CHAPTER ONE

A SHORT HISTORY OF THE STUDY OF COORDINATION

1.0 Introduction

Coordination has always been a peculiar animal which has resisted all ways of taming. Whether it be in a transformational approach, or a non-transformational approach, there has always remained a class of unexplained facts, a "crazy" class of facts, posing problems for an adequate account of coordination. Because of these curious facts which have to do with both the syntax and semantics of coordination, this area of research has proved to be an enormous source of vigorous controversy and debate. For instance, in Chomsky (1957), coordination is used as a test for constituenthood, and as an argument in favour of transformational grammar. On the other hand, in Gazdar (1981), it is used as an argument supporting phrase structure grammar against transformational grammar. Furthermore, it has been used to defend and attack a host of different theories and analyses.

Coordinate structures are of special importance to linguistic theory for a variety of reasons. First of all, coordination seems to be a universal feature of natural
languages. Implicitly, this means that there is a unitary notion of coordination which can be abstracted away from the evident differences between the coordinate constructions of different languages. Secondly, it constitutes one of the sources of the rich productivity of languages in as much as there is a very large number of linguistic units (clauses, phrases, lexical items, etc.) that can be conjoined (potentially) ad infinitum.

We will examine some of the earlier studies of coordination and show that they fail to present an explanatorily adequate theory of coordination. All these studies employ Phrase Structure (PS) rules of one kind or the other for generating coordinate structures. PS rules being essentially unexplanatory, the trend in present day theoretical linguistics is to eliminate them in favour of more fundamental notions like the projection principle, subcategorization and so on. In Lectures on Government and Binding, Chomsky (1981) emphasizes the point that given the projection principle and the general properties of X-bar theory, the categorial component of a particular grammar will be quite meagre. Nevertheless, works on coordination have heavily depended on PS rules. In what follows we will show that it is in fact possible
to construct a theory of coordination without recourse to PS rules.

The organization of the present Chapter is as follows: Section 1 presents a short history of the study of coordination. Section 2 dealing with extractions from coordinate structures discusses the Coordinate Structure Constraint of Ross (1967) and the Path Containment Condition of Pesetsky (1982).

1.1 A short history of the study of coordination

The syntax of coordination is sometimes referred to as 'second-order syntax' (cf. Lang (1984)), that is, a set of rules operating syntactically on linguistic units whose own syntactic properties have to be specified in terms of simplex structures. Such simplex structures in turn constitute 'first-order syntax'. In order to achieve an adequate description of all and only the acceptable coordinate structures of a particular language there seemed to be no straightforward way either to derive second-order syntax from first-order syntax, or, conversely, to design first-order syntax according to the requirements of second-order syntax. As a result, we are left with a highly complex interaction between these two levels involving semantic, pragmatic, perceptual and other factors. Keeping aside the issue of a terminological distinction such as
first-order syntax and second-order syntax, let us come to a problem that has been recurring in the discussion of coordinate structures, namely, whether coordinate structures should be generated directly by means of some sort of PS rules, or whether they should be derived from simplex sentences by some sort of coordination-plus-deletion rule. Despite the fact that PS rules and Transformational rules have undergone substantial changes during the last two decades, the debate for and against these two approaches still persists. Let us take a quick glance at these two approaches.

1.1.1 The Derived Conjunction Analysis

The Derived Conjunction Analysis may be traced back to 1957, i.e. to Chomsky's *Syntactic Structures* wherein Chomsky suggests:

One of the most productive processes for forming new sentences is the process of conjunction. If we have two sentences Z+X+W, and Z+Y+W, and if X and Y are actually constituents of these sentences, we can generally form a new sentence Z-X+ and +Y-W ... If X and Y are however, not constituents, we generally cannot do this.

(Chomsky, 1957:35)
The above suggestion has occasioned a proliferation of studies on coordination elaborating in various ways Chomsky's proposal. Let us see what the essential claim made in the Derived Conjunction Analysis is.

Under this view, the grammar contains a rule which conjoins sentences and a rule or set of rules which deletes identical elements and regroups what is left. Gleitman (1965) is a good example of this approach, wherein Chomsky's proposal receives its fullest elaboration. Her account is the essential 'reduction-based' proposal which has been modified subsequently in several ways by various linguists. Nevertheless, the transformationally oriented approach has survived the last three decades and can be found in Ross (1967), Koutsoudas (1971), Maling (1972), Jackendoff (1972), Hankamer (1972), Stockwell et al (1973), Lagendoen (1975), Kuno (1976), Sag (1976), Williams (1978) and Neijt (1979) among others. We do not intend to discuss all these studies in detail. However, a few selected analyses will be discussed in the course of our elaboration of some of the recurring ideas about coordination.

