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ON DELETION PHENOMENA IN ENGLISH

by

John Thomas Grinder, Jr.

University of California, Santa Cruz

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My fascination with the theory of syntax derives primarily from my association with Paul M. Postal and Patrick A. Brogan. In addition I have been heavily influenced by the work of Haj Ross and George Lakoff.

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CONTENTS

Acknowledgements 1
Preface 5
1. Deletion in the Grammar of Natural Languages 9
2. Free Deletion Transformations 15
Review of the Traditional Arguments for Free Deletion 15
Evaluation of the Traditional Arguments 21
An Alternate System 25
3. A Constraint on Optional Lexicalization: Chaining 36
4. Deletion Path Phenomena 57
The Phenomena 58
The Rule 62
Some Additional Data 70
5. Controller Cross-Over 80
Lakoff's PASSIVE/EQUI Constraint 80
A Principled Explanation of the PASSIVE/EQUI Interaction . . . 82
Other Coreferential Deletion Transformations 87
Other Permutation Rules 92
Some Additional Data 98
6. Identity of Sense Deletion 108
Property I – Essential Variables 110
Property II – Self-Inclusion 112
Interpretation of the Results 120
Bouton's Proposal 123
A New Proposal: Double Partitions 125
7. Conclusion 132
Review of Some of the Results 133
The Controller Cross-Over Cannot Be Stated within a Single Derivation 142
Controller Cross-Over: A Transderivational Formulation 145
References 148

PREFACE

At its present state of development, the theory of syntax offers little hope for those of us who wish to argue for and establish motivated explanations of phenomena of linguistic form. The life expectancy of non-trivial well-defined generalizations about form in natural language has been estimated by various well-known linguists; the one who first comes to my mind is Paul Postal, whom I regard as the clearest, most capable syntactician (detector of linguistic form patterns) functioning – his estimate was 90 seconds.

There is little of the content of the particular generalizations which I made in this study that I would now argue for. Why, then, publish the study? I wish to do so because it has the following quantities: (a) I identify a number of interesting linguistic patterns which will be included among the patterns stated in any adequate theory of linguistic form; (b) I am explicit in my attempts at stating the pattern that I see, and the form of my claims itself is clear; (c) When I present an argument, I attempt to be explicit about the form of the argument itself thus providing an occasion for looking at linguistic patterning at the meta-level.

The relatively clear difference in these levels of analyses (the linguistic pattern itself, the statement or generalizations about that pattern, and the comments about the way I arrive at those generalizations), hopefully, will allow the reader to evaluate the study for him or herself.

I hope that this study will encourage others to conduct further studies of patterns of form in natural language systems subject to the following comments.

