic War (Books I and II), Cicero's first Catiline, and the Aeneid, Book I), finding 9 examples of $\overleftarrow{III}$ and 6 of $\overrightarrow{II}$ in the prose, and an example of $\overrightarrow{I}$: V N" P" + N" P" in the Aeneid (I:118-19).

(20) Apparent <u>rari nantes</u> <u>in gurgite vasto</u>,
V N" P"

<u>arma virum tabulaeque et Troia gaza</u> <u>per undas</u>
N" P"

=(<u>There</u>) appear <u>a few swimmers</u> <u>in the enormous swirl</u>,
(as well as) <u>their arms, planks, and Trojan treasures</u>
<u>all over the waves</u>.

To the extent that the literature can speak for a language, I believe it is possible to conclude that Latin, an SVO language with Scrambling, is of the Russian type, allowing I, II, and III.

A third language of the Russian-type has been attested by Pulte (1972), in a correction of Pulte (1971 and 1973). In the latter works he claims that Bolivian Quechua has free word order (i.e., Scrambling in my terms) but only allows forward Gapping (I, II, and III). He corrects this statement in Pulte (1972) with: "It has been pointed out to me, however, that for some speakers of Bolivian Quechua sentences of the form SO+SOV [III] are at least marginally acceptable." I therefore take Quechua as a Russian-type I, II, III language.

Turkish (6eii) may well be representative of a restriction on Russian-type languages, which disallows verb-initial sentences, thus giving II and III. Ross (1967a) cites Turkish as allowing III (i.e., SO+SOV and SOV+SO, just like Hindi), but Koutsoudas (1971:371) notes that (at least one dialect of) Turkish also allows a type II order SVO. I would expect Scrambling to freely give I, II, and III. Then, C-filter throws out I and II, leaving I, II, and III. If Turkish does not allow verb-initial sentences (as Koutsoudas implies), then the I type would be starred by filter, leaving II and III. I assume this is the pattern for Turkish, as well as Modern Greek and Hungarian (see Koutsoudas (1971:371)). German may be said to have this pattern as well, but type III is only permitted in subordinate clauses, while type II is the pattern for main

clauses.

Rosenbaum cites Furbee (1973)[5] as claiming that Kanobal (6eiii) is a VSO language, with Scrambling, which permits all the forward Gapping types and none of the backward ones. Suppose C-filter stars $\overleftarrow{\text{I}}$ and $\overleftarrow{\text{II}}$; some additional filter would be needed, in my analysis, to star the expected $\overleftarrow{\text{III}}$; I do not know enough about Kanobal to verify Furbee's claim or to suggest a filter. I note, however, that Furbee (1974) lists Kanobal as similar to Tojolabal (which does allow $\overleftarrow{\text{III}}$), and also I note that some of these Guatemalan Mayan languages have unexpected proscriptions of the order OS (see Table 4 in Rosenbaum 1977). I will employ an independently needed restriction on OS to star $\overleftarrow{\text{III}}$ in Cherokee; perhaps such a filter could also describe Kanobal (which disallows expected $\overleftarrow{\text{III}}$), and Mayan Cakchiquel and Ixil (see table 4 in Rosenbaum) which disallow OS in certain environments. For the present, I will retain Kanobal as $\overrightarrow{\text{I}}$, $\overrightarrow{\text{II}}$, $\overrightarrow{\text{III}}$ language, and leave the proscription of $\overleftarrow{\text{III}}$ to an assumed, but unformulated, filter.

The facts of Cherokee (6eiv) are rather more interesting, both because it has been (incorrectly) claimed to behave like Quechua and Kanobal (which, as I have shown, do not even behave similarly), and because the facts of Cherokee are presented in moderate detail in Pulte (1972). Pulte notes that Cherokee disallows verb-initial sentences.(*VSO, *VOS), and also disallows OSV. On the basis of these facts alone, I would suggest that Cherokee has Scrambling, and two phonological filters

effectively constraining the application of Scrambling -- one filter disallows type I sentences, and the other filter disallows contiguous object and subject, in that order: *OS. In simplex sentences, such filters give the paradigm below.

(21)	*VSO	by *I-filter	*uduliha asgaya adela
	*VOS	by *I-filter; by *OS filter	*uduliha adela asgaya
	SVO		asgaya uduliha adela
	OVS		adela uduliha asgaya
	SOV		asgaya adela uduliha
	*OSV	by *OS filter	*adela asgaya uduliha
			money man wants

Clearly, there will not be any Gapping types $\overrightarrow{I}$ or $\overleftarrow{I}$, because I is starred by filter; this is indeed the case. (Also, $\overleftarrow{I}$ is starred by C-filter). But now consider the $\overrightarrow{II}$, $\overleftarrow{II}$, $\overrightarrow{III}$, and $\overleftarrow{III}$ Gapping patterns, while distinguishing between the subject and object. If C-filter throws out $\overleftarrow{II}$, and the *OS-filter disallows OS within a clause, we expect the paradigm (22), below.

(22) *I→ by *I-filter

*←I by *I-filter, by C-filter

I→I: SVO+SO "asgaya uduliha adela, agehya-hno asano"
man wants money woman-and dress

*SVO+OS by *OS-filter

OVS+SO "adela uduliha asgaya, agehya-hno asano"

*OVS+OS by *OS-filter

*←II: *SO+SVO *by C-filter

*OS+SVO " , by *OS-filter

*SO+OVS "

*OS+OVS " , by *OS-filter

III→: SOV+SO "asgaya adela uduliha, agehya-hno asano"

*SOV+OS by *OS-filter

*OSV+SO by *OS-filter

*OSV+OS by *OS-filter

←III SO+SOV

*OS+SOV by *OS-filter

*SO+OSV by *OS-filter

*OS+OSV by *OS-filter

The predictions, based on independently needed filters and the application of C-filter, are almost exactly right. Pulte does claim the patterns SVO+SO, OVS+SO, SOV+SO (with no explanation for the proscribed patterns in types $\overrightarrow{II}$ or $\overrightarrow{III}$), but he claims that sentences like $\overleftarrow{III}$, "with the reduced conjunct to the left, are emphatically rejected by Cherokee speakers". (He does not cite an example).

(23) * SO+SOV

My analysis requires some modification of a required filter, to star $\overleftarrow{III}$. One possibility is to claim that, as for Basque, pattern (23) is permitted with a plural verb, and that Pulte did not elicit it because he had no reason to try such a plural verb. A second possibility is to modify the *OS filter (which Pulte should have used, but did not consider, to disallow Gapping remnants OS). If OS need not be a clause-internal string, then I could modify the OS filter to star OS unless O follows its verb. The same paradigm will obtain for simplex sentences as was given in (21); the only difference is that VOS is not doubly starred, but is only proscribed by the *Verb-initial filter. The new *OS filter will have a distinct effect on the patterns of (22), however, in that it will star everything it did before, as well as starring SO+SOV. The medial string in this pattern is OS, in which the object is not preceded by its verb. (The conjunction -<u>hno</u> is cliticized onto

the following word, so ... O+S ... may be analyzed as ... OS ..., and hence subject to the *OS-filter).

I assume that my *CS-filter, or some version like it, throws out the recalcitrant case in ↰III (SO+SOV). The *OS-filter, in some form, was needed to throw out 8 of 12 otherwise permitted Gapping patterns; extending it to a ninth does no damage to the simplex sentence paradigm, and neatly accounts for the unusual pattern as being due to an unusual OS filter. Further work could show whether it is the OS-filter, or a concordance filter briefly proposed above, which has the effect in Cherokee of starring *SO+SOV.

The final class, (6f), contains Scrambling languages which apparently do not invoke C-filter (therefore, all 6 Gapping types are expected). All attested languages in this class are type I languages; perhaps class (6f) can be restricted to only Scrambling type I languages.

The Guatemalan Mayan languages Tojolabal, Tzeltal, Tzotzil, Cakchiquel, and Ixil are cited by Furbee (1973, 1974) as allowing ↰↱, ↰II↱, and ↰III↱. This would follow at once if there were no C-filter in these Mayan languages. And, indeed, Furbee (1974:300) states that "Tojolabal has no coordinating conjunction equivalent to and : sok [as in (24)] translates as 'with/and', but is a nominal acting as a stative verb."[6]

(24a) Y-i?-a b'ak'et Hwan, čenek' Čep, šok
he-took meat John beans Joe, with/and
tek'ul Manwel.
fruit Manuel.

(b) B'ak'et Hwan, čenek' Čep, sok y-i?-a
meat John, beans Joe with/and he-took
tek'ul Manwel.
fruit Manuel.

Assume that Tojolabal introduces conjuncts without any coordinating conjunction (though perhaps sok may be internal to a conjunct), via the rule $X \longrightarrow (X)^*$, and assume that Tojolabal allows ID to operate freely, to derive Forward and Backward 'Gapping' sentences as in (24), above, and (25), below.

(25a) Y-i?-a b'ak'et Hwan, čenek' Čep, tek'el Manwel.
he-took meat John, beans Joe, fruit Manuel.

(b) B'ak'et Hwan, čenek' Čep, y-i?-a tek'ul Manwel.
meat John, beans Joe, he-took fruit Manuel.

A language without C should not invoke the C-filter, for the function of C-filter was to mark certain conjuncts with the C generated in place in the Base. Since Tojolabal apparently has no C constituent, such a filter would be contradictory. I will assume then, that while coordinating-PSR recursion and ID are universal rules, the C-filter is merely universally available, and employed only if a language uses C in

generating coordinate structures in the Base.

Tojolabal then, should Base generate I, and should give  by ID. Scrambling expands this to , , and . No filters apply, so all 6 Gapping types are output.

Rosenbaum (1977) discusses the Mayan cases briefly, with no attempt at explanation; his primary interest is in Zapotec as a counterexample to proposed analyses of Gapping. In my analysis, in Zapotec, as in Tojolabal, C-filter does not apply. This would appear to be an unpredictable fact, for Zapotec certainly has a coordinating conjunction, ne, which Rosenbaum translates as and. It may be that Zapotec's basic I pattern is important here, for languages wherein C-filter does not apply seem (from my limited data) to be restricted to type-I Scrambling languages. (Somewhat below, however, I will show that C-filter may be bled in Zapotec by a readjustment rule. Thus, although C-filter does not apply, it will, as predicted, exist in Zapotec). The analysis I will assume for Zapotec is that it is a VSO language (as Rosenbaum shows) which will therefore give as the output of ID; it freely Scrambles, to give , , and ; it is not subject to C-filter (hence all 6 types are expected), but it is subject to two independently needed filters for simplex clauses, which throw out some of the gapping patterns.

There must be a filter (following Scrambling) to disallow OS when commanded by a verb. OS is thus starred in a clause VOS or OSV, but permitted as a Gapping remnant (when the verb

has been deleted). With the added proviso that the subject and object must be in the same order in the two clauses after Scrambling, the output of Scrambling should be:

(26)

$\vec{I}$	VSO+SO	$\overleftarrow{I}$	SO+VSO
	*VOS+OS		*OS+VOS
$\vec{II}$	SVO+SO	$\overleftarrow{II}$	SO+SVO
	OVS+OS		OS+OVS
$\vec{III}$	SOV+SO	$\overleftarrow{III}$	SO+SOV
	*OSV+OS		*OS+OSV

Remarkably, (26) is incorrect, in that one additional pattern ($\overleftarrow{I}$) is thrown out: * SO+VSO. The only assumption I can offer is that a needed 'focus' filter will incorrectly apply to star SO+VSO. This focus filter is needed, it appears to me, to account for Rosenbaum's (pp.381-1) restriction on Scrambling of emphatic ([+focus]) constituents: focal scrambling is not permitted to give V$\acute{S}$O or VS$\acute{O}$ as output: "the unmarked order in Zapotec is VSO. By unmarked, I mean that order of main constituents that <u>requires</u> a normal intonation pattern and does not select out any constituent for focus, emphasis, etc.". But suppose that the grave accent, assigned by <u>ID</u>, is read by the focus filter as identical to Rosenbaum's feature [+focus], or emphasis. Then V$\grave{S}$O will be starred just like V$\acute{S}$O, or VS$\acute{O}$, wherein an emphatic (focused) subject or object is not preposed.

(27) * gudo xwa̋in biza

* gudo xwain biz̋a

gudo xwain biza
V S O
eats John beans

My claim, then, is that to explain the exceptional * SO+VSO, one may assume that the grave accent assigned by ID is identical, at the level of the filters, to the focal, emphatic stress permitted as a non-normal intonation. If this is so, one has an explanation for the other peculiarity of Zapotec -- the inability of C-filter to apply. For if grave accent is identical to focal, emphatic stress, the s̀ may well not trigger the application of C-filter. That is, assume that Zapotec rewrites s̀ as merely emphatic s̋, perhaps by a stress readjustment rule like that given late in Section 1.3.3 for English. If s̀ is rewritten as s̋, before C-filter applies, then C-filter will be bled; we can assume that Zapotec retains C-filter, but that, by the time of its application, grave s̀ has been rewritten as s̋. Then the exceptionality of Zapotec reduces to a readjustment rule, rewriting s̀ as s̋. With the focus and *OS filters, the correct patterns of (26) are generated.

The remaining language in Class (6f) is Quiche, which Furbee (1974) claims to "behave similarly to Tojolabal with respect to gapping," but which, according to Rosenbaum (citing Furbee (1973)[7]) is distinct from Tojolabal Mayan in that Quiche

does not allow the backward Gapping patterns $\overleftarrow{1}$ and $\overleftarrow{111}$ (thus Quiche would only allow $\overrightarrow{1}$, $\overleftrightarrow{11}$, and $\overrightarrow{111}$). I do not have enough data about the OS sequences permitted in Quiche, but I assume that at least some of Quiche's otherwise allowed Gapping types are thrown out on the basis of OS strings (just as Cakchiquel and Ixil, which also "behave similarly to Tojolabal with respect to gapping", must throw out certain patterns containing VOS or OSV). Whether such an approach will work or not is to be determined on the basis of much more data; it was shown, in the discussion of Cherokee, Japanese, and Basque, that slight modifications of standard filters can have surprising effects on otherwise orthodox Gapping patterns. I will assume that motivated filters of Quiche will also account for its Gapping patterns.

The conclusion of this section on Gapping and word-order is that the rules of Chapter 1 appear to be appropriate to an initial characterization of the permitted Gapping patterns. No single rule of Gapping (and no single rule of coordination) can describe all restrictions on coordination available to different languages. Rather, I have suggested a simple, bidirectional, optional rule of Identity Deletion, to apply iteratively to coordinate N" or S", and permitted to feed various filters (including C-filter), either universal or language-paticular. As an example, the Gapping rule of Japanese is identical to that of Hindi -- both are actually the unconstrained application of ID to delete a verb. But the output filters for

Japanese differ from those of Hindi, so Japanese disallows $\overrightarrow{III}$ SOV+SO.

The rule of ID, and the C-filter, remain quite simple, while Scrambling adds greatly to the number of patterns; various filters, of independently necessary types, will throw out certain of the Gapping patterns. The resulting paradigm cannot be ascribed to one single Gapping rule, or even to one component of the grammar, but is the effect of the whole of the grammar, as was analyzed in Chapter 1.

2.2. Auxiliaries and Verb Phrase

The topic of this section is the internal structure of the verb phrase, and, in particular, the position of the auxiliary verbs, like *can*, *have*, *be*, *do*. This topic is important to my analysis of Gapping and Verb Phrase Deletion; Sag (1976), for example, devotes his first 40 pages to a reanalysis of Akmajian & Wasow's (1975) study of auxiliaries. I cannot accept Sag's proposed solution for a number of reasons, the most important being that he takes V" as recursive (V" → Aux V"); this is impossible in my framework, which assumes that the only recursive categories are the cyclic N" and S", and that the only directly recursive PSR is PSR (2) of p. 15, above.

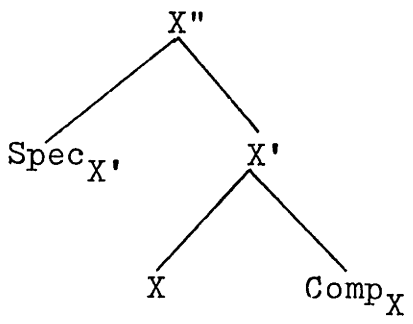
In my analysis, I attempt to avoid transformational rules of Affix Hop, *do*-Support (or *do*-Drop), and *have*/*be*-Raising, by using subcategorization and filters, within the framework of Chomsky & Lasnik's grammar, to describe the auxiliary data. In the following pages, I shall give the generalized structure of an X" category, and then apply this structure to verb phrases, auxiliaries, and modals. I next restrict the permitted orders of auxiliaries, based on suggestions by Emonds, McCawley, Ross, and Schachter, and finally I present the transformations of Subject-Aux Inversion and Neg-Incorporation. I defer examination of Verb-Phrase Deletion until Section 3.3, in a discussion of Sag's (1976) analysis of this rule.

The structure of an X" category (as assumed in Section 1.1.1), is that in Chomsky's (1970) "Remarks on Nominalization." The highest-level category (the major phrasal category) is X". Chomsky's formulation of the X-bar convention rewrites X" by PSR (28a), and rewrites X' by PSR (28b). The lexical category X (ranging over N, V, A, etc.) is the 'head' of X". The subtree generated is as in (28c).

(28a) $X'' \longrightarrow Spec_{X'}, \quad X'$

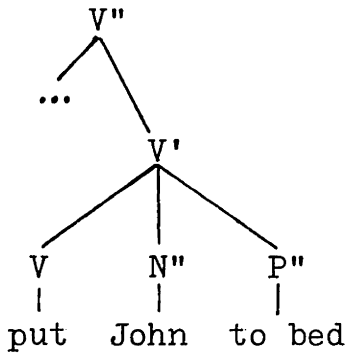
(28b) $X' \longrightarrow X \quad Comp_X$

(28c)

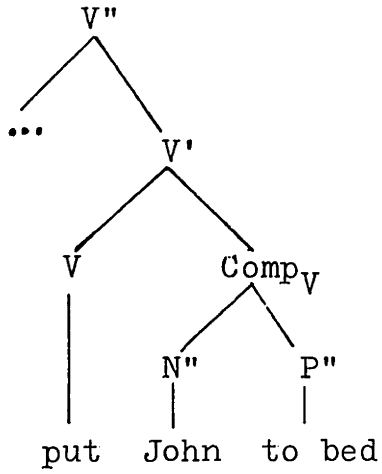


Chomsky does not view $Comp_X$ as a category, because no transformation refers to $Comp_X$. Rather, $Comp_X$ is a cover symbol for the string of complements which follow X, as daughters to X'. For example, N" and P" are complements of the verb put; the pertinent structure is (29), and not *(30). Note that while a transformation might front V', or prepose N" or P", no transformation may refer to N" P" as a single constituent.

(29)



*(30)



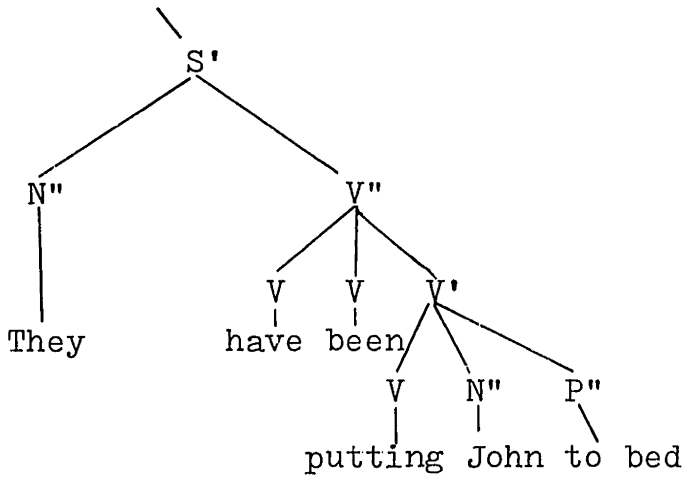
A final point, before turning to $Spec_{X'}$, is that the complements of X may well be restricted to X" categories -- perhaps N", P", A", S". Furthermore, it should be remembered that the insertion of lexical items into a pre-terminal Phrase Marker is by the Lexical Insertion rule, which substitutes lexical entries for the Complex Symbols (CS's) under lexical nodes (X), when the strict subcategorization and selectional restrictions of the lexical entry are met. This matter will become crucial somewhat further on.