Notice that the Derived Conjunction Analysis is not without problems. For instance, consider the following example discussed in Goodall (1987):
(1) a. Louise and George rode bicycles.
b. Mary reads and writes books in French.
c. The old man fed the birds and the squirrels.
d. Tom and Jane eat bread and crackers (respectively).

(2) a. Louise rode bicycle(s) and George rode bicycle(s).
b. Mary reads books in French and Mary writes books in French.
c. The old man fed the birds and the old man fed the squirrels.
d. Tom eats bread and Jane eats crackers.

According to the Derived Conjunction Analysis, the examples in (1) are derived from those in (2). In (2a), rode bicycle(s) in the first conjunct is deleted, and Louise and George is grouped together to form one NP. In (2b), the first conjunct has the material books in French deleted, while in the second conjunct it is Mary which is deleted. After deletion, the verbs reads and writes are grouped into a single constituent. In (2c), the old man fed in the second conjunct is deleted, and the birds and the squirrels are then grouped together. In (2d), eats is deleted in one of the conjuncts and there is regrouping to make constituents out of Tom and Jane and bread and crackers.
Goodall (1987) observes that the deletion rule needed to derive the sentences in (1), will have important properties which are not utilized in deletion rules in other areas of grammar. For instance, it must delete non-constituents, as in (2c) the old man fed. Again, it must apply bidirectionally; in (2a) it deletes elements in the left-hand conjunct, while in (2b) and (2c) it deletes material in the right-hand conjunct. Above all, the regrouping process in (2d) appears suspect, in that it has no known correlate in the rest of the grammar.

Notice that given certain assumptions which were prevalent at the time it was developed, the Derived Conjunction Analysis also makes some incorrect predictions. Consider sentences like the following:

(3) John and Bill met in the park.
(4) John and Mary are similar.

Dougherty (1970), (1971) gives a number of counter-examples like the ones in (3) and (4) and constructs his argument against the transformationally oriented approach on the basis of these. There is no way to derive (3) and (4) from such conjoined sentences as:

(5) *John met in the park and Bill met in the park.
(6) *John is similar and Mary is similar.
According to standard assumptions of the period the under-lying structure is the sole input to semantic interpretations. If this is true, then these sentences present a problem. This is especially clear in cases like (7):

(7) Two and two is/are four.

Obviously, (7) could not have been derived from (8):

(8) *Two is four and two is four.

As early as 1969, Smith came out with sentences like (9) which are semantically ambiguous.

(9) John and Mary bought the new book by John Steinbeck.

(9) can be interpreted as John and Mary buying one copy together, or John and Mary each buying one copy separately. Based on examples like (9) Smith argued for the introduction of nominals by means of a PS rule.

The discussion of the Derived Conjunction Analysis may be summarised thus: Initially it was assumed that all coordination is coordination of constituents, which could be derived transformationally from coordination of grammatical sentences. Convincing evidence to the contrary emerged soon. Clearly, all coordination is not constituent coordination, nor can all coordination be derived from coordination of grammatical sentences.
1.1.2 The Phrasal Conjunction Analysis

Some of the problems mentioned in the preceding section were taken up by Lakoff and Peters (1969). On the basis of examples like (10), they rejected the transformational approach in which all coordination is derived from coordination of sentences, and proposed that at least for NPs there should be a PS rule schema which would expand NP into a coordination of NPs:

(10) John and Mary are alike.

However, Lakoff and Peters did not get rid of transformations totally. Instead, they made an attempt to associate PS and transformational sources for coordination with difference in interpretation. That is, PS coordination, which is base generated as a unit, will be interpreted as a unit; transformationally derived coordinations will be interpreted as non-units. Thus the ambiguity of a sentence like (9) can be explained in terms of two different derivations: if John and Mary is generated as a phrase by a PS rule, we get the reading in which John and Mary together buy one copy of the book; whereas if John and Mary is generated by Conjunction Reduction of two underlying sentences, we get the reading in which John and Mary each buy a copy of the book.
After the publication of Chomsky (1965), the debate on whether coordinations should be derived by means of transformational rules or by means of PS rules gained added vigour. This resulted in total rejection (by some linguists) of transformational rules in favour of PS rules for generating all instances of coordination. This approach is conventionally referred to as "phrasal conjunction" and requires a set of rules like those in (11):