I understand the state of the art of linguistics to be that of an area of inquiry about human activity which has been mapped onto a model in a relatively explicit manner. This model has provided a vocabulary and a syntax which has served well to allow linguists to state the patterns that they detect and to compare the patterns, thereby stimulating further research. When I create a model of my experience, I first isolate some area of my experience. I then focus on certain parameters of that area of my experience and ignore others. Models are punctuations on my experience. My activity (modeling) both clarifies my experience and impoverishes it. Theories are shared models. Using the theory of transformational grammar, I clarify a portion of my experience and ignore both other portions of my experience and other parameters within the portion of my experience I am examining. I find the punctuation that transformational grammar introduces on my experience too narrow. I want to see a model for a larger cut which would include general cognitive functioning (cf. Bever, 1970; Piaget, 1951, 1952; Neisser, 1957; Bransford and Franks, 1971) and a theory of action (cf. Bruner, 1968; Piaget, 1951; Harris, 1972; Huttenlocher et al., 1968a, 1968b, 1970; Greenfield and Westerman, 1972; Goodson and Greenfield, 1973) as well as the inclusion in linguistics of certain parameters which so far have been ignored. One such example is a wider notion of semantics which reintroduces human agents and their relationships, dealing with issues such as the relationships between emotional affect and form of expression, the form of linguistic production as an indicator of systems of interpersonal relations (cf. Wazlawick, Beavin, and Jackson, 1967; Haley, 1962; Bateson, 1973; Bandler and Grinder, 1974; Grinder and Carr, 1974). I suspect that much of the dissatisfaction that I see and hear from other human beings who come into contact with transformational linguistics is because they too find the cut too narrow or the model too impoverished. Generative Semantics is a maneuver which I see as leading in an expansive direction, but the increment of change is small. I am suggesting that transformational grammar as a model has succeeded in its purpose to the degree that it is now more restrictive than enlightening. One sign of the decline of a model is the increasingly ad hoc and complex nature of explanations within that system. Thus, the formulation of the transderivational constraint in the final chapter can be seen equivocally – either as the creation of a new and well-motivated necessary extension of the theory of transformational grammar or a *reductio ad absurdum*, calling for a more thorough revision of the form of the theory itself. One of the most valuable characteristics of the transformational system, its explicitness, guaranteed its demise – it was explicit enough to define its own limits. Those limits are becoming more and more apparent, and some innovation more radical than Generative Semantics is required. What is needed is an explicit non-positivist model of human experience which includes language as a special subsystem, but language as a richer vision than presently reflected in linguistic studies – language which includes the human actors as active components, shaping and being shaped by their linguistic productions. It is a tribute to the pervasiveness of positivism that the very people who so ably evaluate that the grossest of forms of positivism is psychology – behaviorism – themselves accept semantic descriptions which are devoid of human actors. In other words, I feel that part of the reason for my dissatisfaction with the system is that I sense that the generalizations and patterning would become clearer and richer if the model were seriously extended and revised. The changes in the temperature of some quantity of gas are difficult to describe and the result more mystifying than enlightening if no reference is made to the fact that the gas is within a closed physical system whose dimensions are changing. The model which specifies the vocabulary and syntax for the description of the gas must be enlarged to include the larger context/system. So too with transformational linguistics. This movement – the development of an explicit model which identifies its own limits and is in turn superseded by an explicit model with a larger and richer domain which in turn will be superseded, and so on, – seems to me to be a natural dialectic process. Projecting my fantasies into a future time, I see a calculus of predicates which will be applicable to patterning at the level of human economic activity as well as at the level of human linguistic activity. These criticisms apply, of course, to this study, my own work of some three years ago.

Finally, I want to state that I am aware that while my argumentation in this study is explicit, it is also sometimes unnecessarily involuted and dense. This represents a style of writing which is no longer representative of the style I attempt to achieve. I ask the reader's indulgence and hope that my study provides the occasion for both a stimulating and pleasurable experience.

December 1973

1

DELETION IN THE GRAMMAR OF NATURAL LANGUAGES

The purpose of this chapter is to introduce the subject of deletion processes in natural languages, and to mention the theoretical background assumptions necessary to make the succeeding discussion of specific phenomena intelligible.

This study is clearly within the discipline which is commonly known as transformational grammar. At a point not many years ago, this statement itself would have been sufficient to call to the mind of the reader relatively coherent sets of assumptions, claims, and notations which comprise the philosophy of language developed initially by Noam Chomsky and extended by him and his co-workers principally at MIT. This is no longer true. Within the once monolithic framework, there have developed two distinguishable approaches to natural language analysis;[1] in their present forms, they are most clearly represented in Chomsky's Extended Standard Theory (1970), and Lakoff's Generative Semantics (1969). While much of the dispute between proponents of the two approaches appears to be attributable to purely conceptual and terminological differences, rather than differences in the structure of the claims being advanced which would make differential empirical predictions, the positions are distinguishable.

This study in Deletion Phenomena assumes a background in transformational grammar to the level of *Aspects of the Theory of Syntax* (Chomsky; 1965). It will soon become clear that the author is closer in his orientation to the conceptualization of grammar promoted by Generative Semantics than that of the Extended Standard Theory. This will be particularly obvious in the discussion of the central mechanism proposed in Chapter 2 in the treatment of so-called free deletion phenomena as well as in the form of the constraints arrived at in Chapters 3 and 4. Two comments are perhaps in order. In so far as the two approaches are simply notational variants, individuals involved in research in the area of natural language analysis are, of course, free to choose the conceptualization which they find most appealing. Such a choice is most often made on the basis of some unstated aesthetic principle(s). In this regard, I find the approach to the analysis of natural language systems being worked out in the theory of Generative Semantics a natural consequence of the results of the last decade in transformational grammar. Postal has expressed the point succintly:

... one can consider arguments justifying the existence of certain transformational rules. The literature of the last dozen years contains an array of such arguments. Each transformational rule which is justified in turn justifies the existence of a level of syntactic structure, that is, some class of trees, distinct from Surface Structure and in an obvious sense, 'more abstract' than Surface Structure. Given a transformation T_i, with an input structure R_i and an output structure R_{i+1}, I shall speak of R_i as a *Remote Structure* (with respect to R_{i+1})....
Transformations have usually been wholly or largely justified on assumptions independent of hypotheses about the Semantic Representations of sentences. Consequently, to a large extent, the Remote Structures which have been justified have a 'direction of abstractness' which is *defined independently* of assumptions about Semantic Representation. ....Now by saying 'direction of abstractness' is defined independently of assumptions about Semantic Representation, I mean that it is not a logical truth in any sense that in general R_3, R_2, R_1 (successively remote structures with respect to one another – JTG) will provide successively closer approximations to structures which are semantically relevant than the Surface Structure will. Consequently, if it is in fact true that for some arbitrary sentences the various sequences R_3–R_1 etc. do come, in a clear sense, closer and closer to Semantic Representation, this is a fundamental empirical fact about human language, and a fact of the utmost importance. For it shows that the abstract syntactic structures uncovered by transformational analysis are not, as they might be, semantically arbitrary, but rather are in a direct way steps along the path of the mapping known to exist, between Semantic Representations and Surface Structures.

Postal goes on to comment that while his above remarks are stated conditionally, they need not be, as it is well known that the more remote the structures which the transformations of English have defined, the more semantic-like they appear. In other words, the research in transformational grammar has motivated underlying structures which have come closer and closer to the logical representation of the sentences being considered. This is a necessary outcome of the theory of Generative Semantics, but arbitrary with respect to the Extended Standard Theory.

Secondly, I find it intuitively difficult to maintain the distinction between syntax and semantics which seems to be inherent in the Extended Standard Theory. It appears to me that this insistence that the levels of analysis (in this case, syntax and semantics) be kept separate is an unwarranted and to date unexamined assumption left over from the methodology of the Structuralist school of natural language analysis.

Thirdly, transformational grammar has succeeded brilliantly because of its explicitness. Claims advanced within the theory have for the most part been carefully stated and leave little doubt as to what data would constitute a counter-example. In a word, the claims are falsifiable. If Generative Semantics can maintain the standards of explicitness as it approaches the never-never land of semantics, it will assure itself of a non-trivial contribution to the study of the human mind. In a first attempt to indicate what the relationship between the semantic-like structures uncovered by purely linguistic analysis and the system of natural logic might be, Lakoff states (1970: 16-17):

> The main body of this essay is devoted to a discussion of a number of instances where it appears that linguistic evidence does have a bearing on the content of natural logic.
>
> The function of a natural logic is, as indicated above, to account for all the relevant logical relations between the logical forms of natural language sentences. In other words, a natural logic characterizes all rational thought which it is possible to carry out in natural language. ....
>
> Thus, if the generative semantics hypothesis is correct, it is possible to begin empirical investigations of conceptual structure now on the basis of grammatical evidence together with logical evidence.

But these above statements are at this point simply statements about the future value of some approach to the analysis of natural language systems; that is to say, they form a coherent backdrop for my largely aesthetic choice in favor of a frame of analysis which is obviously closer to the position of Generative Semantics. On the other hand, there are empirically distinguishable issues between the two positions. In so far as the analyses presented in this study are concerned, they support the Generative Semantics approach. But first the analyses are to be presented, then the discussion.

It is generally accepted that one can distinguish at least three major types of transformation involved in the grammars of natural languages:

I. Permutation Transformations
II. Insertion Transformations
III. Deletion Transformations

These categories of transformations can be distinguished one from the other simply by an inspection of their formal characteristics. Since we are interested in the third type of transformation for this study, we need only point out that we may identify the set of deletion transformations in some natural languages by comparing the structural index (structural description) and the structural change of each of the transformations of that language. If in the *i*th position of the structural change of the transformation under consideration we find a null term, we need only check to see what was the *i*th term of the structural index for that transformation. If the *i*th term of the structural index never appears in the structural change, then the transformation under consideration is a member of the set of deletion transformations.