$Spec_{X'}$ is taken by Chomsky as a category; $Spec_{V'}$ is the traditional Aux node; $Spec_{N'}$ is Determiner; etc. Jackendoff (1977:37) suggests, however, that $Spec_{X'}$ is comparable to $Comp_X$ in being merely a cover symbol for a string of specifiers, and in not being a category. To Jackendoff's knowledge -- and to mine -- "there is ... no evidence that complements or specifiers function as constituents -- they do not move or delete as units, and unlike normal constituents, no part can

be designated as a head." I assume, with Jackendoff, that there is no Aux node (i.e., no $Spec_{V'}$) dominating the auxiliary verbs. The auxiliary verbs $[\underline{have}]_V$ and $[\underline{been}]_V$, in <u>They have been eating rice</u>, are each sisters of V'=<u>eating rice</u>. $[\underline{Have}]_V$ and $[\underline{been}]_V$ may each be called "specifiers" of V', but they are not together the yield of a putative $Spec_{V'}$ node. Rather, $[\underline{have}]_V$ and $[\underline{been}]_V$ are daughters of V", sisters of V'.

The structure I am assuming is that of (31); I use <u>put John to bed</u> as the V", to show the parallelism between the complements of V and the specifiers of V'. (See Section 1.1.1 for S' as the symbol for clause; S' is right-sister to COMPlementizer, under S"). S' (clause) also may have an optional medial daughter, M", which will be discussed somewhat below.

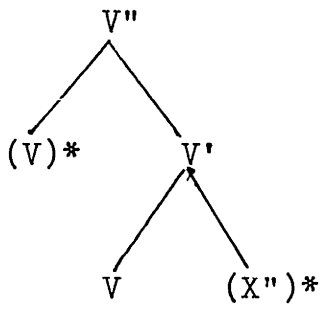
(31)



In (31), the specifiers of V' are classified simply as verbs, and not as auxiliaries. Since the auxiliaries are optional, and the complements are not always needed (e.g., for true intransitives), I suggest that the general form of V"

should be as given in (32).

(32)



Here it is clearly stated that the head of V" (i.e., the Verb under V') is obligatory, but that the specifiers (auxiliary verbs) and complements (here written as X") are optional and infinitely iterative. The fact that English allows only <u>have been</u>, and not <u>have had been</u> as auxiliaries in V" is not part of the generalized PSR's; nor is the fact that <u>put</u> requires two complements, N" and P", while a true intransitive has no complements. The PSR's are rather free; the pertinent restrictions are determined by the lexical entries of the verbs themselves. I shall now examine these restrictions.

The first step is to position the modal auxiliaries. I shall accept Jackendoff's claim (1972:100-107; 1977:47-50) that modals are the yield of a medial modal phrasal category. In my terms, this is M". I assume that M" is an optional daughter to S'; that the Specifier to M' may include speaker-oriented and subject-oriented adverbs (see Jackendoff for discussion), and that the Complement to M is null. Auxiliary verbs may be inserted under M, but only if they are marked

[+modal] in the lexicon. Can, may, shall, will, must are [+mod]; have, be, do, leave, etc. are [-mod].

Taking the modals as generated outside of V" permits Jackendoff a unitary rule of semantic interpretation for the speaker-oriented abverbs (probably, possibly, etc.) -- which are crucially dominated by clause (S'), but not by Verb Phrase, in Jackendoff's analysis -- as well as for the interpetation of modals: John can go may be interpreted as POSSIBLE (John go). Furthermore, in an analysis where Gapping remnants must be X", taking may as the yield of M", and outside of V", allows the derivation of (33a) as well as (34). In (33) (Fiengo's 1974: 118:(20)), may is deletable, because it leaves a complete $\grave{V}$", but may have is not deletable, because it leaves an incomplete V", which is not analyzable into ($\grave{X}$")*.

(33a) Jones may have been crying, and
Smith ___ have been trying to stop him.

(b) *John may have been crying, and
Smith _____ been trying to stop him.

For me, (33a) is not totally acceptable, perhaps because the string of identical auxiliaries must receive contrastive stress. I prefer (34), which is exactly as good as (35) for me; the conclusion I draw from (33)-(35) is that modals may be generated outside of V".

(34) On Tuesdays we could wash dishes, and
on Wednesdays, ___ ___[play poker]$_{V''}$.

(35) On Tuesdays we wash dishes, and
on Wednesdays ___[play poker]$_{V''}$.

And finally, the evidence that M is the yield of a phrasal category M", includes Gapped sentences like (36), where won't is a possible remnant -- and, therefore, an X".

(36) On Tuesdays we will wash dishes, but
on Wednesdays __ won't _____.

Further discussion of Gapping and V" is continued in Section 3.3.

If modals are inserted under M (i.e., the [+mod] lexical category), then we can prevent the insertion of non-modals by simply specifying them as [-modal]. In my analysis, modals are [+verb, +modal]; they inflect (in part) as other verbs do, retaining a Present/Past morphological distinction, but having lost (except in archaic usage) the special marking for the second person singular. Modals are like other auxiliary verbs in being subject to Subject-Aux Inversion (in questions and other affective environments) and Neg-Incorporation (cliticization of not, or n't, onto the auxiliary verb). I will now attempt to characterize the auxiliaries.

The auxiliary verbs are those verbs (categories which can be inflected for tense, person, and number) to which the rules SAI and NI can apply. In a root sentence with an affective 'trigger', SAI fronts the first auxiliary verb over the subject N". Similarly, Neg-Incorporation cliticizes not onto the first auxiliary verb. The auxiliaries are the modals (can, will, shall, may, must), do, and have, be. The non-auxiliaries include eat, read, leave.

(37) Can John eat?
John can't eat.

(38) Does John eat?
John doesn't eat.

(39) Has John eaten?
John hasn't eaten.

(40) Is John eating?
John isn't eating.

(41) *Eats John?
*John eatsn't

(42) *Reads John?
*John readsn't

(43) *Leaves John?
*John leavesn't.

Each of the auxiliary verbs in (38)-(40), either must or may be specified in the lexicon as bearing a positive strict subcategorization restriction [+__V]; each of the non-auxiliaries ((41)-(43)) is marked, by the redundancy convention of Chomsky (1965:165), as [-__V]. It is for this reason that eat, read,

and leave cannot be inserted, in the Base, as specifiers to V'. In such a position, they would have to precede the Verb which is the obligatory head of V", and in so doing would violate their strict subcategorization. Therefore we do not generate (44).

(44) *John eats leave.
*John reads eat.
*John leaves leave.

I have tried to show that it is not necessary to mark the specifiers of V" as [+auxiliary], in the Phrase Structure Rules; leaving them as merely [+verb] is sufficient, because the non-auxiliaries are prevented from being mis-inserted by the strict subcategorization rules (The strictly local nature of these rules would have prevented a similar argument if there existed a $Spec_V$, node dominating all the specifiers. I have assumed, with Jackendoff, that there is no such node. See Chomsky (1965:99-100,216)). If possible, it would be a valuable move to avoid ever referring to the putative feature [±aux]. Let us consider [+__V] as the feature distinguishing auxiliaries from non-auxiliaries, and as being the syntactic feature, in the Complex Symbol for a verbal category, which triggers SAI and NI.

One problem with such an approach is that be, and British have, are auxiliaries even when not in the environment /__V.

That is, copular be and (British) possessive have are both subject to SAI and NI.

(45a) Is John here?

(b) John isn't here.

(46a) Is John a fool?

(b) John isn't a fool.

(47a) Has John a quid?

(b) John hasn't a quid.

The various uses of be (progressive and copular (and passive)) are phonologically identical and syntactically differentiated only in that copular be takes X" complements (adjectival phrase, noun phrase, locative prepositional phrase), while progressive be is followed by a verb in the agreeing, progressive form (V+ing). To the extent to which it is not accidental that be is the verb used to form the progressive, the two uses of be should share semantic features, also. I suggest that be has a bifurcated lexical entry,[8] in which the two be's share all phonological and most syntactic entries, but differ in certain subcategorization features. Progressive and copular be are both auxiliaries, in that they are subject to SAI and NI, and are hence marked [+__V]; copular be is also [+__X"], where X" can be a predicate noun phrase, adjective phrase, or locative prepositional phrase. The interpretation of be as a copula is dependent upon this argument position

being filled by X". Copular be is marked [+__V] to allow an economical statement of the unitary syntactic properties of be, but the argument following copula be must be X", to allow copular interpretation. Similarly, progressive be has restrictions not shared by copula be: progressive be includes, in its particular fork of the lexical entry for be, a selectional restriction requiring that any verb immediately following be must be in the progressive grade (e.g., eating, singing, coming), as opposed to the perfect grade (eaten, sung, come) or the base grade (eat/eats/ate, sing/sings/sang, come/comes/came). Selectional restrictions are assumed (Chomsky (1965:165)) to be negatively specified in the lexicon. Progressive be will include the entry [-___[+verb, -progressive]] , which requires, by the conventions in Aspects, that the verb following be will be in progressive form. This proposed application of selectional restrictions is in keeping with Chomsky's (1965:92) illustrative examples of seletional rules applying "somewhat in the manner of ordinary rules of agreement in many languages." The selectional restriction [-___[+verb, -prog]] forces agreement between be and the following verb -- so the interpretation of be as progressive depends on the following verb being in the agreeing, progressive grade.

The lexical entry for have is similar to that of be; in British English, the auxiliary feature [+__V] is common to perfective and possessive have; in American English, the two haves share some features, but do not share [+__V]. Thus, in American English, possessive have is not an auxiliary verb,

while it is an auxiliary in British. The selectional restriction on perfective have, in either dialect, is $[\text{-}\_\_[^{+\text{verb}}_{-\text{perfect}}]]$.

I have assumed that there are three grades of the verb -- progressive, perfect, and base. The base is the unmarked grade; unless some non-base form is required by a selectional rule (like those listed above for be and have), I assume that the unmarked grade must be used. Modals and do don't select a marked grade; hence the verb following these auxiliaries will be in the base form. Similarly, a clause's first verb (whether auxiliary or not) will not be in the marked perfective or progressive grades. The first verb of a sentence, in the base grade, must bear inflection -- unless the sentence is infinitival or gerundive (with for or Poss in the Complementizer). Inflection, in my analysis, is freely assigned in the Base (except in infinitives or gerunds) to the sentence's first [+verb]; the assignment of inflection does not, of course, change the grade of the verb, from [-perfect] to [+perfect], or [-prog] to [+prog]. The base form of the verb includes, therefore, all non-participial forms -- sing/sings/sang.

The various restrictions I have suggested, to this point, on the ordering of verbs, are that (i), non-modals may not be inserted under M, because they bear [-mod]; (ii), non-auxiliaries may not be inserted, in V", except as the head verb under V', because they bear (by redundancy) the subcategorization feature [-__V]; (iii), aspectual have and be must be followed by the perfect and progressive grades of the verb, because of their selectional restrictions; (iv), participles are only

allowed when selected for by the aspectual verbs, because participles, as marked grades, are disallowed unless required; and (v), the first verb (and only the first verb) of a finite clause is inflected for person, number, and tense. The Phrase Structure Rules for V" and V' have been simplified, in that the specifiers of V', and the head V, are merely written as [+verb], and not as [+aux] or [-aux]. Auxiliaries are not restricted to $Spec_{V'}$; rather, an auxiliary is any verb permitting [+__V], and may be an aspectual (have, be), copular be, possessive have, semantically empty do, or even a modal. In the last case, the subcategorization feature [+__V] must be paired, by 'lexical redundancy', with the feature [+__] to allow a modal to be alone under M'. For note that the strictly local nature of the strict subcategorization features disallows a search outside of M', to look for the verb required by a modal's [+__V]. Hence, if modals are to be characterized, with other auxiliaries, as [+__V], then they must also bear the feature [+__], to allow $[\underline{\text{John}}]_{N''}$-$[\underline{\text{can}}]_{M''}$-$[\underline{\text{go}}]_{V''}$. The relevant mechanism would seem to be a lexical redundancy rule: "[+__V] → [+__]".[9] This rule would further entail that any auxiliary can be final in its verb phrase, and precisely such are the facts commonly ascribed to 'Verb Phrase Deletion", which is said to apply to delete a string, leaving some auxiliary in V"-final position. My analysis (which agrees in several respects with that of Schachter (1978)), views the rule of VPD as an artefact, and generates such sentences in the Base, using the [+__] feature of the auxiliary verbs (i.e., those verbs

whose lexical entries also bear [+__V]). This matter receives further attention below and in Section 3.3, under discussion of Sag's analysis.

A further set of restrictions on the ordering of the aspectual auxiliaries (perfective *have* and progressive *be*) combines restrictions suggested by Emonds (1976:209-211), McCawley (1971), and Ross (1972). Perfective *have* may be followed by progressive *be* (as in *have been eating*), but the orders perfective + perfective (*have had eaten*) or progressive + perfective (*be having eaten*) or progressive + progressive (*be being eating*) are ungrammatical.

Emonds (1976) observes that verbs of temporal aspect "take clause complements that (i) may not have expressed subjects ... and (ii) never begin with the perfective auxiliary *have*." He cites the sentences of (48) as ungrammatical.

(48) *John { began / continued / stopped } { having / to have } { said something important. / eaten dinner. / been examined. }

Emonds classifies the aspectuals perfective *have* and progressive *be* with the verbs of temporal aspects, thereby predicting that the sequences perfective + perfective (*have had eaten*) and progressive + perfective (*be having eaten*) are just as bad as (48). See (49)-(50) below.

(49) *John will have { had eaten dinner. / had overeaten. / had written a letter. }

(50) *John was { having said something important. / having eaten dinner. / having been examined. }

Is Emond's prediction correct? Some speakers find (48) marginally better, and more interpretable, than (49)-(50). For me, this is not so, but I do agree with Emonds that (51) provides an apparent counterexample to his claim, for it is always better than (52a) or (b).

(51) ?John will begin to have finished his work before it is time to leave.

(52a) *John will have had finished his work before it is time to leave.

(b) *John had had been examined before everyone else arrived.

Emonds claims that (51) is ungrammatical, though interpretable, and he marks it as 'slightly unacceptable'. (52a) and (b), however, have an apparently less complex temporal verb than does (51), and "no interpretation can be imposed ... to reduce

their unacceptability." Emonds' point, as I take it, is that aspectual _have_ and _be_ are, in their specified semantic features, simpler than is _begin_: "if we take ... [the former] morphemes ... and consider the set of features that would be necessary to uniquely specify their intrinsic lexical semantic context and their deep structure distribution, I claim these features would all play a role in the transformational component, independent of any insertion rules."[10] Whether this strong claim is true or not, it does seem to me appropriate to distinguish the aspectuals _have_ and _be_ as simpler than _start_ or _finish_, and to require the more complex temporals when an interpretation of temporal + _have_ is required. That is, while some sort of interpretation may be given to (53), no interpretation exists for (54).

(53) ?John started having finished.
?John finished having started.

(54a) *John was having finished.
(b) *John has had finished.

I would say that the sequence temporal + _have_ is semigrammatical, and has reduced acceptability when no interpretation can be assigned to it. Whether this reduced acceptability should be correlated directly with reduced grammaticality is a moot point, but I assume not. However, there is yet a third factor reducing the acceptability (and, in this case, the grammaticality), of (49), (52b), and (54b). Emonds claims that if a

sequence X-Y is semi-grammatical, "the unacceptability of the combination will be greater if .. the combined morphemes are identical". He cites the one one as worse than the two ones; starting starting as worse than beginning starting; and for for as a worse COMP-COMP sequence than for that. I think Emonds is correct; I read these examples of X-X as if they were reduplication, rather than attempting to give them an interpretation, as I would do with the semi-grammatical X-Y sequences. If X-X is worse than semi-grammatical X-Y, then the sequence perfect + perfect should be worse than otherwise predicted. For three reasons, then, perfect + perfect has reduced acceptability. I assume that the simultaneous application of the three constraints throws out perfect + perfect as definitely ungrammatical. (For an analogy, see Kuno (1976) on Gapping).

Two constraints have been given, also, to explain the reduced acceptability of progressive + perfect -- the sequence is one of temporal verb + perfective have (giving semi-grammaticality), and the acceptability is reduced because of the non-complex nature of the temporal verb (i.e., no interpretation can be given, as is given to start having finished). McCawley (1971) has suggested a further constraint, which, in conjunction with the factors cited above, may well suffice to star progressive + perfective. It is well known that stative verbs are less than acceptable in imperatives and progressive forms (as well as in do-something and do-so constructions, and in persuade-complements, remind-complements, etc.). Compare

stative know with non-stative slice. (Data from Lakoff 1966, cited in Lakoff & Peters 1966, with their judgments).

(55) *Know the answer!
Slice the salami!

(56) *I am knowing the answer.
I am slicing the salami.

(57) *What I did was know the answer.
What I did was slice the salami.

(58) *I knew the answer, and George did so, too.
I sliced the salami, and George did so, too.

(59) *I persuaded John to know the answer.
I persuaded John to slice the salami.

(Akmajian, Steele, & Wasow (1979:19) observe that the prohibition of statives from the progressive environment may not be as clear-cut as implied above. They cite the stative contain in Our samples are containing more protein every day, and claim acceptability for this sentence. Presumably they would also accept John is knowing more answers every day as acceptable. For me these are, to some degree, unacceptable; I shall assume they have semi-grammatical status, with interpretation permitted in some contexts.) Consider now the perfective have in the progressive environment. McCawley claims that perfec-

tive have is a stative verb (*Have left!; What I did was have left; etc.); thus (60) -- progressive + perfective -- should be as ungrammatical as (61) -- progressive + stative.

(60) *John is having slept long.

(61) ??Our samples are containing more protein every day.

In fact, (60) is always starred, while (61) is somewhat better. But there are, in fact, three constraints reducing the acceptability of (60) -- (i), the sequence temporal verb + perfective have (cf. (48)); (ii), the sequence progressive be + stative have (cf. (56)); and (iii), the impossibility of finding sufficient semantic complexity in the aspectual verbs to force a reasonable semantic interpretation (cf. (53)-(54)). No one of these factors is sufficient, but the three together are sufficient to mark (60) ungrammatical and uninterpretable.

I would like to suggest, as an addendum to McCawley's analysis of perfective have as a stative, that progressive be is also stative. It is true that imperatives, like be studying, are rather good in certain contxts; but a correct analysis of statives should mark imperative statives merely as semi-grammatical, unless other factors intervene to make them worse. For me, ??Be studying the answer! is as bad, in isolation, as the true stative ??Know the answer! Both are more acceptable in the contexts of (62) and (63).

(62) Be studying the answer when I return!

(63) Know the answer when I return!

The possibility of progressive imperatives, as in (62), should not prevent the assertion that both aspectual _have_ and aspectual _be_ are statives, and are as bad in the test sentences as in _know the answer_. Compare (64) to (55)-(59), above.

(64) ??Be studying!
*I am being leaving.
*What I did was be leaving.
*I was leaving, and George did so, too.
??I persuaded George to be leaving.

I conclude that progressive _be_ is stative, and since statives are somewhat or completely unacceptable in the progressive environment, we should mark as '??' any progressive + progressive (??_I am being leaving_).