(11) a. NP -------> NP and NP
    b. V -------> V and V

The two rules given above allow us to generate the sentences in (1). This sort of analysis does not require any deletion rules and there is no regrouping either. The set of PS rules required for generating various types of coordinate structures may be collapsed into a single rule using X-bar notation, as we shall see. (3) may now be generated, since meet under this analysis has a plural subject in all stages of derivation. Similarly, (4), (7) and (9) are all base-generable. This sort of approach is advocated in various degrees of purity, and in a number of different frameworks, in e.g. Dik (1968), Dougherty (1970, 1971), Schachter (1977), Gazdar (1981) and Steedman (1985), to mention only a few.
The Phrasal Conjunction Analysis avoids the problem of expanding the power of the transformational component, since no special transformational rules seem to be necessary at all. On the other hand, the phrase structure component must now incorporate a new type of rule allowing the occurrence of multiple-headed structures. Note that in a structure like (12):

(12)

both XP₁ and XP₂ have to be treated as heads of the structure.

Goodall (1987) notes that the Phrasal Conjunction Analysis also runs into a serious problem. Consider the following sentence:

(13) John hunted tigers and was killed by snakes.

In this analysis (13) must be the result of conjoining the VPs listed in (14):

(14) a. hunted tigers
    b. was killed by snakes
(14b), however, is not a deep structure VP and may not be conjoined in this form in the base. According to standard assumptions, the string in (14b) is derived transformationally. John is moved out of the object position of was killed and into the subject position. The subject position, however, is occupied by the subject of hunted tigers. Thus in order to derive (13), we need to conjoin sentences rather than VPs. But, interestingly, by conjoining sentences we have arrived at the derived conjunction solution!

To sum up: The early analyses of coordination left us with a few well-defined problems. Clearly, not all coordination is constituent coordination. Neither can all coordination be derived from coordination of grammatical sentences: PS-coordination is also necessary. Nevertheless, the PS coordination approach has some clearly identifiable problems. It might be possible, however, to account for all of the data in question by utilizing both analyses as suggested in Lakoff and Peters (1969). This leads to considerable overlap in coverage in the sense that most sentences will be derivationally ambiguous. But this derivational ambiguity does not always correspond to semantic ambiguity. Apart from this, it is clear that this combined analysis is disastrous with respect to the problem
of integrating coordination with the rest of the grammar. Instead of keeping the additional apparatus necessary for coordination to a minimum, it is expanded with both a new kind of phrase structure rule and a new kind of transformation.

1.1.3 The Treatment of Coordination, 1957-1987: The Issues

What moulded the discussion about coordination in the last three decades is an issue raised in Chomsky (1957); given that there is a clear syntactic relation between sentential coordination and constituent coordination, does one attempt to account for all coordination as sentential coordination, through deletion of identical material, or does one view coordination as much as possible as base-generated, thus reducing the role of deletion rules to a minimum? As Gleitman (1965) has shown, not all coordination can be paraphrased as sentential coordination. Studies like Gleitman (1965) and Tai (1971) have provided a fully transformational account of coordination which fail crucially in those cases of coordination which are not sentence paraphrasable\(^2\), whereas Dougherty (1971) provides a study of coordination in a strongly PS oriented approach which fails to account for cases of non-constituent coordination. The debate whether coordination should be
accounted for by means of PS-rules or by means of transformational rules fizzled out inconclusively, giving way to a fascinating discussion about deletion of identical verbs in coordination, i.e. Gapping. This discussion too more or less ended with the publication of Neijt (1979). But we may note that the issue still crops up in different disguises.

In a recent work Goodall (1987) abandons all of the earlier analyses and adopts instead an analysis wherein coordination is represented as a union of phrase markers. The technical details of this analysis will be discussed later. For the time being it will suffice to think of it in tree terms as a "pasting together", one on top of the other, of two trees, with any identical nodes merging together. Clearly, this approach is an attempt to resolve the "PS rule-or-transformation" question regarding coordination. Again, Oirschow (1987) proposes a deletion approach to coordination and tries to establish that this approach is an improvement on earlier works.