The set of deletion transformations in transformational grammar has since shortly after its incorporation into the grammar been subject to the *recoverability constraint.*[2] The recoverability constraint is designed to insure that if in the course of a derivation some term, t_i, is deleted (replaced by the null term), then there will be a mechanical procedure (an algorithm) to determine which element of the vocabulary of that grammar t_i is. There are two types of procedures for maintaining the recoverability constraint, in effect, two cases to consider. First, there is the case of the deletion of a constant – a member of a finite set over the terminal vocabulary. Such items are recoverable in that they are specifically mentioned in the structural index of the transformation which eliminates them. Secondly, there is the case where the item deleted is mentioned only by way of a variable over some subset of the terminal vocabulary. Suppose that the transformation in question deletes Noun Phrases (NP). The non-terminal symbol will in fact be mentioned in the structural index of the transformation which deletes it. The term NP, however, is a variable over the subset of the terminal vocabulary whose members constitute a noun phrase when concatenated. In every natural language this subset happens to be infinite. Thus the mention of the non-terminal symbol NP in the structural index of the transformation involved obviously does not insure recoverability in the sense required. Instead, in the case of the deletion of a terminal element, where the element is represented in the structural index of the transformation deleting it by a non-terminal symbol, there is an additional condition on the transformation (presumably stated only once in universal grammar) that the structure which contains the element being deleted must also contain another element identical with the deleting term. The first type of deletion will be referred to as Free Deletion; the second as Identity Deletion, of which there are two distinguishable types, Coreferential Identity Deletion and Identity of Sense Deletion.[3] Some examples of these transformational relations are in order.

(1) (a) Lois was contacted by someone.

<Free deletion>

(b) Lois was contacted.

(2) (a) Clark$_i$ hoped that he$_i$ would come.

<Coreferential Identity Deletion>

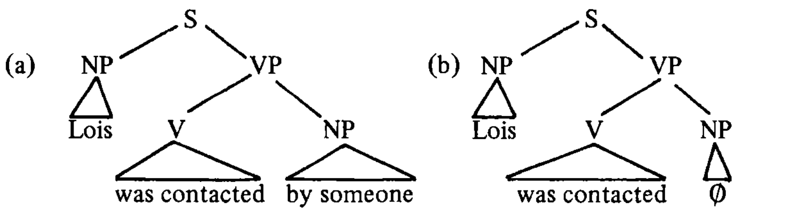
(b) Clark hoped to come.

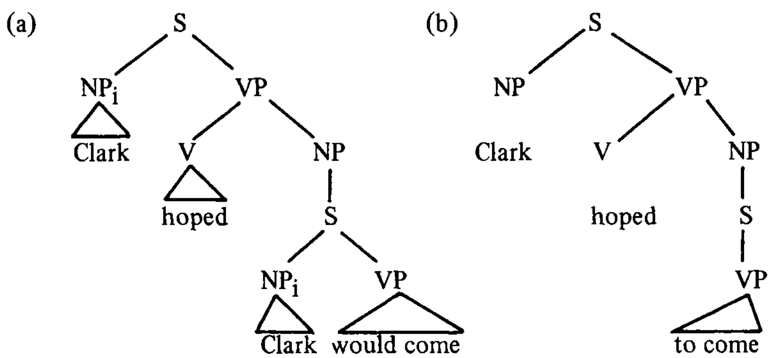
(3) (a) Clark enjoyed changing in phone booths, and Lois enjoyed changing in phone booths, too.

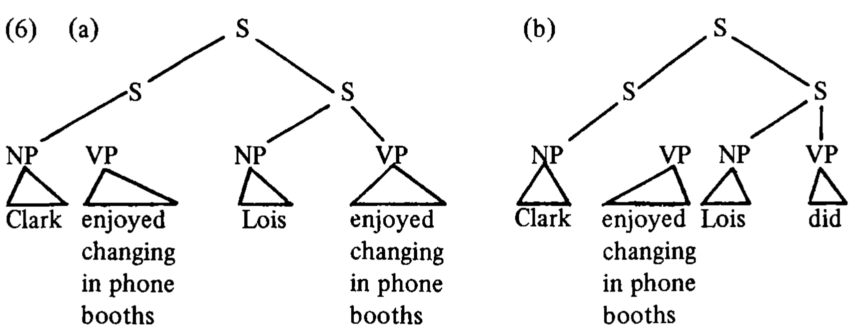
<Identity of Sense Deletion>

(b) Clark enjoyed changing in phone booths, and Lois did, too.