Yet such strings are _completely_ unacceptable, and are not improved by a context like _more every day_. Is there an independent constraint blocking progressive + progressive (as there was with perfect + perfect and progressive + perfect)? One possibility is semantic simplicity versus complexity, but I shall ignore this. I invoke Ross's (1972) Double-_ing_ Constraint, in the form given by Emonds (1976), whereby a surface filter reduces the acceptability of any sequence $[V+ing]_V$ $[V+ing]_V$,

where no N" boundary intervenes (v. Emonds (1973)), and where the node immediately dominating one of the V's also dominates the other (Emonds (1976:243)). (These restrictions prevent the application of the Double-ing Constraint to nominals, across relative clauses, or in reduced coordinate S"'s). An example of the Double-ing Constraint is given in (65) -- (v. Ross (1972)) -- where the only interpretation allowed for stopping is as a transitive verb taking a N" object; the interpretation of stopping as a verb of temporal aspect is blocked because drinking would then be $[\text{drink+ing}]_V$, with no N" boundary separating stopping and drinking.

(65a) The police were stopping drinking on campus.

Compare the unambiguous (65a) with the ambiguous (65b); here, drinking may be a N" object, or a progressive verb in the complement of the temporal aspectual stopped (meaning that the police's drinking stopped).

65b) The police stopped drinking on campus.

The strings $[\text{V+ing}]_V [\text{V+ing}]_V$ which are starred by the output condition (Double-ing Constraint) cannot be characterized in Deep Structure as violating subcategorization restrictions, for various reasons. Ross (1972) shows that a variety of transformations which move one or the other $[\text{V+ing}]_V$ block

the application of the Double-ing Constraint. Furthermore, insertion (by Transformational movement rules, or perhaps Scrambling) of particles, adverbs, or other constituents into a position between the two verbs also blocks the constraint. Finally, Ross claims that there are three (or more) sources of [V+ing] [V+ing] -- (i), when a temporal aspectual (including be) in the gerund or progressive form takes a complement starting with a progressive verb (*trying starting *being starting); (ii), in an exclamation (like Him liking potatoes!), where the sequence $[V+ing]_V[V+ing]_V$ is blocked (*Him continuing/ /being liking potatoes!); and (iii), in certain reduced relative clauses (*The people being telling the story are tired; *John, being studying French, would be the person to ask). I agree with Emonds (1973,1976) that there is sufficient evidence to take *Double-ing as an output filter (but not to follow Ross in viewing it as a global constraint. Such a position is effectively argued against in Emonds (1973)).

The Double-ing constraint was proposed to account for bad sequences of verbs in the progressive (V+ing). In my notation, such verbs are $\begin{bmatrix}+\text{verb}\\+\text{prog}\end{bmatrix}$, and the restriction would be

(66) $* \begin{bmatrix}+\text{verb}\\+\text{prog}\end{bmatrix} \quad \begin{bmatrix}+\text{verb}\\+\text{prog}\end{bmatrix}$

unless: some N" boundary separates verb_1 and verb_2 or neither verb is in construction with the other.

(See p.157 and Emonds (1976:243) for this characterization of output filters as local transformations, requiring 'in construction with'). Now perhaps this filter can be generalized, to disallow any sequence of two verbs in the same grade -- i.e., to disallow two consecutive verbs in the perfect grade, or two in the base (non-perfective, non-progressive) grade. I believe that this is so. Consider the already unacceptable (67) -- which violates Temporal + have, the X-X Constraint, and lacks interpretability. (67) also has a sequence of two verbs in the perfect grade -- had and eaten.

(67) *John has had eaten.

This may then be a fourth reason to throw out (67), independent of the constraints already adduced.

The proposed generalization of the Double-ing constraint -- which will now be termed the α-grade[2] Constraint -- must not apply to star the perfective grade of be (been) when followed by a passive verb (eaten), as in has been eaten. One may perhaps try to distinguish been from eaten by claiming that the former is in the perfect grade, while the latter is a verb in a putative passive grade; an alternative, since the 'passive grade' and perfect grade would then always 'accidentally' have identical forms, would be to develop the claim,[11] that the passive consists of be followed by an adjective. By the Lexicalist hypothesis (Chomsky 1970), the adjective eaten could select and subcategorize its arguments just as the verb eat; in

particular, the Deep Structure object of eaten may be subject to Passivization (by Move N"), just as is the DS object of the noun destruction (The Huns' destruction (of) the city The city's destruction by the Huns). If this proposal is tenable, then (68) is preferable to (67) because it violates no constraints; in particular, it passes the α-grade^2 Constraint because it contains a sequence V-A, not V-V.

(68) John has been eaten.

The proposal would then be that be in passives is the copular be, followed by an X" complement, which is A". (The complements N", A", and P" are available for copular be). I shall not rely further on this proposal, being unable, in this work, to give sufficient support to the copular analysis of (68). Assume, as the alternative, that eaten is in the passive grade.

Having considered Double-ing and Double-en, we now turn to the sequence of two verbs in the non-participial grade -- i.e., the base grade. I have assumed that there are three grades of the verb -- the marked perfect and progressive, and the unmarked base grade. The unmarked grade is employed where no selectional restriction required a marked grade. I have taken Inflection as free assignment of tense, person, and number to the first [+verb] of a sentence; marking for inflection does not, of course, change the grade from base to participial; hence, the base grade includes sing, sings, sang. Consider

now what sequences of base grade + base grade may result. Since the auxiliaries *have* and *be* require that a non-base grade follow them (in their aspectual uses), we restrict our attention to the auxiliaries modal and *do*. The modals, however, will always have a possible position under M' which is not in construction with any following verb in V". Emonds has restricted the starred sequences $[\text{V-ing}]_V\ [\text{V-ing}]_V$ to cases where some node immediately dominates one verb, and dominates the other verb.[12] The node M' immediately dominates the modal verb; M' does not dominate any node in V". Such a M+V should always be allowed, even though both M and V are both in their base grades. This is, of course, correct.

(69) John $\left\{\begin{matrix}\text{may}\\ \text{can}\\ \text{will}\end{matrix}\right\}$ go.

But now consider the [-modal] *do*. *Do* is followed by a base grade of the verb. *Do* can not be inserted inside of M", because it is [-mod]. It must be inserted in V", as specifier to V', but then the α-grade^2 constraint will star any sequence *do*-V, because both *do* and V are in the base grade, and some node (V") immediately dominates $[\underline{\text{do}}]_V$, and dominates the following verb. Therefore all of the following strings are thrown out (with unstressed *do*. See below).

(70a) *John [does have left]$_{V"}$

(b) *John [does be leaving]$_{V"}$

(c) *John [does be here]$_{V"}$

(d) *John [does leave]$_{V"}$

(e) *John [does read]$_{V"}$

(f) *John [does eat]$_{V"}$

All of the sentences of (70) include the string $\begin{bmatrix}+\text{verb}\\-\text{perf}\\-\text{prog}\end{bmatrix}\begin{bmatrix}+\text{verb}\\-\text{perf}\\-\text{prog}\end{bmatrix}$, where no N" boundary intervenes, and where some node (V") immediately dominates [do]$_V$, and also dominates the the following verb.

It should be observed that the * α-grade[2] constraint was adduced, above, to add to the unacceptability of *being drinking. There were independent explanations, however, which conspired to reduce the acceptability of such sequences. Such has been the nature of all the constraints of the preceding pages -- two or more constraints conspire to make mis-orderings of the auxiliaries ungrammatical, and the fact that the aspectual auxiliaries are less complex semantically than, say, begin, implies that whereas (71) is interpretable to a degree, still, "no interpretation can be imposed on [(72a-b)] ...to reduce their unacceptability" (Emonds (1976:210)).

(71) ?John will begin to have finished his work before it is time to leave.

(72a) *John will have had finished his work
before it is time to leave.

(b) *John had had been examined
before anyone else arrived.

For some speakers, and for some verbs, the Double-ing Constraint does not give full unacceptability -- an interpretation can be assigned to (73), and its status may be termed semi-grammatical.

(73) ?John was beginning trying to go.

I would argue, on analogy with Emonds (1976:210), that the sentences of (70), above, are worse than the *α-grade[2] violation of (73), because do is semantically empty, so that "no interpretation can be imposed on [(70a-f)] ...to reduce their unacceptability."

Among Ross's arguments that the Double-ing Constraint applies (at least) as an output filter are analyses of the transformational insertion of particles, adverbs, etc., to a position between the two verbs. Any such interposition blocks the Double-ing Constraint, allowing $[V+ing]_V$ X $[V+ing]_V$ as a well-formed output. Consider now the application of Subject-Aux Inversion, or Neg-Incorporation, to the sentences of (70). Between the two base forms of the verb there is now either a subject N" or a negative adverb not. The examples (70d)-(70f)

behave as predicted -- their analogs in (74) are well-formed.

(74) Does John leave?
John doesn't leave.

Does John read?
John doesn't read.

Does John eat?
John doesn't eat.

The same paradigm holds when emphasis is added to do. It has been argued, since Chomsky (1955), that emphasis on an auxiliary[13] acts like a particle Pos (comparable to Neg) to separate it syntactically from the following constituent. In Chomsky's analysis, emphasis (or Pos) on Tns triggers do-Support, because Tns is separated from the following verb. Hence the examples of (74) should be paralleled by the emphatic sentences of (75).

(75) John dŏes leave.
John dŏes read.
John dŏes eat.

While, however, it is true that the transformations of SAI, Neg-Incorporation, and Pos-Incorporation (Emphasis) do separate V_1 from V_2, and block the α-grade[2] constraint for (74)-(75), it is a basic fact that these transformations do not improve (70a)-(70c). In (76), the relevant cases are cited.

(76) *Does John have left?
*John doesn't have left.
*John d$\ddot{o}$es have left.

*Does John be leaving?
*John doesn't be leaving.
*John d$\ddot{o}$es be leaving.

*Does John be here?
*John doesn't be here.
*John d$\ddot{o}$es be here.

I have two, separate, proposals for (76). The first is that do selects a following non-auxiliary verb (i.e., do is [- __[+aux]] , or, in my terms, [- __[+__V]]) in its lexical entry. Then the possible specifiers of V' (do and aspectual have, be) each have a particular negative selectional restriction: do is [- __[+__V]] ; perfective have is [- __$\begin{bmatrix}+\text{verb}\\-\text{perf}\end{bmatrix}$]; and progressive be is [- __$\begin{bmatrix}+\text{verb}\\-\text{prog}\end{bmatrix}$]. The prohibition disallowing do have or do be would thus be specified in the base, and would not be amenable to any improvement via transformations. The cost of this is apparently the addition of a single selectional restriction feature to the lexical entry for do, but there is a problem, in that the previous function of the selectional restrictions seems to have been to capture a generalized notion of agreement -- e.g., between a verb and its animate subject, or abstract object. These are agreement relations that in some languages are realized by concordance features. The proposed selectional restrictions on have and be fit within

this framework -- the aspectuals require that the grade of the following verb "agree" with the aspectual, in the sense that perfective _have_ takes a following perfective grade verb, while progressive _be_ takes a verb in the progressive. The selectional restriction proposed for _do_, however, is of a different type, being in effect a 'disgreement' restriction -- i.e., the auxiliary _do_ requires a following non-auxiliary. While such a selectional feature doesn't violate the permitted formalization, I believe it does violate the spirit of the restrictions. In any case, marking _do_ as [-__[+__V]] provides no explanation for _do_'s position, while the constraints presented above sought to explain the ordering of the auxiliaries by the simultaneous application of independently required restrictions.

I propose, as an alternative (tentative) solution, that the α-grade[2] output filter may distinguish between _doesn't leave_ ((74)) and *_doesn't be_, etc. ((76)). There are two rules (SAI and Neg-Incorporation) which differentiate _do_ X _leave_ from *_do_ X _be_. _Do_ is effectively separated from a following non-auxiliary ([-aux], or, better, [- __V]) by movement over subject N" or cliticization of _not_; but _do_ is not so separated from a following auxiliary (a verb marked [+aux], or, better, [+__V]). It is intriguing, to me, that both of the rules of SAI and NI crucially refer to the feature [+__V], ([+aux]), in their structural description, for SAI only inverts the first _auxiliary_ verb, and NI only incorporates Neg (or, I assume, Pos) onto the first _auxiliary_ verb. If the empty node, which SAI leaves after movement of the first auxiliary, is marked

only [+__V] (or [+aux]) and not [+V], etc., then there will result a sequence [+__V][+__V] (or [+aux][+aux]), where both categories will be in the same grade (neither bears [+perf] or [+prog]). Similarly, if NI builds any structure when cliticizing not onto the first [+__V], ([+aux]), it is reasonable to assume that this structure is only labeled [+__V] ([+aux]), since [+__V], and not [+V], is the only feature mentioned in the SD of Neg-Incorporation. Then doesn't or does will be the yield of a node labeled [+__V] ([+aux]), and not of [+V] -- i.e., the new category is an auxiliary, but not a verb. If the Double-ing Constraint can be extended to disallow consecutive α-grade auxiliaries, then doesn't be will be thrown out, because doesn't and be are both [+__V]. But doesn't leave would be [+__V][+V] -- i.e. an auxiliary non-verbal followed by a non-auxiliary verbal, so doesn't leave will pass. The proposed generalization of Double-ing is that two auxiliaries or two verbs, in the same grade, are starred, unless there is an intervening N" boundary, or unless they are not local (in the sense that some node X immediately dominates one, and dominates the other). So, structure-building transformations (or movement transformations) might only add (or leave) the features explicitly mentioned in the Structural Description of the transformation (e.g., Move NP leaves only an empty NP node, with no lower structure. This has often been assumed). If this proposal is workable, it provides an explanation of *doesn't be, *Does John be?, while allowing doesn't leave and Does John leave?. SAI and NI refer only to [+__V] (or [+aux]); hence,

the structure left, or built, by SAI and NI should only be labeled [+__V] (or [+aux]) -- and not [+V]. The Double-*ing* constraint will then differentiate *Does John leave* and *John doesn't leave* from **Does John be* and **John doesn't be*. If this explanatory proposal should prove unworkable, I retreat to the more conservative, and purely descriptive, selectional restriction: *do* = [- __ [+__V]], or *do* = [-__ [+aux]], to be operable in the Base.

If some version of the generalized Double-*ing* Constraint is accepted, I have provided an ordering for the modals, *do*, *have*, and *be*. One minor point remains, under the topic of the head verb of V". Since this position is not *negatively* specified for auxiliaries or modals, we expect *be*, *have*, *do*, and *can* to surface as main verbs. Following Schachter's (1978) and Fiengo's (1974) suggestions, I will assume that this is so. Not only can copular *be* and British possessive *have* be the head verbs of V", but the sentences used to exemplify VPD are, in my analysis, merely examples of an auxiliary as the head of V". There is an additional restriction, however -- modals, and in American English auxiliary *do*, can only be the head verb in V" when there is no preceding auxiliary as the specifier of V'. This can be captured merely be noting that the lexical entries for the modals and auxiliary *do* are defective, having no entries for perfective and progressive grades. Thus modals and *do* cannot be preceded by *have* or *be*. In fact (as McCawley (1971) points out), modals can only be phonologically realized in their inflected forms -- i.e., in the position of the first

verb of a finite clause. Thus any string [+verb]-[+mod] will be disallowed, because the modal, in a position as the second verb, cannot receive inflection. Thus the insertion of a modal can be free, but if it is placed inside of V", certain restrictions may prevent its realization in well-formed sentences.

The auxiliary do, in American English, is similarly restricted -- do can only be interpreted in its inflected base form. Thus it cannot be preceded by [+verb], for in that position it cannot receive inflection. In British English, however,[14] auxiliary do appears after modals, to, and perfective have (though not, it seems, after progressive be).

(77a) ... and John can do, also.
(b) ... and John wants to do, also.
(c) ... and John has done, also.
(d) *... and John is doing, also.

The lexical entry for British auxiliary do allows full base and perfective forms, but not the progressive doing, it would appear. (In both American and British dialects, of course, non-auxiliary do appears in all grades).

Having thus formulated a simple, general structure for X", and applied it to V", and having attempted to provide for the ordering restrictions among the auxiliaries, I shall now give a brief account of two transformations affecting the auxiliary entries. As described above, Subject-Aux Inversion and Neg-

Incorporation (including Pos incorporation) refer to the first auxiliary verb ([+__V]) in a sentence.

SAI is a root transformation (see Emonds 1976:22) which preposes the first auxiliary verb in an affective environment (i.e., when the COMP contains wh or Neg, or, according to Emonds' analysis of tag questions, so). One possible formulation is:

(78) $\underset{[+\text{affect}]}{\text{COMP}} - X - [+\_\_V]$

$1 \quad 2 \quad 3 \longrightarrow 1 \quad 3 \quad 2$

I am not sure that the medial term in (78) should not merely be the subject N"; the answer will depend on the analysis of sentential adverbs. But X must be restricted so as not to contain the sentence's first [+__V] -- for this auxiliary verb must be term 3. The major effect of (78) is to separate COMP and subject N", so that root sentences which have a filled COMP (which can not be emptied by free deletion in COMP) will no longer include the string COMP-N". Chomsky & Lasnik (1977:486) suggest that SAI (like all transformations) is optional, but that root sentences must pass an output filter (79), making SAI effectively obligatory in root sentences which have an affective constituent (wh-phrase, NEG, so) in their COMP position.

(79) $* \underset{\bar{S}}{[}$ COMP N" ...]

SAI, in (78), is only preliminary in its characterization of terms 1 and 2, but it suffices for the purposes of this analysis. Note that root wh-questions (and, I assume, yes-no questions) require that the head verb (under V') be either an auxiliary, or preceded by an auxiliary, so that SAI may apply and bleed the output filter (79).

If, along with SAI and other transformations, Neg-Incorporation is to be optional, then the obligatory placement of not as an enclitic on the first auxiliary must be captured by an output filter, prohibiting not unless dominated by an auxiliary node [+__V]. Thus, again, the head verb must be auxiliary or preceded by an auxiliary, to allow the cliticization of not onto an auxiliary, Thus John leaves is paired with John doesn't leave. Semantically empty do bears the concordance features and the clitic n't; do is required by the output filter on not.

In Section 3.3, the primary topic will be Verb Phrase Deletion; I defer discussion until then. My claim will be that there is no general rule of VPD (although V" can certainly be deleted in some patterns, by ID). Rather, Base generation of auxiliary verbs in V"-final position accounts for much of the data. The interpetation of these auxiliaries is dependent upon a pragmatic, discourse, or sentential context which allows 'sufficient disambiguation', as studied by Schachter (1978).

In conclusion, in this section I have presented a simple structure for V", wherein the features [±aux] and $Spec_V$, are not mentioned by the Phrase Structure Rules. Auxiliaries and

non-Auxiliaries are freely inserted under any [+verb] category, while various ordering restrictions (including subcategorization restrictions, semantic constraints, and output filters) give a possible output like may have been being undermined, where may is a modal in M", have is a (temporal, stative) aspectual, the first be is a (temporal, stative) progressive, and the second be (the head of V") is passive be, which may perhaps be analyzed as copular be taking an A" complement.

I have not invoked transformations of Affix-Hop, do-Support (or do-Drop), or Have/Be-Raising. The necessary transformations of SAI and NI can thus be simple, and merely refer to the first auxiliary verb. Finally, the patterns purportedly due to VPD are now (largely) Base-generated structures. A comparison of some aspects of my analysis to a more transformationally-oriented one will be given in Section 3.3, below.

3. Past Analyses

3.0. Introduction

In this final chapter, I try to further support and clarify my analysis of coordination, by comparing it with three alternatives within the transformational generative framework. Consider PSR (1).

(1) $X \longrightarrow (CX)^n$

Two opposed approaches to (1) are to take X as symbolizing a major category, or to restrict X to Sentence. The former is the phrasal analysis of coordination (e.g., Dougherty), the latter is derived conjunction (e.g., Schachter).

In Sections 3.1 and 3.2, I show that my analysis both meets Dougherty's requirement for Base-generated coordinated NP's (missing in Schachter), and has a clear statement of the deletion rule(s) needed for coordination (missing in Dougherty). Quantifiers and respectively are also treated, continuing the analysis of Chapter 1.