From the early transformational discussion, the idea of directionality of deletion emerged (cf. Ross (1967), (1970) and Tai (1971)), and along with it the 'mirror-image' formulation of coordinate deletion rules. This idea has been attacked in a number of publications, and is under

Jackendoff's (1972) account of Gapping gave rise to a lively discussion which produced the idea of peripherality of deletion (cf. Langendoen (1975)). This idea has also recurred in various places in the literature but again inconclusively.

Notice that the grammatical models have become vastly more sophisticated, but the problems remain the same: non-transformational accounts cannot deal with obvious non-constituent coordinations, while transformational accounts still have trouble with NP-coordinations in association with symmetric predicates like be similar. These controversies are real. Recent attempts to treat rules like Gapping as rules outside the domain of syntax are clearly inadequate. A work of this nature is Kuno (1976).

1.2 The Coordinate Structure Constraint and the Path Theory

Besides the question of how to generate coordinate structures, there is a host of issues regarding extraction
from coordinate structures. In this connexion, we now discuss two analyses of coordination in some detail, namely Ross's (1967) analysis and Pesetsky's (1982) analysis. These two analyses deserve special mention for independent reasons. Our interest in Ross is because of his formidable Coordinate Structure Constraint (CSC) which seems to have survived in its pristine formulation all the processes of sophistication of linguistic theory in the last twenty years. All of the other constraints proposed in Ross (1967) along with the CSC appear to have been absorbed into other hypotheses as the theory evolved and (hopefully) acquired more and more explanatory power. To give an example, the Subjacency Condition proposed in Chomsky (1973) subsumes most of Ross's Island Constraints. By the time the Government and Binding theory evolved, only the CSC (of all Ross's constraints) continued to exist in the literature. One might wonder why a constraint like the CSC, which is a purely observational generalization and does not explain anything, should be retained in the grammar.

Pesetsky's analysis deserves special mention because of the attempt he has made to integrate coordination with other areas of grammar. By proposing the Path Theory he is able to eliminate one of the clauses contained in the CSC. Almost all works on coordination that appeared prior to Pesetsky
(1982) considered constructions involving coordination to form a special class by themselves. Something special was to be stipulated exclusively for such constructions at the cost of losing much generality. For the first time in the history of the study of coordination, an account of coordination was proposed in Pesetsky wherein coordinate constructions were treated on a par with any other construction.

1.2.1 Ross’s Analysis

Ross (1987) defines a coordinate structure as any structure conforming to the schematic diagram in (15):

(15)

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A
\{ and \} \ A \ A \ ...
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Ross’s intention is to give a universal definition of coordination and therefore, and and or in the diagram represent language independent representations of these terms. Furthermore, the conjunction can either precede all the conjuncts or follow them. Coordinate structures contain at least two conjuncts, but may contain any higher number of them.

Ross proposes that the structural position of the conjunction with respect to the conjuncts in a sentence like
(16) is as represented in (18), and not as represented in (17). The crucial difference is that in (18), each occurrence of the conjunction and forms a constituent with the following sentence instead of being coordinate with it as in (17).

(16) Irma washed the dishes, and Sally dried, and Floyd loafed.

(17)

(18)

Ross gives a number of syntactic reasons for assuming the structure in (18). One reason is that if a conjoined sentence is broken up into two sentences, the conjunction
always goes with the second conjunct and never with the first. See the illustrative example (19) which is broken into two sentences in (20), where the (b) example is starred.

(19) John left, and he didn't even say goodbye.

(20) a. John left. And he didn't even say goodbye.
    b. *John left and. He didn't even say goodbye.

In support of the structure (18) Ross gives another kind of syntactic evidence based on languages in which coordinating conjunctions can become clitics. Such clitics are always inserted into the following conjunct, and never into the preceding one. From German we have an illustrative example with the word aber 'but'. Notice that (21) may be converted into (22a), but not into (22b).

(21) Sie will tanzen, aber ich will nach Hance gehen
      'She wants to dance, but I want to go home.'

(22) a. Sie will tanzen, ich will aber nach Hance gehen.
    b. *Sie will aber tanzen, ich will aber nach Hance gehen.

A third syntactic reason for regarding (18) as the correct structure is the following. The appositive clause formation rule must convert sentences like (23a) to (23b).
(23) a. Even Harold failed, and he is the smartest boy in our class.
   b. Even Harold, and he is the smartest boy in our class, failed.

Ross observes that there are very general theoretical grounds for arguing that the string and he is the smartest boy in our class is a constituent, for except for this case, transformations can be constrained so that only constituents may be adjoined.

Ross also gives a piece of phonological evidence supporting the assumption that (18) is the correct structure; the bracketing of the subject NP of (24) must be as shown in (25a) and not as shown in (25b) or (25c).

(24) Tom and Dick and Harry all love watermelon.

(25) a. ((Tom) (and Dick) (and Harry)) all love watermelon.
   b. *((Tom) (and) (Dick) (and) (Harry)) all love watermelon.
   c. *((Tom and) (Dick and) (Harry)) all love watermelon.

The intonational pauses come before the coordinating conjunction, not after it or equally on both sides of it.

In Ross's analysis (however), (18) is a derived structure, the deep structure being in the shape of (15). To generate
the deep structure, Ross has a phrase structure rule like (26) in the base.

(26) \[ S \longrightarrow \{ \text{and, or} \} \ S^n, \text{where } n \geq 2 \]

Later, the and or or which is introduced by (26) is copied and Chomsky-adjoined to each of the infinitely many \( S \)'s that are introduced by (26) by a rule of Conjunction Copying. Thus the deep structure of (16) will be something like (27), which in turn will be converted to (28) \((=18)\) by Conjunction Copying\(^3\).

(27)

\[
S \quad \text{and} \quad S \quad \text{Sally dried}\quad S \quad \text{Floyd loafed}
\]

(28)

\[
S \quad \text{and} \quad S \quad \text{Sally dried}\quad S \quad \text{Floyd loafed}
\]
Ross argues that the first instance of *and* in (28) is deleted by a general rule in English. It is obligatorily deleted if the conjuncts are sentences, but it may be converted into *both* if the conjuncts are NP, VP, or V. The rules for conjunction with *or* are similar in all respects, except that the initial *or* may be converted into *either*. Ross shows that further motivation for this analysis is provided by languages like French and Dutch.

(29a) *Et Jean et Pierre sont fatigues*  
and John and Peter are tired

b. *Ou Jean ou Pierre doit le faire*  
or John or Peter must do it

(30a) *en Jan en Bob en Bill*  
and John and Bob and Bill

b. *of Jan of Bob of Bill*  
or John or Bob or Bill

Ross also proposes a rule of *Conjunction Reduction (CR)* which Chomsky-adjoins to the right or left of the coordinate node a copy of some constituent which occurs in all conjuncts on a right or left branch respectively. The constituent so copied is then deleted in all conjuncts. This
rule may be illustrated using the example (31). It will have the deep structure shown in (32), which will be transformed to the structure (33).

(31) Sally might be, and everyone believes Shiela definitely is, pregnant.

(32) 

```
S
  /   \
/      \
S     S
  |    |
  /    /  \
/      /   \
NP    VP   NP    VP
|      |      |      |
Sally might be pregnant everyone
|      |
NP    VP
|      |
believes S
  |    |
  /    /
/      /
NP    VP
|      |
Shiela definitely is pregnant
```
Now, within the framework of the above analysis of coordination, Ross proposes the Coordinate Structure Constraint (CSC) in order to account for the impossibility of movement out of a coordinate structure. The constraint is stated as follows:

\[(34) \text{Coordinate Structure Constraint (CSC)}\]

In a coordinate structure, no conjunct may be moved, nor may any element contained in a conjunct be moved out of that conjunct.

To illustrate, consider the following:
Both (35) and (36) are derived structures, being the output of Conjunction Copying. In (35), Conjunction Reduction has also applied, followed by an application of a pruning rule which
gets rid of non-branching nodes. Ross argues that the encircled nodes are restricted from being moved by virtue of the CSC. This constraint correctly predicts the ungrammaticality of the examples in (37).

(37)  

a. *The lute which Henry plays and sings madrigals is warped.

b. *The madrigals which Henry plays the lute and sings sound lousy.

c. *The nurse who polished her trombone and the plumber computed my tax ...

d. *Which trombone did the nurse polish and the plumber computed my tax.

e. *The plumber who the nurse polished her trombone and computed my tax was a hefty fellow.

f. *Whose tax did the nurse polish her trombone and the plumber compute.