In Section 3.3, I analyze Sag's rule of English Gapping, and show that the restrictions Sag imposes on Gapping serve to obfuscate its basic similarity to Gapping in other languages, and to the many other reflexes of Identity Deletion. Output filters (Sag's and my own) play a major role in this last section. Also at the end of Section 3.3, I argue that Verb Phrase Deletion should not be taken as a case of Identity Deletion.

3.1. Dougherty

Dougherty's (1967, 1968, 1970-71) works on coordination may be viewed as extensions of Chomsky's (1965) 'phrasal' analysis of coordination; such an analysis contains both a rule schema for Base generation of coordinate structures (like (2), below) and certain transformational devices to account for a wider range of data not characterizable at Deep Structure.

(2) $X \longrightarrow C(X)^*$

Chomsky's (1965:212,224) suggestions for coordination allow X, in a schema like (2), to be any major category (i.e., categories which are lexical or dominate lexical categories). Sentences (3a) and (b) derive from DS's containing a VP rewritten by (2) into a coordinate VP.

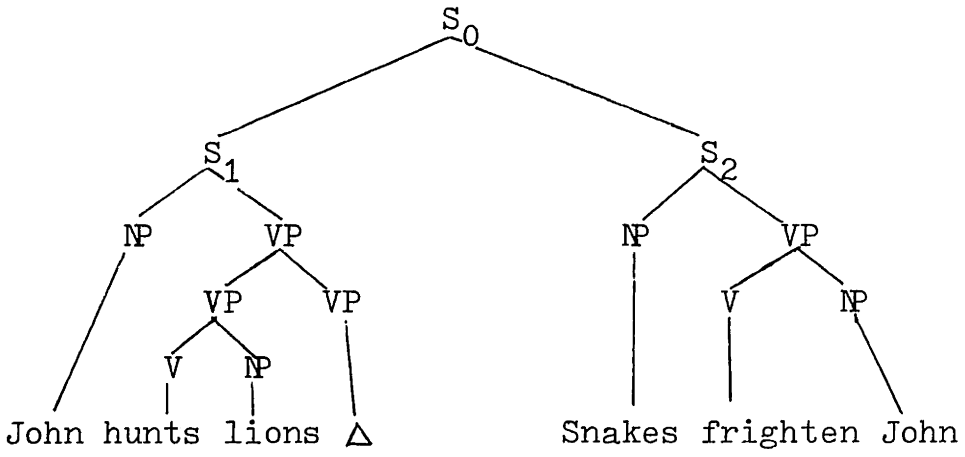
(3a) John [[hunts lions] and [frightens them]].

(b) John [[hunts lions] and [is frightened by snakes]].

Sentence (3b), however, has required the application of certain transformations. The passive VP (the second conjunct VP) is not Base-generable, but derives from a VP wherein John is the object. Chomsky (1965:224) proposes: "wherever we have coordination, some [major] category is coordinated n times in the matrix sentence, and n occurrences of matched sentences are

independently generated by the base rules." One natural reading[1] of Chomsky's suggestion is to allow the DS coordinate VP, in (4), to contain one empty conjunct, and to require, via "the filtering effect of transformations,"[2] that the second sentence undergo Passivization and then transformational substitution of the passive VP <u>is frightened by snakes</u> for the Δ of the DS. The stranded remnants (here, <u>John</u> of S_2) must be deleted. The DS (4) is presented in the notational framework of Chomsky (1965); it is unclear where C should be positioned in DS.

(4)



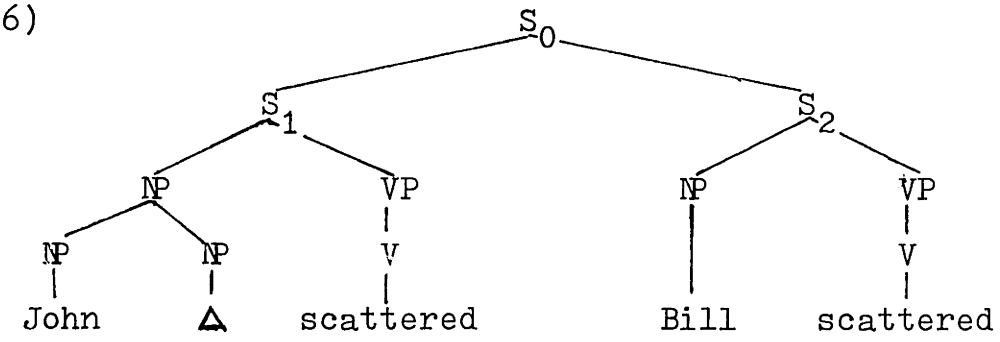
Chomsky's analysis is a very interesting blend of 'phrasal' and 'derived', in that he provides a PSR schema for any major category's coordination, but through the use of the transformational substitution operation, avoids the DS interpretation of any coordinations except coordinate propositions. For observe that even (3a) will undergo the substitution transformation, if indeed "wherever we have coordination, ... n occur-

rences of matched sentences are independently generated by the base".

An analysis true to Chomsky's suggestions may, however, have serious difficulty with predicates or number words requiring that their arguments have a plurality of referents. Consider scatter. If, wherever we have coordination, we must have n conjunct sentences, then what are the conjuncts in the DS of (5)? In a theory of DS interpetation (and of selectional restrictions stated in the Base), there has been no proposed method of allowing the putative DS (6), but of also disallowing (7).

(5) John and Bill scattered.

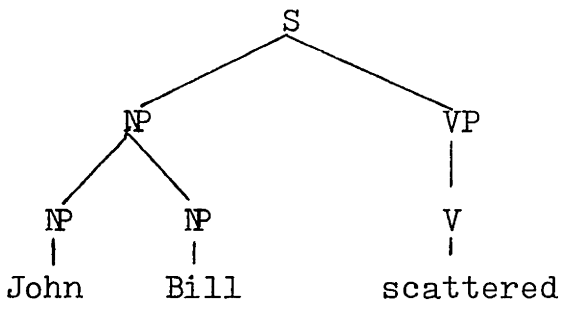
(6)



(7) *Bill scattered.

Dougherty (1968, 1970-71) suggests that coordinate NP's can be lexically filled in DS, and need not be subject to a transformational substitution. In Dougherty's formulation, the DS of (5) is (8).

(8)



Dougherty's analysis, then, counters Chomsky's assumption that compound S's underlie every case of surface coordination, for Dougherty has allowed coordinate NP's to surface with no transformational interference. Dougherty must, however, retain Chomsky's rule of transformational substitution for cases like the passive conjunct of (3)-(4); hence, some coordinate NP's may in fact be ambiguously derived. In Dougherty's formulation, John and Bill will come may derive from a single DS sentence with a filled coordinate NP, or from a coordinate sentence with a structure like (6), above, requiring the substitution transformation.

Thus it would appear that both NP and proposition (or perhaps sentence) occur in coordinations which need not undergo the substitution transformation. Is there evidence that other categories, like Verb Phrase and Adjective Phrase, occur as completely filled coordinations in DS? If not, then perhaps PSR (2) should be restricted to proposition and NP, and all other coordination (like (3a) and (b)) should be derived by regrouping and/or deletion.

Dougherty in fact suggests that PSR (2) should be restricted, but his proposed restrictions vary throughout the versions of his work, and it is unclear, at any point, what restriction should hold. For example, Dougherty (1968:93) quotes Chomsky (1965:212):

> The general rule for conjunction seems to be roughly this: if XZY and XZ'Y are two strings such that for some category A, Z is an A and Z' is an A, then we may form the string X^Z^and^Z'^Y, where Z^and^Z' is an A ... But, clearly, A must be a category of a special type; in fact, we come much closer to characterizing the actual range of possibilities if we limit A to major categories.

and Dougherty claims that his Phrase Structure Rule Schema ((9), below) and his substitution transformation (1968:93) "provide an explicit formulation for the general rule for conjunction suggested by Chomsky."

(9) $X \longrightarrow (Q)\ X^n\ (ADV)$

However, even though Dougherty uniformly states that X, in (9), symbolizes "the major categories"[3], a "major category"[4], or "a major category"[5], yet he always lists these as just S, NP, and VP. With such a restriction, of course, Dougherty is not providing "an explicit formulation for the general rule for conjunction suggested by Chomsky". For example, Chomsky would derive (10) and (11) by Base-generation of a coordinate Det or coordinate M, and later substitution into the Δ of one of the

conjuncts.

(10) Both these and those men may enter.

(11) John either will or won't go to New York.

But since, in Dougherty's framework, Det and M are not possible coordinate structures, (10) (and presumably (11)) must be derived

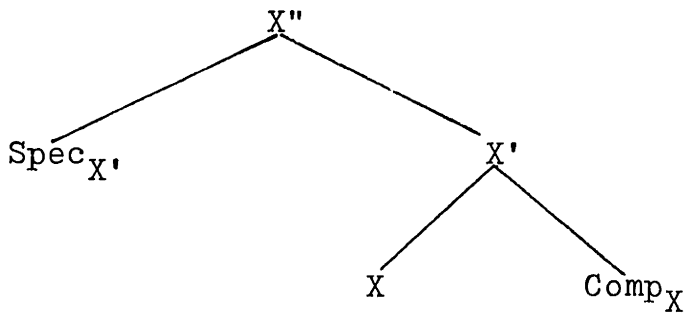
> by a deletion transformation [which] will be discussed in Dougherty, (forthcoming). The Appendix on recoverable deletion, at the end of this [1968] thesis, discusses a general fact relevant to the formulation of deletion transformations. [6]

Dougherty's 'forthcoming' work ("The Structure of the Base") has never appeared; his appendix was not included in his thesis.

Thus Dougherty's "formulation for the general rule for conjunction suggested by Chomsky" actually involves a number of crucial changes -- rather than permitting coordination of any major category in the Base, Dougherty restricts X to S, NP, and VP; he claims that these coordinations may be completely filled in DS (i.e., that the substitution transformation need not always apply); he suggests that coordinate NP's may be interpreted (at DS) in environments (like: ___ scatter) where singular NP's would be disallowed; and he requires deletion transformation(s) to generate coordinations other than S, NP, and VP.

Beside this unnecessary confusion, involving his novel use of 'major category', Dougherty ran into a partly unavoidable dilemma in attempting to formulate his analysis within the X-bar convention. This notation was being formulated even as he wrote, so that his initial assumption of four levels, $\bar{\bar{\bar{X}}}$, $\bar{\bar{X}}$, $\bar{X}$, and X) is later modified (1971:335) to the three levels of Chomsky (1970) -- $\bar{\bar{X}}$, $\bar{X}$, and X. As stated earlier (Section 1.1 and 2.2), and as discussed in Jackendoff (1977), Chomsky's "Remarks on Nominalization" proposes PSR schemata expanding the major phrasal categories X" to give structures like (12).

(12)



The notation Comp$_X$ is a cover symbol for the various complements available to the various X's (N, V, A, and perhaps others). I follow Jackendoff (1977:37) in viewing Spec$_X$, in like manner. The important point, however, is that Chomsky takes Spec as a sister to X', and Comp as a sister to X (this is noted in the subscripts on the terms). But nowhere does Chomsky mention coordination; it may be expected (Jackendoff (1977) and I make this assumption) that an Aspects type recur-

sive rule (13) or (14) must be added, for coordination.

(13) $X \longrightarrow C\ X^n$

(14) $X \longrightarrow (CX)^n$

Throughout his work, Dougherty uses a recursive PSR like (13) (his version is (9), above), but, in an attempt to translate (9) into the X-bar notation, he claims[7] that, in "Remarks on Nominalization",

> Chomsky's proposals can be interpreted to mean that the phrase-structure rules of the base may conform to these schemata:
>
> (358) $\bar{\bar{X}} \longrightarrow ([SP,\bar{X}])\ \ \bar{X}^n\ \ ([CPL,\bar{X}])$
>
> (359) $\bar{X} \longrightarrow ([SP,X])\ \ X\ \ ([CPL,X])$
>
> ...$\bar{\bar{X}}$ represents all and only the features common to the major categories S, NP, and VP. If a distributive quantifier, Q in rule 147 [(9), above], is considered to be a $[SP,\bar{X}]$, and a distributive adverb...to be a $[CPL,\bar{X}]$, then we can see that 147 [(9)], the rule in the PSR hypothesis which expands major categories, is a special case of (358), the one which represents the generalized expansion of major categories.

But there are clearly several differences between (9) and (358), and between (358) and Chomsky's PSR's (to give the structures (12)). The crucial notion of the X-bar convention is that when X^i is introduced under X^{i+1}, X^i is the head of X^{i+1}. But a coordinate structure has no head; the basic attempt to force (9) into a mold like (358) (rather than a recursive rule)

seems to me misguided. Secondly, (9) was [illegible]d by Dougherty to apply to S, NP, VP; Chomsky's PSR for expanding X" was assumed to apply to NP, VP, and AP; a separate rule was required for rewriting S into N" V"; Dougherty does not note this change. Thirdly, Chomsky's proposal takes Specifier as sister to X' and Complement as sister to X; Dougherty generalizes the rule, apparently just to position the distributive quantifier (both, each, all, etc.) and distributive adverb (together, separately, etc.). In a N" like both the men, he assumes both the is the Specifier to the N' men. But how can he derive a true coordinate NP? It has been almost universally assumed that a coordinate NP contains two NP's, yet Dougherty's translation of (9) into (358) prevents the generation of such a simple coordinate NP as [Both [the man]$_{N"}$ and [the woman]$_{N"}$], because his rule (358) is not recursive on NP.

I believe the proper approach to Dougherty (1968, 1970-71) is to laud his intent to provide a general schema for coordination, but to note his incorrectness in claiming that his X-bar rules in fact generate the recursive structures required by PSR (9). His analysis of 1970-71 refers to a fuller treatment in Dougherty 1968; we turn now to this. His PSR rules are:

$$\begin{array}{lllll} (15a) & \overline{\overline{X}} \longrightarrow ([Sp, \overline{\overline{X}}]) & \overline{\overline{X}}^{n} & ([Cpl, \overline{\overline{X}}]) \\ (b) & \overline{\overline{X}} \longrightarrow ([Sp, \overline{X}]) & \overline{X}^{n} & ([Cpl, \overline{X}]) \\ (c) & \overline{X} \longrightarrow ([Sp, X]) & X^{n} & ([Cpl, X]) \end{array}$$

The apparent symmetry of (15a)-(c) is illusory, for a number of reasons. For example, [Sp,N] is rewritten as co-, fellow, etc., but Dougherty (1968:194,307) later claims that coworker is a Noun (not a string [Sp,N]-N), and that "[c]ompound nouns and nominal prefixes are outside of the scope of this thesis." But then there is little evidence to support the [Sp,N] category. There is also little evidence for the coordinate verbs generated by (15c), for there are alternative derivations of sentences like (16).

(16) John saw and heard Bill.

PSR (15c) may not, in fact, be needed to generate (16), for Dougherty (1968:116) has required a deletion rule to reduce coordinate VP's, as in (17b), from (17a).

(17a) John either will go to New York or won't go to New York.

(b) John either will or won't go to New York.

But such a rule may well apply inside the coordinate VP of (18), to derive (16), without having used the iterative V^n provided by (15c).

(18) John saw Bill and heard Bill.

There is, I believe, little justification for the [Sp,X] node in (15c), nor for the iterative X^n. (15c) should be replaced by the (now) standard PSR (19), perhaps as modified in Section 1.1.1.

(19) $\bar{X} \longrightarrow X$ [Cpl,X]

Now consider the $\bar{\bar{X}}$ category, and iterative $\bar{\bar{X}}^n$ of PSR (15a). While $\bar{\bar{X}}^n$ is justified (as in coordinate propositions, or the coordinate NP both [the women] and [the men], the only justification for the $\bar{\bar{X}}$ is to avoid a recursive rule. But the rule introducing coordination in DS should be recursive; certainly a new level should not be introduced merely to avoid a PSR like Dougherty's (9), above, which would rewrite $\bar{\bar{X}} \rightarrow$ (Q) $\bar{\bar{X}}^n$ (Adv).

Dougherty (1968), by restricting Specifiers and Complements, requires that $\bar{\bar{X}}$ be rewritten as (Q) $\bar{\bar{X}}^n$ (Adv), and $\bar{X}$ to be rewritten as (Q Det) $\bar{N}^n$ (Adv) or (AuxQ) $\bar{V}^n$ (Adv). Permitting Q to be the Specifier of $\bar{X}$ as well as $\bar{X}$ is apparently used, by Dougherty, only to describe data like (20) and (21),

(20) $\bar{\bar{N}}$[each of $\bar{N}$[all of the $\bar{N}$[men]]]

(21a) $\bar{\bar{N}}$[each of $\bar{N}$[the men] and $\bar{N}$[the women]] will put on a play.

(b) $\bar{\bar{N}}$[$\bar{\bar{N}}$[each of the $\bar{N}$[men] and $\bar{N}$[women]]] will put on a play.

But such phrases are problematic for Dougherty, in any case; for example, the higher quantifier of (20) must obligatorily postpose (contrary to the ususal optionality of Quantifier Movement), and (20) violates Dougherty's (1968:146) 'Feature Percolation' mechanism, whereby each could not cooccur with all. Dougherty uses (21) to give (22), but he could avoid the problems cited here (and others in Fiengo & Lasnik (1973)) by Base-generating each other. I will assume that there are sufficient problems with (20) to opt for the alternative analysis.

(22) All of the men saw each other.

Consider now (21). Dougherty claims a semantic distinction between (21a) and (21b), but he observes that his rule of Specifier Deletion may apply to $[\text{the women}]_{\overline{\overline{N}}}$ of (21a), to derive $[\text{women}]_{\overline{\overline{N}}}$. Thus the output of DS (21a) may be either (23a) or (b); while DS (21b) will underlie only (23b),

(23a) Each of the men and the women will put on a play.
(b) Each of the men and women will put on a play.

According to Dougherty, (21a) (with the women) means that only two plays will be put on; (21b), interpreted at DS, means that many plays will be put on. Since (21a) can surface either as (23a) or (23b), (23b) will be ambiguous between the two play reading (due to (21a)) and the many play reading (due to (21b)). Thus Base-conjoined $\overline{N}$'s are needed by Dougherty, as well as

Base-conjoined $\bar{\bar{N}}$'s, to account for the difference in semantics.

I find this evidence extremely tenuous and hardly sufficient support (given the problems with (20)) for the claim that the base allows $\bar{X}^n$ as well as $\bar{\bar{X}}^n$, with Specifier Deletion giving possibly identical output strings. For me, (23a) (Each of the men and the women) will undergo Quantifier Postposition, to give (24), on the reading where one play is associated with the conjunct the men, and a second play with the women. (23a), when each is meant to quantify a duple, is no better than (25).

(24) The men and the women each will put on a play.

(25) #Each of John and Bill will put on a play.

Other speakers I have questioned agree that (23a) is difficult to construe in the 'two plays' reading, and that the purportedly ambiguous (23b) does not, in fact, allow the 'two plays' reading, either. I do not, therefore, find sufficient evidence in (21a)-(b) for requiring both (15a) and (15b), and will merely assume that Chomsky's (1970) X-bar PSR's should be supplemented with some recursive PSR for coordination, restricted (as in Dougherty's PSR (9), above) to proposition, NP, and (perhaps) VP.

The first two classes, proposition and noun phrase, form a natural class in Chomsky (1970) and later work, as the recursive, cyclic nodes. These categories are taken as the

only ones rewritten by the PSR for coordination. My analysis accepts the assumption that propositions be conjoinable at DS (avoiding this assumption means allowing generalized transformations, which apply to two PM's to form one). My analysis also meets the requirement, which is well argued for throughout Dougherty's work, that the Base be able to generate coordinate and plural NP 's in comparable manner. Dougherty shows that, at least at the level of semantic interpretation, there must be plurals and NP -coordination. In my framework, Semantic Interpretation is at SS; since I assume no regrouping transformation which might derive plurals or coordinate NP 's, I must permit such SS NP 's to be Base-generated in essentially their SS forms.