(cf. Ross (1967:88)

1.2.2 The "history" of CSC

Ross's formulation of the CSC has triggered a number of studies on coordination. The exact nature of the constraint operating on extractions from a coordinate structure has been a topic of controversial discussion. Various propositions have been made in different frameworks to tackle the problem of such extractions. For instance William (1978) proposed an account of extractions from coordinate constructions in
terms of his "simultaneous factorization" in the ATB format. This was intended to capture examples like the following:

(38)  a. Who does Mary love - and William hate -  
      b. Who - loves Mary and - hates Susan:  
      c. *Who does Mary love and Susan hates Peter.

As seen above when extraction takes place simultaneously from both conjuncts CSC effects are not realized. Also, Williams (1978) noticed a sort of "parallelism requirement" in ATB extractions. cf. (39):

(39)  a. John who\textsubscript{1} Bill saw e\textsubscript{1} and Mary likes e\textsubscript{1}  
      b. John who\textsubscript{1} e saw Bill and e likes Tom.  
      c. *John who\textsubscript{1} Bill saw e\textsubscript{1} and e\textsubscript{1} likes Mary.

In (39a) the object NP is extracted from two conjuncts; in (39b) what is extracted is the subject NP. But in (39c) from the first conjunct the object NP is extracted and from the second conjunct the subject NP is extracted.

Grosu (1973) examines extraction from asymmetric conjunction and shows that in such cases the CSC may be violated. This is illustrated by the following examples:

(40)  a. I went to the store and bought some whiskey.  
      b. the whiskey which\textsubscript{1} I went to the store and bought e\textsubscript{1}  
      c. the store that\textsubscript{1} I went to e\textsubscript{1} and bought some whiskey
Gazdar (1981) proposed to account for CSC violations using slash notations in the GPSG framework. We do not want to discuss these works in detail, our intention was just to show the state of things. However, we will discuss Pesetsky's (1982) analysis briefly since we want to make use of some of his insights in our new account of coordination.

1.2.3 Pesetsky's (1982) Analysis

Pesetsky claims that in making certain requirements on constituents it governs, a conjunction acts very much like a predicate that Θ-marks an argument. (What is special about a conjunction is that it Θ-marks more than one argument at a time. According to Pesetsky, this in fact is 'the syntactic content of the term conjunction'.\(^5\)). Taking this analogy literally, Pesetsky proposes the following principle for coordination.

(41) \( a. \) \( X \longrightarrow \text{C}^i \text{Head} \)

\( b. \) Conjunctions Θ-mark \( n \) constituents simultaneously, \( n > 1 \)

(In (a), the superscript \( i \) on each occurrence of \( C \) indicates that the occurrences are non-distinct, i.e. \( C \) is discontinuous.)
What is guaranteed by (41a) and (41b) is the fact that coordinate structures are multiple headed structures. It is the case that the constituent formed by coordination of occurrences of $x^n$, where $n$ is some number of bars, is itself $x^n$; but this should follow from X-theory and therefore is not indicated in (41a). The main point that Pesetsky suggests here is that (41b), i.e., the fact that conjunctions require more than one "complement", is something which should be kept separate from the linear order of conjunctions with respect to the conjuncts and from the X-bar properties of conjunction structures.

A central claim of the Path Theory is that there is a path running between the maximal projection of the lexical category that receives the $\theta$-role and the first maximal projection dominating the $\theta$-marker. There is (42), which is a coordinate construction, in which the nodes $(VP_0, VP_1, VP_2)$ form a path.

(42) $\left[ VP_0 \ [ VP_1 \ \text{plays} \ [ NP_1 \ \text{the lute}] ] \right]$

$\left[ \text{signs} \ [ NP_2 \ \text{madrigals}] \right]$

Path: Between conjunction and conjuncts
$(VP_0, VP_1, VP_2)$
Now, by assuming that the conjunction "O-marks its conjuncts, Pesetsky obtains the result that a path runs between the maximal projection dominating the conjunction and the conjuncts. Pesetsky regards the conjunction as containing a Θ-grid from which the conjuncts are bound. If the conjuncts are all bound from the same position in the Θ-grid, the situation is analogous to that of a parasitic gap construction where a series of parasitic gaps are bound by a common Æ-binder. In coordinate structures a single path runs from the maximal projections dominating the lexical projections of the conjuncts to the maximal projection dominating the conjuncts as illustrated in (42). Note that the path in (42) counts as a single forking path, and not as two paths.