For coordinate VP's, however, Dougherty has given no real justification. His semantic arguments for DS coordination deal exclusively with coordinate NP 's; the scatter-type argument , whereby a non-singular NP does not always correlate with a coordination of sentences, has no obvious analogue with coordinate VP's -- for (26) means the same as (27).

(26) $John_i$ sang and danced.

(27) $John_i$ sang and $John_i$ danced.

If he were to state it, Dougherty's independently needed Deletion transformations, (sometimes supplemented by some Quantifier Movement) may well be sufficient to derive (26) from (27), obviating the need for VP-coordination in the Base. This is

the approach I take, in restricting the PSR for coordination to proposition (S") and N", and deriving (26) from a DS (and SS) coordination of propositions.

Beside his arguments for PSR (9), especially as it applies to rewrite NP, Dougherty's work is valuable in its clarification of cooccurrence restrictions among distributive quantifiers, conjunctions, various non-singular NP's, certain predicates (like Gleitman's (1965) V_{cmb}), and the distributive adverbs. Much of this analysis is devoted to distinguishing among the distributive quantifiers, as in table (28). (I have added the plurality feature to his analysis.) I can merely mention some aspects of his analysis here, and compare it to my own.

(28)	each	(n)either	all	all/both	∅
totality	-	-	+	+	-
individual	+	+	-	+	-
disjunctive	-	+	-	-	-
negative	-	±	-	-	-
exhaustive	+	+	+	+	+
plural	±	-	±	+	+

In my analysis, I have only distinguished distributive quantifiers as being the [+Q] conjunctives (C), and I've differentiated the [+pl] quantifiers (which can be postposed) from the [-pl] Q's (which do not postpose, and allow singular verb concordance). Assume that Dougherty's [+exhaustive], which is a

special mark of distributive quantifiers, is equivalent to my [+Q]; another possibility is to differentiate all, both, each, (n)either in the lexicon as permitting insertion before N" (i.e., [+___N"]); other quantifiers (degree and amount quantifiers, like some, few, many, two, several, etc.) do not have this subcategorization feature, so they may not be inserted before N". Only the distributive quantifiers (marked [+___N"]) will then be inserted under matrix N" in a coordination of N"'s. Whatever the feature, [+Q], [+exhaustive], or [+___N"], distributive quantifiers must be differentiated from other quantifiers, in the lexicon. It is not clear, however, that syntactic rules, like Quantifier Postposition, and the phonological filters, need to refer to this feature, for the fact that distributive Q's are uniformly inserted pre-N" may permit a clear delineation of their position, sufficient for the purposes of QP and Q-filters. For example, I have suggested (Section 1.2.1) that the moved Q must be daughter to N" (or S"). Only a distributive Q could be in such a position; therefore, only a distributive quantifier could be moved. I will not require a syntactic feature [+exhaustive]; all that need be specified is that the distributive quantifiers are quantifiers inserted as daughter of a recursive S" or N" category.

While [+exhaustive] may not have syntactic justification, [±pl] certainly does. However, Dougherty only once mentions this feature. He observes (1968:74) that concordance follows Quantifier Movement, since (29) is singular, and (30) is plural.

(29) Each of the men was sick.
[-pl] [-pl]

(30) The men were each sick.
[+pl] [+pl]

Dougherty does not mention if the quantifiers are to be marked [±pl] in the lexicon, but I assume that they must, for compare (31) to (32).

(31) Both of the men were sick.

(32) Either of the men was sick.

In my analysis, either is [-pl], both is [+pl], while each and all may be [-pl], (when not postposible, (29), and when modifying a singular or mass noun), or each/all may be [+pl] (the [+pl] Q is postposible, and modifies a coordination or plural, (30)). For me, then, [±pl] is a syntactically necessary feature; a Q marked [+pl] will undergo concordance differently than a [-pl] Q, and may be subject to Quantifier Postposition where the [-pl] Q (e.g., either) is not. (Alternatively, there may be a semantic explanation for *John or Bill either, see Section 1.2.1).

Dougherty's other features, [±totality], [±individual], [±disjunctive], and [±negative], may well be semantic features but not syntactic features. For example, a large part of their

function, in Dougherty's analysis, is to capture cooccurrence restrictions between predicates and their arguments. Consider disperse; Dougherty claims this needs a [-totality, -individual] subject; Table (28) shows that every realizable Q is either [+totality] or [+individual]. Thus no quantifier is allowed on the subject of disperse (or of be heterogeneous, scatter, be a motely crew, etc.). Even after Quantifier Movement, (33) will be disallowed.

(33a) *John, Bill, and Tom each scattered.
(b) *John, Bill, and Tom all scattered.
(c) *John, Bill, and Tom are all a motely crew.

However, it might be that the crucial point about (33) is not the presence of the quantifiers each/all, but that scattered requires a crowd as subject, and not merely several individuals, individually named. Dougherty notes (1968:301-2) that even with no quantifier, disperse and scatter require a large number of conjuncts in a coordinate subject; certain other [-totality, -individual] predicates (be numerous) seem to disallow a coordinate subject to enumerate the individual referents, and require a subject with undetermined cardinality. Disperse and scatter are exemplified in (34) -- the (e)-(f) cases "sound better" than the "peculiar" (a)-(b) cases (Dougherty's terminology. Dougherty claims that (a), though strange, is grammatical. "It is a semantic fact" that dispersal

requires more than two individuals. I would agree, but I would attempt to capture all the relevant arithmetic requirements in the semantic component, and not in the Base, via putative selectional restrictions referring to [±totality, ±individual]).

(34a) #John and Bill dispersed/scattered.

(b) #John, Bill, and Tom dispersed/scattered.

...

(e) John, Bill, Tom, Harry, Joe, and Sgt. Shriver dispersed/scattered.

(f) John, Bill, Tom, Harry, Joe, Sgt. Shriver, and King Kong dispersed/scattered.

I suggest that in an analysis of Surface Structure interpretation, such as the one I provide, the cooccurrence restrictions with predicates like collide, disperse, be a couple, etc., should all be treated by the arithmetic component. I have claimed that (35) is bad for the same reason as (36) -- i.e., they are both arithmetically anomalous. (35) requires a subject with two referents; (36) requires a subject with two (or more) referents.

(35) #John is a nice couple.

(36) #John collided.

Although Dougherty's feature analysis is important in distinguishing the various arithmetic classes of verbs, I believe

that in an analysis where interpretation is at SS, there is insufficient justification for claiming that features like [±totality] and [±individual] are syntactic, and could therefore be referred to by the syntactic selectional restriction rules. I take Dougherty's analysis of features as an important step toward clarifying the arithmetic component, but not as a clear-cut justification for increasing the number of features to which the selectional rules can refer.

In conclusion, we have examined Dougherty's various schemata for the PSR's of coordination, and attempted to clarify his claims. I remain satisfied that restricting recursion to S" and N" is sufficient to account for the data; S" and N" have the additional virtue of falling together as a natural class (recursive nodes) in Chomsky & Lasnik's framework. Dougherty's feature analysis is mainly valuable for the distinction of semantic classes, each with a different arithmetic requirement. Mix, collide, etc., are thus functionally similar to couple and trio, as discussed in Section 1.2. While I require a syntactic feature [±pl], I do not utilize [±totality, ±individual], as syntactic features.

3.2. Schachter

Certain aspects of my work may be clarified by comparison with Schachter's (1973) 'derived conjunction' analysis. Such an analysis requires that (DS) semantic interpretation of coordinates be restricted to coordinate sentences (via the restriction of X in PSR (37) to Sentence), and that semantic interpretation be ordered before any required transformations of regrouping and deletion applying to coordinate structures.

(37) $X \longrightarrow C\ X^n$

In a derived conjunction analysis, one of the primary justifications for regrouping is that simple deletion cannot derive respectively-structures, like (38b), from an assumed DS (38a).

(38a) John sang and Bill danced.

(b) John and Bill sang and danced, respectively.

Schachter's assumption is that all sentences in Deep Structure contain only singular, unquantified and non-coordinated NP's, so that coordinate NP's must be derived by regrouping (giving [John and Bill] in (38b)), and so that plurals must be derived, after regrouping, by collapsing certain coordinate NP's (e.g., I and you is collapsed into we; that man$_i$ and that man$_j$ is col-

lapsed into those men).

Such assumptions differ crucially from those of Dougherty and myself; Dougherty argues convincingly (see Section 3.1 and references cited there) that plurals and at least some coordinate NP's must be Base-generated. If plurals are Base-generated, then respective(ly) sentences like (39) are not the result of regrouping applied to coordinate sentences, but are, in fact, Base-generated.

(39a) Those two men visited their respective wives.

(b) Those men visited their respective wives.

The interpretation rules for respective must be able to correlate the referents of one non-singular NP with the referents of a second NP. In (39a) and (b), two plural NP's are correlated, while in (40), the (two) referents of a coordinate NP are correlated with the (two or more) referents of a plural NP.

(40) John and Bill visted their respective wives.

The interpretation of respectively, as analyzed in Section 1.2.3, is somewhat freer, since respectively (unlike respective), is not the Determiner of a NP. While respective correlates the referents of one non-singular NP with those of another (hence requiring two NP's), respectively takes each

referent of a non-singular NP as the argument for one conjunct proposition of a coordinate S". Hence, at the level of SS, respectively requires one non-singular NP in each conjunct of a conjoined proposition. At the level of SS, in my analysis, coordinate S"'s may exist, containing a coordinate (or plural) NP, but there are no other coordinations. Hence (41) is the SS underlying the output (42).

(41) Those two men sing and those two men dance respectively.

(42) Those two men sing and ____ dance, respectively.

If, as I have assumed, respective(ly) coordination is crucially concerned with non-singular NP's then Schachter's denial of DS non-singulars leads to his need of regrouping, in deriving (38b). My analysis requires a deletion rule (like the one Schachter also needs) but no regrouping; in my analysis, the SS underlying (38b) is (43); semantic interpretation takes John as the argument in $S"_1$, and Bill as the argument in $S"_2$.

(43) [[John and Bill] sang] and [[John and Bill] danced] resp.

(44) [John and Bill] sing and _____ dance respectively.

In my analysis, respective(ly)-interpretation requires a conjoined or plural NP, because at the level where respectively is interpreted, the only coordinate structures are NP's and

propositions. Virtually all of the examples cited by Schachter include a plural or coordinate NP, but two sentences do not -- Schachter claims that (45)-(46)[8] should be generated by his rule of regrouping.

(45) John gave, and Bill lent, Mary $5 and Susan $10 respectively.

(46) John will, and Bill won't, sing and dance respectively.

My analysis does not derive such sentences, because there is no non-singular NP in the possible underlying forms for (45)-(46). The problem is not one of secondary conjunction (coordination of non-constituents), because where secondary conjunction is permitted, as with (47), so is 'secondary' respectively-coordination, as in (48), when there is a non-singular ([John and Bill]) available at SS.

(47) [John] gave Mary $5, and ____ Susan $10.

(48) [John and Bill] gave Mary $5, and ____ Susan $10, respectively.

The requirement that a non-singular NP exist at SS in respectively-constructions will throw out (49)-(53), as well as (45)-(46).

(49) *John will and won't sing and dance, respectively.

(50) *John sings and dances well and badly, respectively.

(51) *John walks and runs slowly and quickly, respectively.

(52) *A horse walks and canters respectively slowly and quickly.

(53) *John walked and ran respectively into and out of the theater.

I believe all of these are bad, like (45)-(46). My claim is that, to be interpreted, respectively-constructions must only involve coordination of NP's and propositions. In my analysis, the restriction of X, in the PSR for coordination, to N" and S" gives this requirement on respectively as a natural result.

In conclusion, (38b), repeated below as (55), does not constitute evidence in my analysis for a rule of regrouping, but derives, via ID, from (54).

(54) t_Q [[and John and Bill] sang] and [[and John and Bill] danced] respectively

(55) [John and Bill] sáng and _____ dànced, respectively.

It is important to clarify why ID must apply to (54), to obligatorily generate (55). The answer, I assume, is that the quantifier respectively is obligatorily moved by Quantifier Postposition. (Schachter (1973:412) makes a similar assumption;

his rule of Quantifier Movement is obligatory for respectively, and for both, all, each in coordinate structures). Since the framework I am assuming has no means to mark a rule as formally obligatory, I will employ the same mechanism for respectively as was used to prevent both from being output as a S"-initial Q. That is, I will extend the both-filter, of Section 1.3.3, to respectively (indeed, the both-filter was said there to apply to all [+pl] Q's -- those which cooccur, like respectively, with and). Because of this filter, respectively must be postposed (by Move α) to a position before an acutely-accented s. In some dialects (the one described by Schachter, for example), both (56) and (57) are permitted.

(56) John sáng and dànced both.

(57) John and Bill sáng and dànced, respectively.

For such dialects, the both-filter (extended to include all [+pl] Q's) must permit both in the environments /sCs___, as well as /___sCs. Such a requirement allows a somewhat freer positioning of both (and respectively) than described in Section 1.3.3, but still requires that both and respectively be moved from an S"-initial position to a position inside a conjunct proposition, to a position before or after sCs. These filters on the quantifiers force the formally optional rules of Move Q and ID, to become effectively obligatory in their application to both or respectively in S" coordinations.

I have argued, in discussing respective(ly), that Schachter has been forced to use a regrouping analysis, as opposed to a deletion analysis, largely because he does not Base-generate non-singular NP's. Thus (58) will be evidence, for him, of regrouping.

(58) John and Bill sang and danced, respectively.

His assumptions about NP also give further need for a regrouping rule, for if (60) must be derived from (59), syntactic concordance (at least) will require that John and Bill have been regrouped into a coordinate NP.

(59) John is here and Bill is here.

(60) Both John and Bill are here.

However, in my analysis (60) is Base-generated, with Q and conjunction in place inside a coordinate NP. The facts of syntactic concordance then follow readily, as analyzed in Section 1.3.1.

Schachter's assumption (that NP's in DS are singular, unquantified, and non-conjoined) requires that he propose syntactic transformations of regrouping, quantifier formation, plural-formation, etc., as well as a deletion rule applying inside coordinate structures. In my analysis, there are no rules of regrouping, plural formation or quantifier formation.

(Schachter's transformations of Q-formation help derive (60) and (59) by actually counting the conjuncts. I have argued that this function is properly extra-grammatical, and part of semantic interpretation). I do have a deletion rule, to generate secondary conjunction (as in (61)), Primary Conjunction (as in (62)), Gapping (as in (63)), Right Peripheral Ellipsis, (as in (64)), etc.

(61) Mary loaned John $5 and Bill $10.

(62) John sang and danced.

(63) John likes rice, and Bill beans.

(64) John likes rice, and Bill (too).

Schachter (1973:321,332) has considered proposals (e.g., Schane 1966) for a deletion rule (much less general than my own) to derive (61) by deletion of Mary loaned in the second conjunct proposition (or sentence). He concludes, however, that

> a treatment of constructions involving secondary conjunction as products of simple deletion transformations is deficient in two important repects: (a) failure to generate derived structures that correctly predict intonation; and (b) failure to provide an account of the occurrence of such quantifiers as respectively in certain constructions involving "secondary" conjunction: e.g.,
>
> [Schachter's] (118) John bought, and Mary sold, a house and a car respectively.

I have already considered the respectively data, above, and have provided an analysis which allows respectively to be properly positioned, and interpreted, in an analysis with no regrouping transformation. For Schachter's (118), I agree with his claim (p.332) that a house and a car bear the 'is a' relationship to some node -- in my analysis, it is a DS coordinate NP -- but would deny that "there is a node to which John bought, and Mary sold has an 'is a' relationship". What could such a node be? In Schachter's analysis, that node is S: he suggests that John bought is a sentence, and Mary sold is a sentence. His regrouping rule extends grammatical theory to permit improper analyses: it can analyze $[[\text{Mary}]_{NP}\ [\text{sold}\ [\text{a car}]_{NP}]_{VP}]_S$ into two terms: $[[\text{Mary}]_{NP}\ [\text{sold}]_{VP}]_S$ and $[[[\text{a car}]_{NP}]_{VP}]_S$. The first term is conjoined to $[[\text{John}]_{NP}\ [\text{bought}]_{VP}]_S$; the second to $[[[\text{a house}]_{NP}]_{VP}]_S$. Pruning is assumed to apply, to convert $[[[[\text{a house}]_{NP}]_{VP}]_S$ and $[[[\text{a car}]_{NP}]_{VP}]_S]_S$ into the simpler $[[\text{a house}]_{NP}$ and $[\text{a car}]_{NP}]_{NP}$.

While I have no deep objection to Pruning (but believe its need has never been justified), I do have a methodological objection to the node-splitting capability of Schachter's regrouping rule, which has analyzed the nodes S and VP as simultaneously belonging to the term Mary sold and to the term a house. The regrouping rule actually splits these nodes, moving the S node (with its daughter VP node) simultaneously to the left and to the right. Some of the yield of S (and VP) is moved to the left, as $[\text{Mary}\ [\text{sold}]_{VP}]_S$; some of the yield

of S (and VP) is moved to the right, as $[[[\underline{\text{the house}}]_{NP}]_{VP}]_S$.

The justification for such an extreme extension of the theory of grammar (which could no longer require all transformational rules (or schemata) to make 'proper analyses'), is based in part on the intonation in secondary conjunction, like Schachter's (118) (this will be discussed below), and in part on the position of <u>both</u> and <u>respectively</u> in (65) and (66), below. We'll discuss the quantifiers first.

(65) I gave both a nickel to the boy and a dime to the girl.

(66) John gave, and Bill lent, Mary $5 and Susan $10 respectively.

Schachter notices that <u>both</u> may not conjoin sentences on the surface; he assumes that <u>both</u> may only conjoin single constituents. Then <u>a nickel to the boy</u> would have to be a single constituent; Schachter has allowed his regrouping rule to analyze <u>a nickel to the boy</u> as a VP, the VP that is split to also give $[I\ [gave]_{VP}]_S$. He does not observe that, for many speakers, (65) is starred -- presumably just because it conjoins <u>a nickel to the boy</u>, which is, in fact, a non-constituent. In my analysis, <u>both</u> may be Base-generated conjoining propositions, but postposed by <u>Move Q</u> to the left of <u>a nickel to the boy</u>. Dialects allowing (65) have the <u>both</u>-filter discussed in Section 1.3.3; <u>both</u> must merely surface before $\acute{s}C\grave{s}$. More restrictive dialects require that the conjuncts following <u>both</u> be single constituents. One possible restriction on the <u>both</u>-

filter would be to require that the ś Cs in both ś Cs has had its contrastive accent reduced by the accent reduction rule for 'Primary Conjunction' of Section 1.3.3, which gives sing and dance from sing and dance (but does not reduce accent on non-constituents). Then, in the restrictive dialect, both would cooccur with 'Primary Conjunction' in output, but would allow neither 'Secondary Conjunction', nor proposition coordination. Once again, a dialectal filter has been proposed, allowing Move Q to remain unitary and optional.

The second sentence, (66), to me is quite ungrammatical. I have claimed (Section 1.2.3 and above) that respective(ly) requires a non-singular NP ; there is no such NP in (66). Thus while (66) is starred, (67a) and (67b) are permitted, to exactly the same extent as (68a) and (68b) would be.

(67a) [John and Bill]gave Mary $5 and Susan $10, respectively.

(67b) John bought, and Mary sold, a house and a car, respectively.

(68a) [John] gave Mary $5 and Susan $10.

(68b) John bought, and Mary sold, a house.

To my ear, the (a)'s are better than the (b)'s; my analysis predicts this, in that the grave remnants in (67a)-(68a) are X"'s (Susan $10) while the grave remnants of (67b)-(68b) are X" X (Mary sold). (This matter of differentially acceptable Secondary Conjunctions is discussed somewhat below).

We turn now to the intonation of Secondary Conjunction. Schachter accepts Chomsky's (1957:35-36) observations on the prosody of non-constituent conjunction, as in (69).

(69) John enjoyed and my friend liked the play.