Pesetsky argues that if paths such as these exist, then the second part of the CSC follows immediately, because extraction from a coordinate structure will create another path violating the Path Containment Condition (FCC) stated below:

(43) Path Containment Condition (FCC)

If two paths overlap, one must contain the other.

Keeping this in mind consider (37a), reproduced here as (44).
*the lute which Henry plays e₁ and sings madrigals]

Path (i): Between conjuncts and conjunction

(VP₁, VP₂, VP₀)

Path (ii): Between e₁ and COMP of S

(VP₁, VP₀, S)

Paths (i) and (ii) overlap, but neither contains the other and hence there is a violation of the PCC.

Quite generally, if there is a path that includes all conjuncts and a node dominating the conjuncts, extraction from any single conjunct will violate the PCC. Consider the abstract situation.

(45)

```
    A
   /|
  /  |
 B--|
   C
   and
   D
```

By virtue of the conjunction and, there is a path which runs between the conjuncts (C, D, B). Now suppose we extract from within C, such that a path runs from C or lower to A: (C, B, A). The second path will violate the PCC, because it includes two members of the path formed by the conjunction, but does not include the nodes that dominate the other conjuncts.
However, Pesetsky observes that his analysis cannot derive the first part of the CSC which is meant to prevent the extraction of a whole conjunct as seen in (46):

(46) \([_s \text{ who}_1 \text{ did Bill } [\text{VP see } [\text{NP}_0 [\text{NP}_1 \text{ Mary}]] \text{ and } [\text{NP}_2 \text{ e}_1 ]]]])

Path (i): (\text{NP}_1, \text{NP}_2, \text{NP}_0)

Path (ii): (\text{NP}_0, \text{VP}, _s)

Path (i) is the forked path between the two conjuncts and the node dominating the conjunction. Path (ii), which is the path created by the extraction, starts at \text{NP}_0, which is the first maximal projection dominating the extraction into C. Note that the two paths, while they touch at \text{NP}_0, do not overlap. Thus the extraction of a whole conjunct does not violate the PCC. Pesetsky, therefore, invokes the A/A Condition stated below to prevent the extraction of a whole conjunct from a coordinate structure.

(47) A/A Condition (Chomsky, 1973)

If a transformation applies to a structure of the form \( [\infty \ldots [A \ldots ] \ldots ] \) where \( \infty \) is a cyclic node, then it must be so interpreted as to apply to the maximal phrase of the type A.
Thus we see that, despite the insightful observations made in Pesetsky (1982) regarding the facts about coordination, the PCC account does not account for certain cases of extraction from coordinate structures. In the next chapter we will propose an alternative analysis which hopefully will be an improvement on earlier works. Without taking recourse to PS rules we will present a theory of coordination and will show that coordinate structures fall in line with other structures. In the framework of grammar that we are assuming here, the interaction of the principles of the various modules of grammar solely determines the structure of each possible string. As there are no rules for particular constructions such as interrogative, relative, passive and so on, there are no rules for coordinate constructions also. We will show that extraction from coordinate structures is not barred by any particular principles that are postulated exclusively for such constructions but by general principles of UG.

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NOTES


2. To give a sense of the kind of proposals put forward in this approach, we give below the derivation of sentence (i) in Tai (1971).

(i) John and Bill conferred.

'Identity deletion' applies to the input sentences in (iia) to yield (iib).

(ii) a. John conferred with Bill and Bill conferred with John.

b. John conferred with Bill and Bill \( \emptyset \) with John.

Optional 'restructuring' of subjects and prepositional phrases applies along with an obligatory rule of 'respectively' insertion. Thus we get (iii).

(iii) *John and Bill conferred with Bill and John respectively.

'Each-other-pronominalisation' applies to (iii) to yield (iv).

(iv) *John and Bill conferred with each other, respectively.

Respectively, which was inserted obligatorily, is now deleted obligatorily.
(v) John and Bill conferred with each other.

A rule of 'prep-each other deletion' deletes with each other and thus (i) is derived.

3. After Conjunction Copying, the original and generated by the PS rule (26) must obviously be deleted, to yield the structure (28). (Ross however, glosses over this deletion.)

4. We will argue at a later point that both is in fact a quantifier.

5. Note that the "one-conjunction-but-many conjuncts" idea is also expressed in Ross's deep structure for coordinate constructions, namely (14), in which there is one conjunction preceding a string of conjuncts. The surface iteration of the conjunction is derived by a copying rule by Ross.

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