> Such sentences ... are ... marked by special phonemic features such as extra long pauses (in our example, between "liked" and "the"), contrastive stress and intonation, failure to reduce vowels and drop final consonants in rapid speech, etc. Such features normally mark the reading of non-grammatical strings.... It is immaterial to our discussion, however, whether we decide to exclude such sentences ... as ungrammatical, or whether we include them as semi-grammatical, or whether we include them as fully grammatical but with special phonemic features. In any event they form a class of utterances distinct from "John enjoyed the play and liked the book,"

Schachter (1973:321) claims (69) to be fully grammatical, and that its special phonological characteristics are fully predictable by assuming that John enjoyed and my friend liked is the yield of a sentence (formed by conjoining the split [John [enjoyed]$_{VP}$]$_S$ to the split [my friend [liked]$_{VP}$]$_S$; this sentence is followed by a non-sentence ([the play]$_{NP}$)). Schachter claims that "[w]henever there is a constituent break between an S and some constituent other than S, such characteristics [i.e., the 'special phonological characteristics noted by Chomsky'] may be predicted."

But while such a constituent break could reasonably be assumed to give rise to extra long pause between liked and the,

it is not clear how this constituent break could give rise to the 'contrastive stress and intonation, failure to reduce vowels and drop final consonants' inside the conjuncts themselves. Indeed, I claim that the contrastive accent, and the pause of (69), is a concomitant of Identity Deletion, and is not due to Schachter's regrouping rule splitting nodes to separate a putative sentence (John enjoyed and my friend liked) from the play. For consider a simple deletion case, like (70).

(70) John likes rice, and Bill beans.

In (70) no regrouping can have applied: Schachter accepts Gapping (as in (70)) as a deletion, but he ignores it in his analysis. Yet I claim that (69)'s long pause, contrastive stress and intonation, and blocking of vowel and consonant reduction are also evident in (70). Thus these phonemic features must be a concomitant of some type of deletion, not of regrouping.

I assume that Identity Deletion assigns contrastive accent to the contexts of deletion, as ś and s̀. There is usually pause between ś and s̀, and always between s̀ and the following unstressed string. (see (71)). The contrastive stress blocks the reduction of vowels or loss of final consonants.

(71) That Alan played 1st base, and Betsy shortstop, is very surprising.

If pause is purely predictable as an S-non-S constituent break, then (71) should have no long pause, in the same way that it is missing in (72).

(72) That Alan played 1st base (i)s very surprising.

In my analysis, then, pause is a concomitant of ś and ѐ, which are the output of Identity Deletion; no (node-splitting) regrouping rule is invoked to give the constituent break of (69); such a rule would fail to account for contrastive accent in (69), as well as the contrastive accent and pause of (70).

But certainly, in the cases of 'Primary Conjunction', there is no phonetic contrastive stress and pause. This is accounted for, in my analysis, only by a late-level rule of reduction of śCѐ to sCs, where ś is a single category. (See Section 1.3.3 for discussion of this rule, deriving (74) from (73), by optional application).

(73) John sáng and dànced.

(74) John sang and danced.

Schachter (1973:322) claims that there are also examples of secondary (i.e. non-constituent) conjunction which "do not show the phonological characteristics" discussed above. His examples (75a)-(d) are analyzed, by him, as not involving an S-non-S constituent break; hence these should not have the "special phonological characteristics" of (69).

(75a) I gave the boy a nickel and the girl a dime.

(b) The Soviets rely on military and on political indications of our intentions.

(c) He took John home and Mary to the station.

(d) The conjunction of an imperative and an interrogative sentence is excluded.

But I believe that the sentences of (75a)-(d) are indeed read with contrastive stress, as predicted by my rule of ID. Take (75a) as a sentential subject . In Schachter's analysis, I gave the boy a nickel and the girl a dime includes no S-non-S break, for the boy a nickel and the girl a dime is, for him, a coordinate VP. Thus t..ere should be no more contrastive stress and long pause before is of (76), than in (77); but there is.

(76) That I gave the boy a nickel and the girl a dime is no surprise.

(77) That I can sing and dance is no surprise.

I believe that (75a) is intonationally marked,[9] just like the example of Gapping (78) which Gleitman gives as the fifth member of the list of uniformly acceptable sentences; this is the list from which Schachter has taken only four examples, to give (75a)-(d).

(78) The man was haggard and the girl sick with exhaustion.

My claim is that all of (75a)-(d) and (78) have the contrastive accent assigned by ID. Thus such sentences are not evidence for Schachter's correlation of a S-non-S constituent break with special intonation.

My analysis does falter, though, on certain of the remnants, in (75), left by deletion. My C-filter excludes $\grave{s}$ unless it is a single constituent or a string of $\grave{X}$"'s. While this filter predicts that (75a), (c), and (77) are fully grammatical (because the remnants are $(\grave{X}")\ \grave{X}"$), it predicts that (75b), with on political=$\grave{X}\ \grave{X}$, and (75d), with an interrogative=$\grave{X}\ \grave{X}$, should be disallowed. A partial solution, for (75b), is suggested by Gleitman; she observes that while speakers uniformly accept (75b), they usually repeat (75b) as (79), "convinced that ... [this] was the sentence submitted to them." (79) is a standard example of Primary Conjunction. Thus the C-filter may not need to be modified to cover (75b).

(79) The soviets rely on military and political indications of our intentions.

I also believe that (75d) may not be a case of Secondary Conjunction, for compare it to (80), which I believe is starred, or, at least, certainly worse than (75d).

(80) *The memorization of an impossible and an invalid theorem is not excluded.

And indeed, compare (75d) to (81):

(81) The conjunction of an imperative sentence and an interrogative is excluded.

(81) is not a possible case of Secondary Conjunction, but is as good as (75d). I assume that in (75d) and (81), an interrogative is a complete NP, and is not reduced from an interrogative sentence. Thus C-filter may hold, in its assumed form, even for (75)-(81).

But the C-filter would throw out (69), repeated as (82), and (83), which Gleitman found "awkward by acceptable".

(82) ?John enjoyed, and my friend liked, the play.

(83) ?The man saw and the woman heard the shot fired.

I will distinguish the examples that pass C-filter (whether Primary, Secondary, Peripheral Ellipsis, or Gapping) as completely grammatical, while violations of C-filter give a marking of greater or lesser degrees of semi-grammaticality. The C-filter only permitted a string $\grave{s}$ when (i) $\grave{s}=X^i$ in the environment $/\acute{s}C\_\_\_$; or (ii) $\grave{s}=(\grave{X}")^*$ in the environment $/uC\_\_\_$. To my knowledge, there are no 'semi-grammatical' violations of the second condition -- Gapping and Right Peripheral Ellipsis remnants must be $(\grave{X}")$'s, with no exceptions (see Section 3.3 for futher analysis). This was reasonable, I claimed in Section 1.3.3, as a perceptual strategy to simplify the task of pairing

the contrasted ś and ŝ, when there may be an intervening unstressed u. The strategy requires that X" categories are the strings to be paired. But now consider the perceptually simpler task of pairing contiguous ś and ŝ -- where the (maximal) acute ś remnant is only separated by C from the grave ŝ remnant. The fully grammatical cases are those where ŝ is a single constituent; this is the fully well formed Primary Conjunction. But now take ŝ as my friend liked. This grave string is analyzed as X̀" X̀, and will not pass the C-filter as stated. Suppose C-filter's condition (i) be allowed to pass any string ŝ, but that the 'degree of grammaticality'[10] lessens as ŝ deviates from the optimal single constituent X^i. Then (84)-(87) provides a 'squish' of grammaticality, each coordination being better than its successor.

(84) John saw and heard the shot fired.

(85) ?John saw and Mary heard, the shot fired.

(86) *John saw this, and Mary heard that, shot fired.

(87) *John saw this big and Mary heard that loud, shot fired.

Such a formalization of 'degree of grammaticality', as being dependent upon the restriction on some term in an output filter (C-filter), may well allow for dialectal variation. For example, Schachter cites (85) as fully grammatical; perhaps his C-filter should allow ŝ, in condition (i), to be $\hat{s}=(\grave{X}")\ \grave{X}^i$. Along with (85), he accepts (88); for me these are both semi-

grammatical.

(88) Yesterday large, and this morning small, flags were flying.

The study of the details of this dialectal variation lies beyond the scope of my present work, wherein I have tried to give an analysis of fully grammatical constituent and non-constituent coordination, on the basis of DS and SS coordination of N" and S", a deletion rule of Identity Deletion, and a simple C-filter to simplify the perceptual task of pairing contrasting strings $\acute{s}$ and $\grave{s}$. Any relaxation of condition (i) of C-filter will permit (85) as semi-grammatical, and (86)-(87) as somewhat worse. I have suggested that slight relaxation of condition (i) still permits the pairing of contrasted $\acute{s}$ and $\grave{s}$ to be a simple task, but that non-contiguous $\acute{s}$ and $\grave{s}$ are inherently more difficult to pair, and retain their X"-hood requirement. Thus, while (89) is semi-grammatical, or dialectally accepted (see above on $\grave{s}=(\grave{X}")\ \grave{X}^{i}$), (90) is always out.

(89) Philósophers loáthe, and mystics prefèr, bibliomancy.

(90) *Philósophers loáthe bibliomancy, and mystics prefèr.

In Section 3.3, under the rubric of Gapping, violations like (90) will be studied further.

In conclusion, I agree with Schachter's aim of providing a unitary account for a wide range of coordination data, but

our analyses differ crucially in his denial of DS plurals and coordinate NP's, and his concomitant need for a (node-splitting) regrouping rule. Similarly, his denial of DS coordinate NP's requires him to form the quantifiers (both, all, etc.) by ad hoc syntactic transformations, which have the arithmetic property of distinguishing two conjuncts (both) from three or more (all). This, I have argued, is properly part of an arithmetic component of semantic interpretation. I rely more heavily on a deletion rule than does Schachter, and attempt to incorporate data which he ignores (Gapping and Peripheral Ellipsis, for example). Finally, while his dialect includes somewhat freer cases of Secondary Conjunction than does mine, I can analyze these as motivated extensions of condition (i) (the 'Primary Conjunction' condition) of C-filter, and define a notion of 'degree of grammaticality' of contiguous $\acute{s}C\grave{s}$ coordination.

3.3. Sag

In this final section, I compare Sag's (1976) analysis of Gapping and Verb Phrase Deletion with my own. I will conclude that restrictions which Sag writes into the Structural Description of his Gapping rule should be dropped, and relegated to an output (C)filter ; such a move permits Gapping to be analyzed as one reflex of the general Identity Deletion rule. But Verb Phrase Deletion has characteristics which disallow its collapse into ID; I will present evidence (based on Fiengo (1974) and Schachter (1978)) that Verb Phrase 'Deletion' is, in fact, interpretation of a bare VP, containing only an auxiliary verb. Thus, while ID accounts for Gapping, Right and Left Peripheral Ellipsis, Primary and Secondary Conjunction, Respectively Conjunction, etc., it cannot cover all cases of VPD -- cases like (91) and (92).

(91) The man who did yesterday will climb Mount Tutte-Grothendiech again tomorrow.

(92) Sandy hit everyone that Bill did.

In (91) and (92), the 'empty' Verb Phrase did is not in a conjunct; it is, in fact, found in a range of positions more appropriate for a pronoun than for a remnant of Identity Deletion. I give an account of VPD after studying Gapping, below.

Sag presents Gapping as a deletion rule within a framework like that of Chomsky & Lasnik, where deletions are part of

the interpretive phonological branch. This deletion rule is subject to output filters, permitting a description of variant dialects without modifying the deletion rule itself. Sag's Gapping rule, in (93) below, deletes string W_1 (and W_2, if this exists) under identity with string W_1 (and W_2) in the preceding conjunct sentence (Actually, Sag requires that the two conjuncts be alphabetic variants at the level of Logical Form. See below for a discussion of this, as it applies to 'Sloppy Identity').

(93) $W_3 - [_S X^2 - W_1 - (X^2)^* - W_2] - \left\{\begin{matrix}\text{and}\\ \text{or}\end{matrix}\right\} - [_S X^2 - W_1 - (X^2)^* - W_2] - W_4$

1 2 3 4 5 6 7 8 9 10 11

$\Longrightarrow$ 1 2 3 4 5 6 7 $\emptyset$ 9 $\emptyset$ 11

To my mind, Sag's most valuable contribution to the proper formulation of Gapping is the requirement that Gapping remnants be categories of the X", or X^2, level, and his observation (Sag:192,288) that these remnants bear contrastive intonation. The former requirement is written at cost into his Gapping rule; I have suggested, throughout my analysis, that Gapping is an example of Identity Deletion, unconstrained as to direction or remnants, but that its output must pass the C-filter. My formulation allows me to collapse Gapping with a number of other coordination deletions. Sag claims that Gapping should not be so collapsed, and his formulation in (93) thus has many restrictions which I must argue against.

We will consider some of the empirical distinctions between Sag's rule (93) and my claim that Gapping is an example of ID, wherein C-filter takes the grave string $\grave{s}$ as $(\grave{X}")^*$. One difference is that my Gapping rule can apply to languages with VOS or SOV order, but Sag's cannot. Not only is Sag's rule (93) trivially restricted to English, by its listing of the conjunctions and and or, but, also, his rule requires term 7 to be X^2, not V (as required to delete initial V to give VSO+_SO), nor $(X^2)^*$ (as required to delete final V to give SOV+SO_). Furthermore, his Gapping rule is one of forward deletion; he could not derive the SO_+SOV pattern which type III languages generally permit (see Section 2.1).

What is Sag's evidence that term 7 should be a single constituent? The only evidence stated (Sag:299) is that, by (93),

> Sentences like (i) cannot be generated, because only one remnant to the left of the (first) Gap [term 8] is allowed.
>
> (i) *John certainly likes Sue, and Joan possibly ∅ George.

But an earlier (Sag:221) statement contradicts this generalization.

> Moreover, one example attributed by Stillings to Bach, where the gapped clause contains the sequence [NP-ADV-NP], is judged to be perfectly acceptable (though perhaps awkward) by almost all of my informants:
>
> (3.2.45) Monk probably enjoyed epistrophy, and Albert Ayler, almost certainly, ghosts.

If the adverb in (3.2.45) is an X" (whether D" or an epistemic adverb introduced under Jackendoff's (1977) modal phrase category), it should be allowed to surface as a Gapping remnant. Such is Sag's claim, in adducing his (3.2.45). I accept that claim; the (still mysterious) fact that (3.2.45) is better than Sag's (i) cannot be captured by his (93), which would star both equally. I conclude that his term 7 should not be restricted to a single X" category, but should be (X")*.

Beside the single-constituent requirement which Sag (apparently incorrectly) ascribes to term 7, he mentions (Sag: 265) a restriction that term 7, for many speakers, "cannot analyze S's" (or, better, propositions S"), as in (dialectally) starred (94).

(94) *That Harry is a fool bothers Dick,
and that Bill is a fool ∅ Sam.

But even in my dialect, where (94) is only semi-grammatical, it is improved if Dick and Sam are replaced by some people/the rest, as in (95).

(95) That the world is flat might surprise some people,
and that there's no bottom, the rest.

As Kuno (1976) has shown, Gapped sentences with proper names as remnants do not provide a true test of syntactic constraints on Gapping, but involve perceptual constraints on 'old infor-

mation' versus 'new information'. Although Sag quotes Kuno with approval, certain of his examples, meant to show syntactic violations, can be improved by merely observing Kuno's caveats. On the basis of further study it may prove necessary to mark (94) as unacceptable to a dialectal output filter, but at present I find little evidence for so constraining the deletion rule itself. I conclude that if Sag's rule (93) is to be retained, term 7 should be (X")*.

We turn now to term 8. Sag (p.299) notes: "[t]his rule must be constrained somehow to prevent term 8 from being null [Note that term 10, W_2, usually is null]. Gapping must effect right-peripheral ellipsis only when it is concomitant with sentence-initial ellipsis." If term 8 were null, Gapping would find its only deletion target (term 10) completely to the right of terms 7-(8)-9, thus giving RPE.

We will examine Sag's evidence that Gapping and RPE are distinct, but it may first be noted that Sag must not only constrain term 8 (W_1) to be non-null, but must also replace term 9 ($(X^2)^*$) by $(X^2)^+$, to prevent term 9 itself from being taken as null. For if term 9 were null, then here, too, Gapping would effect RPE, deleting all terms to the right of the initial term 7, and therefore letting Sag's Gapping give the RPE output (96).

(96) John flew to Europe, or Bill.

Sag must therefore do more than merely constrain term 8, if he wishes to separate Gapping from RPE.

Sag's requirement that Gapping, (93), be allowed to delete two targets simultaneously, concerns sentences like (97a) and (b)

(97a) Betsy talked to Peter on Sunday, and Alan Ø to Sandy Ø.

(b) Betsy believed Peter to be sexy, and Alan Ø Barbara Ø.

In my analysis, (97a) and (b) are differently affected by the iterative application of Identity Deletion. The underlying SS of (97a) is (98); I follow Sag (p.277) in analyzing on Sunday as ("at least sometimes") a daughter of S', to the right of V". Then one application of ID could leave (99), which would pass my C-filter, since $\grave{S}=\grave{N}"\grave{V}"$.

(98) and Betsy talked to Peter on Sunday and Alan talked to Sandy on Sunday.

(99) and Betsy talked to Peter on Sunday and Alan talked to Sandy.

Another possibility is to first delete talked inside the V", and then, on a second application of ID, to delete on Sunday, having the left context N"V". These two applications of ID give (97a), which passes my C-filter because $\grave{S}=\grave{N}"\grave{P}"=\grave{A}$lan to Sandy.

Now consider (97b). As was stated, (97b) is differently affected by my ID and C-filter, for to be sexy is not outside of V", as was on Sunday. Thus if ID deletes to be sexy, (100) will be left, which cannot pass the C-filter, since the categories marked with grave ` are Ǹ"V̀ Ǹ", and not Ǹ"V̀", as in (99).

(100) *Betsy believed Peter to be sexy, and
Alan believed Barbara.

Before C-filter applies, however, a second application of ID is permitted; [believed]$_V$ is the target (and trigger) of deletion; the left context is the subject N"; the right context for deletion is the complement proposition S". In the first conjunct, this proposition is [Peter to be sexy]$_{S"}$; in the second conjunct it is merely [Barbara ___]$_{S"}$, but at the pertinent level (HPA), the two contexts are identically S". Deletion thus is permitted, to give (97b), above, which passes C-filter with s̀=Ǹ"Ǹ".

Therefore, RPE can feed Gapping, if each case of deletion is taken as one application of ID. Only after all deletions have applied must the output pass C-filter. In this way, a structure (like the 'RPE' example of (100), which would be starred by C-filter), may be improved by a second application of ID (to give 'Gapping'). My ID-C-filter analysis can cover the desired cases (97a)-(b),[11] without allowing simultaneous deletion of two separate strings. Repeated application is

descriptively sufficient, and preferable for the economic statement of the rule.

I have discussed the import of Sag's terms 7, 8, 9, and 10, and have concluded that left-context term 7 should be (X")*, just as is right-context term 9, and that there is no need for the second target term 10, if Gapping (or ID) is fed by RPE, and the output checked only later, by an output filter. If my conclusion is accurate, Sag's Gapping rule would then be almost identical to my ID-C-filter analysis of Gapping.

We now turn to various arguments Sag has given to prevent collapsing Gapping with other deletion rules. It is important, however, that in Sag's framework (similar to my own), the output of deletion rules must pass through certain filters, the use of which allows a simpler statement of deletion. Furthermore, idiolectal variation may be covered by slightly differing output filters. As an example of this process, I would like to consider a requirement Sag (p.266) places on his rule: "the second X^2 [term 9] ... must be restricted so that it cannot analyze V^2. This would presumably be done by means of syntactic features, but we will not pursue that matter here". In (101), Sag's V^2(V") dominates Aux (must have) and V' (seemed sad), and, it is claimed, cannot be the right-hand remnant.

(101) On Tuesdays, Sam must have seemed happy and on Wednesdays Ø must have seemed sad.

Suppose that (101) is bad, for the reason Sag claims. Such a condition on the rule of Gapping would serve to distinguish it from other deletions, for I have claimed that V" is the right-hand X" remnant in (102).

(102) John sings and ___ dances.

But Sag (p.278) may provide a possible solution, in the form of an output filter he independently needs. He wants to give reduced acceptability to (103), at least in some idiolects:

(103)?*Willy put the flowers in a vase, and Charlie _____ the book on the table.

He proposes an output filter, (104), which can be modified to suit the dialects.

(104) * $[_S X^2 [_V, X^2 - C^*]]$, where C* stands for any (non-null) sequence of (X") constituents.

Now, to throw out (101), a filter comparable to (104) may be proposed; a preliminary formulation is as in (105).

(105) *$[_{S"} X^2 V^2]$ unless X^2 is (or controls) subject of S"

(105) may be a perceptually motivated constraint, preventing interpretation of (101), because Wednesdays is in the subject's

pre-V" position, but is not the subject. In some such manner, Sag's V"-condition on Gapping can be captured as an output filter, similar to, and perhaps collapsible with, his filter (104).

If (101) should indeed be starred, I propose that this is by a filter like (105). Such an approach leaves Gapping largely unconstrained (and collapsible, therefore, with RPE), and permits the capture of idiolectal variation. For many (perhaps all) speakers, (106) is fine, even though the second remnant is V". (107) is similar.

(106) At our house, we wash dishes, and
at Betsy's house, play poker.

(107) At 10 mph, a horse canters, and at 5 mph, trots.

It is in fact likely, I believe, that (101) is only bad because two strings of identical auxiliaries are contrastively stressed. Thus (101) is improved by contrasting differing auxiliaries, as in (108), which is better than the minimally different (101). (In my analysis, s̀ in (108)=P̀"M̀"V̀").

(108) On Tuesdays, Sam must have been happy, and
on Wednesdays, might have been sad.

I conclude that the proper method of disallowing (101) cannot be by a general prohibition on the rule of Gapping, to prevent term 9 from analyzing V", for such an approach incorrectly

stars (106)-(108), and cannot capture idiolectal variation.

Sag presents other evidence which is initially (p.198) viewed as part of the VP-prohibition, but later (p.265) he notes that this data is subject to an alternative account. He cites Ross's example (109) (with Ross's judgments) to show that "VP is an unacceptable second remnant in a Gapped clause."

(109a)?*He may stay inside, and she ∅ go to the beach.

(b)?*He has taken the Star of Pittsburgh, and she ∅ stolen the Moon of Altoona.

(c)??He was squeezing a tennis ball, and she ∅ greasing a shoe.

(d) ?He was driven to Aix, and she ∅ taken to Ghent.

But Sag does not, in fact, use this proposed restriction, since in is analysis, none of the remnants in (109) is a V". He (pp.32,264) treats only "the 'highest VP' (the VP which immediately dominates that AUX which expands to tense (M) (have-en)) as V^2, and the other VP's as recursive V'." Thus each of the remnants of (109) (go to the beach, stolen the Moon of Altoona, greasing a shoe, taken to Ghent) is a V', and not a V". Such X' remnants are prohibited by Sag's formulation of Gapping, which leaves only X" remnants.

Therefore (109a)-(d) do not provide evidence for or against Sag's special V"-constraint, but rather are part of his X"-restriction. Note, however, that the X"-restriction was basic to his formulation of Gapping, and apparently inviolable; why aren't all the examples in (109) then simply starred? In some

dialects (my own, included), (109a) is rather good (and better if one man/the other man are substituted for he/she, which do not bear contrastive intonation as well as do the longer NP's), while (110a)[12] and (b) [13] are perfect.

(110a) Harry may leave, and Fred ___ stay.

(b) John will sing and Mary ___ dance.

In my analysis, such sentences provide evidence that the modal is outside of V", so that stay and dance are possible Gapping remnants. In Sag's analysis, such sentences must be starred, whether they are V' remnants (as he claims) or V" remnants (perhaps dialectally) -- for in the latter case, his V"-prohibition would star (110a)-(b).

I take (109a) to be grammatical, and may perhaps account for dialectal variation (if it exists) by dialectally permitting modals to be inserted under V", as a specifier to V'. Such a modal could not be deleted in (109a), for the remnant would not be a grave string $(\grave{X}")^*$. Next, my analysis of Verb Phrase (Section 2.2) would predict (109b) to be starred, since stolen the Moon of Altoona is neither a complete V", nor analyzable as a string $(\grave{X}")^*$. But (109d) should be fine (especially when one man/the other man are substituted for he/she), if the passive participle is indeed an adjectival phrase (as suggested in Section 2.2). The $\grave{s}$ remnant in (109d) would be $\grave{N}"\grave{A}"\grave{P}"$. Note, incidentally, that example (111a) which should be as good as (109d), is bad when taken as a Gapped sentence,

and (111a) is bad for the same reason as (111b) is. As Chomsky & Lasnik (1977:438) suggest, The horse raced (past the barn) appears to be a tensed sentence; its true analysis is mistaken, because of purely accidental morphological facts.

(111a) *The ball was thrown, and the horse ___ raced.

(111b) *The horse raced past the barn fell.

The final example is (109c), which Ross marks ??; it would be marked * by my analysis of ID as leaving X" remnants. But Ross's marking is, in fact, correct. Although I have explained why (109c) is worse than (109d) (and, in my dialect, (109a)), I have not explained its being better than (109b). An extremely tentative possibility is a rule of be-deletion, applying in a lower S", as in the relative clause of (114), derived from (112) by Move α and COMP-deletion. Be-deletion may optionally apply to (114), to give (115); if it does not apply, Chomsky & Lasnik's (1977:486) NP-T-VP filter will throw out (114).

(112) The man [who is greasing a shoe] arrived.

(113) The man [who t is greasing a shoe] arrived.

(114) The man [___ t is greasing a shoe] arrived.

(115) The man [t greasing a shoe] arrived.

Such a rule may perhaps misapply, into a lower (conjunct) S", to give the semi-grammatical (109c). I assume, in any case, that some such explanation is available, so that the differential (and dialectal) acceptability of (109) may in fact follow from -- and not be a counter to -- the requirement that Gapping leaves X" remnants.

I have examined Sag's proposed restrictions on terms 7, 8, 9, and 10, and considered that each term should be so modified as to bring it more in line with my analysis, of ID applying to coordinate NP's or propositions. We will now examine the domain of application of Sag's rule. As stated ((93)), it seems to apply to conjoined sentences, and not to propositions, but Sag apparently used a novel abbreviation, S, to collapse S^1 (his sentence) and S^2 (his proposition), for on p.265, he labels (116) as "$S(S^2)$" and (117) as "$S(S^1)$".

(116) On Wednesday, Sam must have seemed sad.

(117) Sam must have seemed sad.

Sag never mentions this abbreviation, so I may be wrong in assuming that S in (93) is ambiguous. However, Sag must apply Gapping to a S" conjunct like (116) to derive (118) (his (3.4.16)).

(118) On Tuesday, Sam must have seemed happy, and on Wednesday, sad.

And also, unless he applies Gapping to conjoined sentences (S'), he cannot derive (119) (his (3.4.17b)) by Gapping, because <u>that</u> is not a possible term 7 for him.

(119) That Alan played 1st base and Betsy shortstop, is not surprising.

In my analysis, the only conjuncts available to <u>ID</u> are propositions and noun phrases. Since <u>ID</u> can apply repeatedly, (119) is the result of first deleting <u>played</u> in (120) (in the context COMP-N"-___-N"), and then deleting COMP (in the context $\emptyset$-___-S").

(120) [[That Alan played 1st base] and [that Betsy played shortstop]], is not surprising.

The deletion of COMP, in $S"_2$, is required by C-filter, because otherwise COMP would be an $\grave{s}$ remnant which is not $\grave{X}$". Free, repeated application of <u>ID</u>, followed by C-filter, permits the derivation of both (118) and (119), without requiring that Gapping's domain include conjoined sentences as well as conjoined propositions.

A second example of <u>ID</u> obligatorily deleting COMP is in (121), which must give (123), not the intermediate *(122).

(121) Bill said[[that Betsy played shortstop], and [that Alan played 1st base]].

(122) *Bill said [[that Betsy played shortstop], and [that Alan ___ 1st base]]

(123) Bill said [[that Betsy played shortstop , and [___ Alan ___ 1st base]].

We may expect Chomsky & Lasnik's free deletion in COMP to interact with the patterns given, and to further permit deletion of the 1st (unstressed) COMP, to give (124) as an alternant:

(124) Bill said Betsy played shortstop, and Alan, 1st base.

This is correct; (124) is as good as (123) (But see below, on this matter).

We have considered the case where Gapping (ID) applies inside two conjunct S"'s, and must delete that. Now consider the case where one of the remnants of Gapping (ID) is itself a proposition. C-filter requires that the remnant be X", for example S", so that (126) cannot be the output of ID, while (125) may be.

(125) Sandy said that he was a fool, and Betsy, that he was out of his mind.

(126) *Sandy said that he was a fool, and Betsy, ___ he was out of his mind.

Although ID is constrained, through C-filter, not to leave the S' remnant [he was out of his mind], there is no such constraint on free deletion in COMP. Why, then, can't free deletion remove the COMP of the S" remnant, so that both (125) and (126) pass C-filter with grave sting s=$\grave{N}$"$\grave{S}$"?

Chomsky & Lasnik suggest that COMP-deletion is effectively constrained by their [NP tense VP] filter. They want to permit that to delete after believes (as in (127), below), but not after the second subject NP, Bill.

(127) John believes (that) Mary saw Sam, and Bill, [that Sue saw Harry]

However, that may delete after the head NP of a relative clause. Chomsky & Lasnik (p.484) present their filter as (128), to capture the fact that "finite declaratives are generally restricted to the immediate domain of Verb or Adjective (i.e. [+V]) or that; or NP, as in relatives."

(128) * [$_{\alpha}$ NP tense VP], unless α is adjacent to and in the domain of [+V], that, or NP

In (127), they claim, that-deletion would give [$_{\alpha}$Sue saw Harry] "adjacent to the NP but not in its domain." But this claim is clearly incorrect;[14] by their definition of 'domain' (p.459), the domain of a subject NP is its whole clause, including its VP and any objects in that VP. Thus the string

[[Bill] [Sue saw Harry]] should be permitted, just as is the relative [[the man] [John saw]].

I have an alternative explanation for *(126) -- a perceptual constraint disallowing certain NP NP sequences in Gapped sentences. The perceptual constraints proposed (or discussed) by Kuno (1976) throw out a number of patterns that are otherwise well-formed. These constraints are not conditions on the application of Gapping (or ID), but perceptual restrictions on the interpretability of the reduced and contrastively-stressed structures which deletion leaves behind. For example, Kuno shows that Gapping sentences may be improved by avoiding proper names as remnants, because Gapping remnants are best interpreted as 'new information', while proper names have the opposite interpretation, as 'old information'. Of course, the deletion rule abstracts away from this requirement, which should be an independent, non-syntactic constraint. A second perceptual phenomenon is that "[w]hen Gapping leaves an NP and a VP behind, ... the NP [is readily interpreted as] representing the subject of the VP". This Tendency for Subject Predicate Interpretation (TSPI) is violated in Sag's (3.2.56), repeated as (129):

(129) *Jack asked Mike to wash himself, and
Sue to shave himself.

A third perceptual constraint is Kuno's Requirement for Simplex-Sentential Relationship (RSSR), whereby the remnants

are (almost exclusively) interpreted as constituents of a simplex sentence. Thus (130) is*in the desired interpretation, because Martha is not in the same simplex sentence as Bill. (Sag's (3.2.62)).

(130) * John persuaded Dr. Thomas to examine Jane, and Bill _____ Martha.

I would like to suggest a fourth perceptual constraint[15] on the interpretation Gapping remnants, much in the line of Kuno's constraints. My Tendency for Subject Object Interpretation (TSOI) holds that "when Gapping leaves initial NP-NP behind, they are most readily interpreted as subject and direct object." TSOI is readily viewed as an extension of RSSR, whereby the simplex-sentential relationship of two NP remnants is the subject-object relationship. I will show first that TSOI may be relevant to disallowing that-deletion in *(126), and then provide justification for TSOI.

In *(126), the initial S̀ remnants are Bètsy and he of S̀"=[he was out of his mind]. The lack of an intervening COMP permits TSOI to attempt to interpret he as object of Betsy. Such an attempt fails, because of the following Verb Phrase and resulting lack of parallelism with the stressed ś remnants, in S". TSOI would also be invoked in interpreting (127), if that is deleted in the second COMP, for then Bill and Sue are contiguous NP 's, readily interpreted as subject and object by TSOI. Such a strategy fails, so that (127) must surface with

filled COMP separating Bill and Sue.

Other evidence for TSOI includes the restricted range of interpretation for (131):

(131) A gave B to C, and D, E.

D and E are interpreted as subject and direct object, but not as subject and prepositional object, or direct and prepositional object.

As Sag has noted, Gapping does not delete the preposition of a Prepositional Phrase, leaving an NP stranded. But TSOI may explain this fact.[16] (132) is disallowed because his Ford, according to TSOI, should be interpreted as a direct object.

(132) *Mary is happy with her Porsche, and Bill, his Ford.

Similarly, (133-134), where the second act would be misinterpreted as object.

(133) *Beth left after the first act, and Norma _____ the second act.

(134) *Jim was hassled on Winthrop Street, and Norma, ___ Hooker Street.

The requirement that the second NP be a direct object and not an indirect (or prepositional) object will account for the different acceptability of (135a) and (b).[17]

(135a) We'll send roses to Tom, and you ___ tulips ___.
(b) *We'll send Tom roses, and you ___ Janet ___.

The cases above show that the second NP must be the direct object; the requirement that the first NP be the subject would be violated in (136), so (136) is disallowed.

(136) At our house, we play poker, and
Betsy's house, bridge.

I assume that the perceptual constraints mentioned above are only invoked to solve the difficult problem of parsing non-contiguous coordination -- i.e., coordination wherein an unstressed string u separates the paired ś and s̀ strings. Then TSOI, in particular, need not be invoked for Left Peripheral Ellipsis, as in (137), because the pairing of contiguous ś and s̀ is perceptually easier than the pairing involved in Gapped sentences.

(137) I gave John $5, and Bill $10.

In (137), there is no tendency for Bill and $10 to be read as subject and object; I assume TSOI is not invoked, because the ś and s̀ strings are contiguous, across C: śCs̀. The fact that TSOI is not invoked for (137) should not, I claim, argue against a collapsing of LPE and Gapping into ID, for the application of

TSOI should be made dependent upon output structure. The proper form of these perceptual constraints is as superficial filters, and not as conditions on rule application.

Sag examines comparable sentences -- as in (138a) and (b) -- and concludes that Left Peripheral Ellipsis, but not Gapping, may delete a preposition, leaving a NP remnant.

(138a) *John spoke to Harry, and Bill ___ ___ Mike.

(b) John spoke to Mrs. Wimble on Friday and the dean onDaturday.

That this is true is ascribed, in my analysis, to the TSOI's forcing interpretation of Mike, in (138a), as direct object and not prepositional object. I do not view (137)-(138) as evidence for distinguishing the deletion rules giving Gapping and LPE, but suggest that TSOI, like others of Kuno's constraints, be restricted to Gapping outputs.

Sag (pp.204-210) suggests four further differences between Gapping and LPE; examination of these will be among the last points in my clarification of Gapping as an example of ID. First, "most people seem to find [Gapping] ... with but to be unacceptable"[18]. Sag gives the example (139).

(139)(%)*John likes Richard, but Betsy Ø Peter.

However, (139) also violates Kuno's constraint on new information; (139) is improved, and more generally acceptable, when

fewer proper names are included. Compare (139) to Neijt's (1979:59) example (140), adduced by her to argue a similar point.

(140) Some people like bagels, but others ___ cream cheese.

That the constraint on new information versus old may be pertinent is supported by (141); contrastive accent on the four proper names leads to unacceptability, even in a LPE output.

(141)?* Mike introduced Joan to Richard, but Betsy to Peter.

I assume that the badness of (139) does not support a differentiation of LPE from Gapping, but suggests further study of but.

Secondly, Sag claims (p.206) that Gapping's first remnant may not be a sentential subject, and uses this to separate Gapping from LPE, whose first remnant may be S". But the S" left by LPE is not a sentential subject, and Sag (p.265) notes that the restriction on Gapping may follow from independent constraints on sentential subjects; in any case, the badness of such sentences (as (94) on p.217, above) varies among speakers. From my discussion on p.217, I concluded that some of the badness of Sag's example certainly was due to his extensive use of proper names, and that, if (95) is bad for some speakers (it is good, in my speech), the badness should be captured by output filters rather than a restriction on the

rule of deletion.

Sag's third point is that Gapping remnants (the X"'s in the second conjunct) must be separated by a pause; such pauses are not required, for most speakers, in cases of LPE. But suppose, as in Section 3.2, that the contrastive intonation assigned by ID can be reduced, universally in cases of Primary Conjunction, and also, for some speakers, on cases of Secondary Conjunction (e.g. for ś C s̀, where ś and s̀ are analyzed as $(X")X^{i}$. See Section 3.2). Then the contrastive intonation would be reducible, dialectally, in just such cases. I'll assume this is the derivation of reduced accent in LPE, which in this respect must differ from Gapping or RPE, though all three are cases of ID.

Sag's final argument is that as well as can conjoin the paired strings of LPE, but not of Gapping. (See Sag (p.209) for discussion). However, he cites Fiengo (1974:126) as permitting Gapping with as well as, and the bad Gapping sentences which Sag proposes have proper name remnants. Certainly (142) is bad. Can it be improved by the standard change to (143)? The answer is "no".

(142) *Peter is happy as well as Betsy Ø sad.

(143) *One man is happy, as well as the other sad.

I suspect that the semantic contrast required by Gapping disallows as well as. For as well as means something like in addition to, and seems (to me) inappropriate to capture contrast.

I have not considered such conjunctive phrases in my analysis, and cannot, in this work; but I assume that some such explanation is operating, perhaps as a semantic rule, and does not distinguish the formal rule of deletion for LPE from that of Gapping.

I conclude, from the discussion of this section and Chapters 1 and 2, that not only must Gapping be collapsed with LPE into Identity Deletion, but also Right Peripheral Ellipsis, Primary/Secondary Conjunction, and quantified conjunction (as analyzed in Sections 1.3.3, 3.2). Gapping in English is merely forward Identity Deletion, later subject to idiolectal/dialectal output filters in addition to the general C-filter. Kuno's perceptual constraints, and my additional TSOI, further delimit the permitted Gapping patterns, though not at the cost of modifying the Structural Description of the deletion rule (into a form like Sag's (93)), or of conditioning its application. Gapping is one reflex of ID -- which remains an optional bidirectional rule, constrained mainly in that its output must pass C-filter.

The second and final topic of this section is a brief account of 'Verb Phrase Deletion'. My analysis of ID + C-filter offers no description of the wide range of VPD data, since, among basic differences: (i) ID requires a linguistic trigger for deletion, in an environment 'local' to that of the target of deletion (See Section 1.3.1). But VPD allows pragmatic control (144)[19] and discourse control (145).

(144) (A and B are competing in weight lifting. A lifts 300 pounds)

B: If you can, so can I.

(145) A: Eat this banana.

B: I won't.

(ii) the output filter (C-filter) for ID disallows non-contiguous remnants unless of major phrasal category, X". Thus the RPE in (146) is starred.

(146) Philósophers loáthe bibliomancy, and mystics prefèr ____.

But VPD in (147) is permitted:

(147) John loves Mary, and Peter does, too.

It may be noted, also, that the contrastive intonation obligatorily retained by non-contiguous remnants, ś and ś, is not necessary in VPD; (147) requires no contrastive stress.

(iii) VPD is not restricted to coordinate structures, as are Gapping, Peripheral Ellipsis, Primary and Secondary Conjunction, respectively- and quantifier-coordination, and all other cases of ID, followed by C-filter. VPD may apply in a subordinate clause, whether the antecedent precedes (as in 148) or follows (as in 149) the 'empty' VP.

(148) Gwendolyn hit a single after Sandy did.

(149) Anyone who can should go to this movie.

Indeed, VPD can apply,'internally' to a trigger VP, as in Sag's (1976:68) (150):

(150) Betsy grabbed whatever she could.

It is clear that ID will not account for VPD, which allows its antecedent to be as free as the antecedent of a pronoun. I follow Fiengo (1974) and Schachter (1977, 1978), in claiming that the rule(s) giving identity deletion should not give VPD. Fiengo's (1974:131) observation on this point is important: "the interpretation of the VP in the relative clause" in (151), below, is "as free as that of the VP in" (152). (Fiengo's examples).

(151) The man who did yesterday will climb Mt. Tutte-Grothendieck again tomorrow.

(152) The man did yesterday.

The VP, in (151) and (152), is disambiguated by its context, just as he of (153) is disambiguated.

(153) Before he came, John telephoned.

In the ultimate interpretation of (153), he may be anaphoric to a NP in its sentence (subject to the Backward Anaphora Constraint[20]), or in preceding discourse (this directionality may be a reflex of the BAC), or, as a deictic pronoun, he may refer to some person in the pragmatic context.

So, too, for did. In isolation, (151) will be interpreted as climbed Mt. Tutte-Grothendiech, just as (153), in complete isolation, will interpret he and John as coreferential. In a discourse context, did may be much freer -- perhaps to the extent of allowing, as antecedent, any action which does not contradict the requirement for the past time and adult male actor in The man did yesterday. Finally, bare auxiliaries may be interpreted solely on the basis of their pragmatic context (Schachter (1977,1978)); (144), above, is an example. (Note Hankamer (1978) has claimed that such cases of VPD are formulaic and stereotyped; but this may be a concomitant of Schachter's requirement for VPD's very restrictive pragmatic contexts).

I view Schachter's account as only the preliminaries to an analysis of VPD as 'deep' (pronominal) anaphora, but I believe it may well be the correct approach. Note that, in

my analysis of the Verb Phrase (Section 2.2), auxiliaries are generated as head verbs (generalizing the case of copular _be_ and British possessive _have_), without any special restrictions. The head verb of a V" is merely restricted to [+V]; thus any verb, whether auxiliary or not, should be insertable into such a position. It seems to me appropriate to take the semantic component (and its extensions to Discourse Grammar) as the locus for determination of the antecedent of an auxiliary inserted under V', because that antecedent may be in V's sentence, or discourse, or pragmatic context.

I conclude that VPD cannot, and should not, be collapsed with _Identity Deletion_, which has been constrained to apply to adjacent structures in a single PM, and not to allow deletion in discourse or pragmatic control. 'VPD' should then be interpretation of any ("vague") aux-filled V", on the basis of sentence, discourse, or (necessarily restrictive) pragmatic context. The 'trigger' and 'target' of VPD, as of pronominal anaphora, are determined in the semantic branch; the 'trigger' and 'target' of _ID_ are determined in the phonological branch.

4. Conclusion

My goal in this work has been to show that a variety of seemingly disparate coordinative phenomena should be collapsed into one optional bidirectional deletion rule, whose output must pass the later C-filter. The interaction of Identity Deletion (subject to C-filter) with the other components of the grammar permits the description of such complex paradigms as the permitted quantifier positions in English (Sections 1.2.1 and 1.3.3) or the permitted Gapping patterns available to natural languages (Sections 2.2 and 3.3). Some of the constraints on Gapping, for example, are properly perceptual or semantic; some are syntactic; certain restrictions (e.g., C-filter) are best captured in the phonological component. I have attempted, in this work, to sketch out some examples of these (complex) interactions of the (relatively simple) components, following the lead (and within the general framework) of Chomsky & Lasnik (1977).

FOOTNOTES

Chapter 0.

1 (p.7) (6b) would be grammatical:

Jóhn síngs ____, and Bìll dànces today.

Chapter 1.

1 (p.9) I have changed Ch & L's (1977:431) tentative ordering of the phonological components, as described below.

2 (p.9) v. Chomsky (1970)

3 (p.11) in the sense of Chomsky (1965:225,fn. 11)

4 (p.13) The filters may not follow the phonological component, or else only counter-intuitive language-particular filters, couched in terms of phonetics, would be allowed. I take the filters as part of the phonological component. See below.

5 (p.32) wh-movement could not, of course, move just one conjunct, since such an application violates A/A. Movement of whose, out of whose friends, would also violate sujacency.

6 (p.34) or forward Deletion. This rule is comparable, in some respects, to the forward application of my bidirectional Identity Deletion rule. However, Williams requires supplementary rules of Gapping and Right Node Raising; in my analysis, ID covers these.

7 (p.39) Emonds stars:

John gave the boys all some new clothes.

but I believe most studies would disagree (Schachter (1973:406), Baltin (1978:183)).

8 (p.40) Dougherty (1970:877) provides examples ending in ...dollar each. See also Postal (1974:115) and Emonds (1976:49) on inserted parentheticals and all.

9 (p.42) I will allow (p.46) postposition of Q into its sister S" conjunct.

10 (p.43) cf. Baltin (1978) for counter-examples and an alternative account, invoking 'landing sites'

11 (p.45) v. Emonds (1976:240; also 1970:234) for this argument.

12 (p.45) See p.54, below, and fn.15

13 (p.51) A syntactically non-singular subject, like scissors, will not suffice. Note that there also exist verbs, not cited in the text, which require non-singular objects (contrast, shuffle).

14 (p.52) at SS (as at LF) the and will be extant, being only deleted in the phonological branch.

15 (p.54) Baltin (1978:68) uses $\bar{\bar{X}}$ instead of arbitrary category X, but his restriction is tentative; he cites $\bar{\bar{X}}$ with the disclaimer: "whatever the appropriate category symbol may be."

16 (p.61) But Ross (personal communication) cites (without marking):

Have you answered all questions, and what bank are you routing payments through?

17 (p.61) Ross:

There are 2 spots here, and can you see a robin?

18 (p.61) Ross:

Tune the piano, and by when can you fix the hammock?

19 (p.62) A matter I ignore here is resumptive PRO in an implied threat:

He's the mafioso who you say his name and you end up in the East River.

20 (p.66) Oxford English Dictionary: "Relatively to each of several persons or things; individually, singly, separately; each to each, severally"

21 (p.68) The parenthesized (respective)s of (120) do not add to the meaning, but Dougherty consistently cites these as grammatical.

22 (p.72) Possibly ́is ultimately realizable as Bolinger's (1965) B accent (and ˜ as Bolinger's A accent), but I will not collapse these accents at the level of ID's application.

23 (p.74, 75) v. Chomsky (1965:181) for 'non-distinctness'. See below in text for my notion of strict identity.

23 (p.83) v. Chomsky (1965:181)

25 (p.87) I describe one common dialect; a second, which finds concord with the conjunct subject nearer the verb, is not treated here.

26 (p.92) in my analysis, the filters are rules of the phonological component, the final component of the phonological interpretation branch

27 (p.95) I accept this; for many speakers, Bill, too is a better remnant.

28 (p.103) Dialectal variation exists here; see discussion in Section 2.2.

29 (p.104) Thus (177) is bad with stressed them.

Chapter 2.

[1] (p.100) See Section 1.3.3. Asyndeton, which is available in some Gapping patterns, must arise after C-filter applies. It can not be an example of ID, because there can be no trigger for the deletion of a unique string.

[2] (p.114) All are SVO except VOS Toba Batak and SOV Maninka, Susu, Turkish. The compound verb data for Indonesian, Susu, Swahili, and Thai are unclear (Koutsoudas (1971:346)).

[3] (p.115) unavailable to me; I take my information from Rosenbaum 1977.

[4] (p.121) whether he derives SO+SOV by Gapping or by Right Node Raising. (see Kuno 1971 & Ross (1967b) for relevant structures)

[5] (p.126) unavailable to me (v. fn.[3])

[6] (p.130) The misspellings here (if any) are as in Furbee (1974)

[7] (p.134) unavailable to me (v. fn.[3])

[8] (p.146) cf. Dougherty (1968), citing Perlmutter and Chomsky (1965)

[9] (p.149) cf. Chomsky (1965:167) for $[+\_\_\ \widehat{NP\ \text{Manner}}] \rightarrow [+\_\_\ NP]$

[10] (p.152) Emonds (1976:212), discussing Lexical Insertion of have, be.

[11] (p.159) countered, perhaps, by the well-known uninhabited data

[12] (p.161) Emonds (1976:242-3). See also p.157 above.

[13] (p.164) semantically distinct from emphasis on a non-auxiliary; the latter emphasizes the single verb, the former, the whole proposition.

[14] (p.169) Pullum & Wilson (1977)

Chapter 3.

1 (p.175) but Chomsky may mean that there is a total of n+1 sentences, the matrix sentence containing a coordination of n empty conjuncts

2 (p.175) cf. Chomsky (1965:224)

3 (p.178) Dougherty (1968:38)

4 (p.178) Dougherty (1970:864)

5 (p.178) Dougherty (1971:315)

6 (p.179) Dougherty (1968:305)

7 (p.181) Dougherty (1971:335)

8 (p.197) his (123) and (137b)

9 (p.208) see p.237, below, for the dialectal possibility of stress reduction for certain Left Peripheral Ellipsis remnants; perhaps just those strings śCs where both is possible dialectally.

10 (p.211) cf. Chomsky (1965:75-79)

11 (p.220) I am ignoring cases of Null Complement Anaphora here,

... but Bill refused

and consider NCA to be Base-generated 'deep anaphora', therefore subject to discourse/pragmatic control, and not bound by the requirements on ID and C-filter. See the final pages of this section, for similar thoughts on VPD.

12 (p.225) from Pullman & Wilson (1977:744). They call this Modal-Gapping.

13 (p.225) from Hudson (1976)

[14] (p.230) as observed by Iwakura (1979), for example, who distinguishes, in filter (128),'head ℕP' from 'ℕP'.

[15] (p.232) perhaps a sub-case of Kuno's RSSR

[16] (p.233) Sag (his Section 3.3) presents an Immediate Domination Principle as the explanation for *(132)-*(134) and *(136).

[17] (p.233) examples due to J.R. Ross (personal communication)

[18] (p.235) Sag (p.190)

[19] (p.239) cf. Schachter (1977, 1978), and, for counter arguments Hankamer (1978)

[20] (p.241) BAC: cf. discussion in Sag (1976: Section 4.2)

BIBLIOGRAPHY

Akmajian, A. (1975) "More Evidence for the NP Cycle," Linguistic Inquiry 6, 115-129.

Akmajian, A., S. Steele, and T. Wasow (1979) "The Category AUX in Universal Grammar," Linguistic Inquiry 10, 1-64.

Akmajian, A. and T. Wasow (1975) "The Constituent Structure of VP and AUX and the Position of the Verb Be," Linguistic Analysis 1.3.

Bach, E. (1970) "Is Amharic an SOV Language?," Journal of Ethiopian Studies 8, 9-20.

Baltin, M. (1978) Toward a Theory of Movement Rules, unpublished Doctoral dissertation, MIT, Cambridge, Massachusetts.

Bolinger, D. (1965) Forms of English: Accent, Morpheme, Order, Harvard University Press, Cambridge, Massachusetts.

Carlson, G. (1977) Reference to Kinds in English, unpublished Doctoral dissertation, University of Massachusetts, Amherst.

Carroll, J.M. (1978) "On Coordination Reduction," Lingua 46, 49-60.

Chomsky, N. (1955) Logical Structure of Linguistic Theory, Plenum, New York, 1975.

Chomsky, N. (1957) Syntactic Structures, Mouton, The Hague.

Chomsky, N. (1965) Aspects of the Theory of Syntax, MIT Press, Cambridge, Massachusetts.

Chomsky, N. (1970) "Remarks on Nominalization," in R. Jacobs and P. Rosenbaum, eds., Readings in Transformational Grammar, Blaisdell, Waltham, Massachusetts.

Chomsky, N. (1978) "On Binding," mimeographed paper; appeared in Linguistic Inquiry 11.1.

Chomsky, N. and H. Lasnik (1977) "Filters and Control," Linguistic Inquiry 8, 425-504.

Dik, S.C. (1972) Coordination, North-Holland, Amsterdam.

Dougherty, R.C. (1967) "The Deep Structure of Plurals, Conjoined NPs, Plural Reflexives, and Reciprocal Pronouns," unpublished paper, MIT, Cambridge, Massachusetts.

Dougherty, R.C. (1968) A transformational grammar of coordinate conjoined structures, unpublished Doctoral dissertation, MIT, Cambridge, Massachusetts.

Dougherty, R.C. (1970) "A Grammar of Coordinate Conjoined Structures: I," Language 46, 850-898.

Dougherty, R.C. (1971) "A Grammar of Coordinate Conjoined Structures, II," Language 47, 298-339.

Downing, B.T. (1970) Syntactic Structure and Phonological Phrasing in English, unpublished Doctoral dissertation, University of Texas, Austin.

Emonds, J. (1970) Root and structure-preserving transformations, unpublished Doctoral dissertation, MIT, Cambridge, Massachusetts.

Emonds, J. (1973) "Alternatives to global derivational constraints," Glossa 7, 39-62.

Emonds, J. (1976) A Transformational Approach to English Syntax, Academic Press, New York.

Fiengo, R. (1974) Semantic Conditions on Surface Structure, unpublished Doctoral dissertation, MIT, Cambridge, Massachusetts.

Fiengo, R. (1977) "On Trace Theory," Linguistic Inquiry 8, 35-61.

Fiengo, R. and H. Lasnik (1973) "The Logical Structure of Reciprocal Sentences in English," Foundations of Language 3, 447-468.

Furbee, N.L. (1973) "Gapping in Tojolabal-Maya: Problems of Direction and Identity," mimeographed paper.

Furbee, N.L. (1974) "Identity in Gapping and Lexical Insertion of Verbs," Linguistic Inquiry 5, 299-304.

Gastañaga, L. (1975) "Gapping Basque Constituents," mimeographed paper.

Gleitman, L. (1965) "Coordinating Conjunctions in English," Language 41, 260-293; reprinted as Gleitman (1969) in D. Reibel and S. Schane, eds. (1969).

Greenberg, J. (1963) Universals of Language, MIT Press, Cambridge, Massachusetts.

Grimshaw, J. (1979) "Complement Selection and the Lexicon," Linguistic Inquiry 10, 279-326.

Grinder, J.T. (1971) On Deletion Phenomena in English, unpublished Doctoral dissertation, University of California, San Diego.

Hankamer, J. (1978) "On the Non-transformational Derivation of some Null VP Anaphors," Linguistic Inquiry 9, 66-74.

Huddleston, R. (1978) "On the Constituent Structure of VP and Aux," Linguistic Analysis 4, 31-60.

Hudson (1976) "Conjunction Reduction, Gapping, and Right Node Raising," Language 52, 535-562.

Iwakura, K. (1979) "Surface Filters and Deletion Rules," Linguistic Analysis 5.1.

Jackendoff, R. (1971) "Gapping and Related Rules," Linguistic Inquiry 2, 21-35.

Jackendoff, R. (1972) Semantic Interpretation in Generative Grammar, MIT Press, Cambridge, Massachusetts.

Jackendoff, R. (1977) $\overline{X}$ Syntax: A Study of Phrase Structure, MIT Press, Cambridge, Massachusetts.

Koster, J. (1976) "Remarks on Wh-Movement and the Locality Principle," mimeographed paper, MIT, Cambridge, Mass.

Koster, J. (1978) Locality Principles in Syntax, Foris Publications, Dordrecht.

Koutsoudas, A. (1971) "Gapping, Conjunction Reduction, and Coordinate Deletion," Foundations of Language 7, 337-86.

Kuno, S. (1971) "Gapping and Right-Constituent Raising," unpublished xerox.

Kuno, S. (1976) "Gapping: A Functional Analysis," Linguistic Inquiry 7, 300-318.

Lakoff, G. (1966) "Stative Adjectives and Verbs in English," unpublished mimeograph.

Lakoff, G. and S. Peters (1966) "Phrasal Conjunction and Symmetric Predicates," in D. Reibel and S. Schane, eds. (1969).

Long, R.B. (1961) The Sentence and its Parts, University of Chicago Press, Chicago.

Maling, J. (1972) "On 'Gapping and the Order of Constituents'," Linguistic Inquiry 3, 101-108.

McCawley, J. (1971) "Tense and Time Reference in English," in C. Fillmore and D.T.Langendoen, eds., Studies in Linguistic Semantics, Holt, Rinehart, and Winston, New York.

Milsark, G. (1972) "Re: Double-ing," Linguistic Inquiry 3, 542-549.

Neijt, A. (1979) Gapping, A Contribution to Sentence Grammar, Foris Publications, Dordrecht.

Panhuis, D. (1979) "Gapping in Latin," unpublished xerox.

Peters, S. (1966) Coordinate Conjunction in English, unpublished Doctoral dissertation, MIT, Cambridge, Massachusetts.

Postal, P. (1974) On Raising, MIT Press, Cambridge, Massachusetts.

Pullum, G. (1974) "Restating Doubl-ing," Glossa 8, 109-120.

Pullum, G. and D. Wilson (1977) "Autonomous Syntax and the Analysis of Auxiliaries," Language 53, 741-788.

Pulte, W. (1971) "Gapping and Word Order in Quechua," in D.Adams et al., eds., Papers from the Seventh Regional Meeting of the Chicago Linguistic Society, University of Chicago, Chicago.

Pulte, W. (1972) "Some Claims Regarding Gapping: The Evidence from Cherokee," unpublished xerox.

Pulte, W. (1973) "A Note on Gapping," Linguistic Inquiry 4,100-1.

Reibel, D. and S. Schane, eds. (1969) Modern Studies in English—Readings in Transformational Grammar, Prentice Hall, Englewood Cliffs, N.J.

Ross, J.R. (1967a) "Gapping and the Order of Constituents," in M. Bierwisch and K. Heidolph, eds., Papers in Linguistics, Mouton, The Hague.

Ross, J.R. (1967b) Constraints on Variables in Syntax, unpublished Doctoral dissertation, MIT, Cambridge, Massachusetts.

Ross, J.R. (1969) "Guess Who," in R. Sinnick et al., eds., Papers from the fifth regional meeting of the Chicago Linguistic Society, University of Chicago, Chicago.

Ross, J.R. (1972) "Doubl-ing," Linguistic Inquiry 3, 61-86.

Rosenbaum, H. (1977) "Zapotec Gapping as Counterevidence to Some Universal Proposals," Linguistic Inquiry 8, 379-96.

Sag, I.A. (1976) Deletion and Logical Form, unpublished Doctoral dissertation, MIT, Cambridge, Massachusetts.

Sanders, G.A. and J. H.-Y. Tai (1972) "Immediate Dominance and Identity Deletion," Foundations of Language 8, 161-198.

Schachter, P. (1973) "Conjunction," in R. Stockwell, P. Schachter, and B. Partee, eds., The Major Syntactic Structures of English, Holt, Rinehart, and Winston, N.Y.

Schachter, P. (1977) "Does She or Doesn't She?" Linguistic Inquiry 8, 763-767.

Schachter, P. (1978) "English Propredicates," Linguistic Analysis 8.

Schane, S. (1966) "A Schema for Sentence Coordination," ISL Studies Number 10, Bedford, Massachusetts.

Sjoblom, T. (1975a) Derived Conjunction with and, not, but, and too, unpublished thesis, MIT, Cambridge, Massachusetts.

Sjoblom, T. (1975b) "Some Singular Answers to Objections against Derived Conjunction," unpublished paper.

Williams, E. (1978) "Across-the-Board Rule Application," Linguistic Inquiry 9, 31-43.