The (a) and (b) version of the tree structures (4), (5), and (6) correspond to the stages in the derivations suggested by the (a) and (b) versions of (1), (2), and (3) respectively.

(4) 

(5) 

(6) 

The feature of the above three structures relevant for our present discussion is simply that in the tree structures (5a) and (6a) there are two instances of some term (*Clark* in the former, and *enjoyed changing in phone booths* in the latter) which appears only once in the (b) versions of the tree structures being considered; while in the case of the tree structure (4a), there is but one occurrence of the term which fails to appear in the (b) tree (the term *by someone*). As mentioned above, the free deletion case involves the deletion of a constant; thus, there is no further requirement to insure recoverability. The other two cases require the characteristic identity element. It is the task of the grammarian to give an explicit account of the possible deletions in the grammars of natural languages.

One may consider the phenomenon from another vantage point. Consider the surface structures of (7).

(7) (a) Frodo wanted to carry the ring and Big Nurse did, too.
(b) Gandolf persuaded Siddartha to have a smoke.
(c) Fidel promised J. Edgar to behave himself.

The sentences of (7) are recognized by any native speaker of English as well-formed surface structures of English. Further, although there is nothing in the sentences which *directly* presents the information, any .native speaker of English will be able to answer affirmatively to the questions:

(8) (a) Does the sentence in (7a) tell you that Big Nurse wanted to carry the ring?
(b) Does the sentence in (7b) tell you that Siddartha has a smoke?
(c) Does the sentence in (7c) tell you that Fidel intends to behave himself?

The brute fact is that there are surface structures in every natural language (examined to date) which are understood to convey more information than is actually present in the sense that, for these structures, there is no explicit sequence of lexical items specifying the relations which are understood by native speakers of the language to be present when the sentence is heard. It is the purpose of the succeeding chapters to explicate some of the features necessary to give a full, explicit account of the deletion processes possible in the grammar of English specifically, and hopefully, to suggest the form of the general processes to be found in universal grammar.

NOTES

1. The Extended Standard Theory is presented most clearly in the most recent paper by Chomsky (1970). In addition, cf. Jackendoff (1068, 1969), Akmajian (1969), Dougherty (1968) among others for work conduced within that framework. The Generative Semantics model is most clearly presented in the writings of McCawley (1968a, 1968b, 1969), Lakoff (1969, 1970), Postal (1970, 1971), and Ross (1969) among others.
2. Cf. Matthews (1961), Chomsky (1964: 71-74; 1965: 144-147, 180-184). The topic will be treated again later in this study.
3. These distinctions are the ones commonly made in the field to date. They will not be challenged here.

2

FREE DELETION TRANSFORMATIONS

In this chapter, I will review the arguments which have appeared in the literature for the Free Deletion Transformations and attempt to evaluate their force. This latter task is particularly important as the form of the grammars of natural languages which is presently being entertained differs radically from that current at the time that the arguments were originally developed.[1] * Finally, I will consider the possibility of eliminating the set of Free Deletion Transformations in favor of another mechanism.

Surprisingly enough, the set of arguments for the free deletion phenomena is quite small; their form, by present standards, being implicit rather than explicit. I begin with arguments for UNSPECIFIED AGENT DELETION.

REVIEW OF THE TRADITIONAL ARGUMENTS FOR FREE DELETION

Argument 1

In Lees (1960:34), one finds more an assertion that the transformation exists than a well-formed argument for its existence.

> It is possible next to permit the derivation from any sentence with a transitive verb phrase a corresponding passive sentence, the verbal object becoming the new subject, the old subject appearing in a prepositional phrase in *by* which is later itself deletable.

The transformation itself is formulated by Lees as:

(T3)
$$X\text{–be En } V_{tr}\text{–by Nom–}Y \longrightarrow X\text{–be En } V_{tr}\text{–}Y$$

the cited examples being:

They were put by the side of the road by the police
They were put by the side of the road

The argument appears to have only historical interest in that there is no one presently doing research in transformational grammar who would consider the pair cited to be transformationally related. The difference in attitude concerning the pair of sentences is simply that two surface structures as differ different in meaning as the two cited would not suggest a transformational relation to present grammarians. The observation by Lees is, of course, sufficient to suggest such a relation if one is concerned only with distributional facts about strings of English (as Lees was), and no appeals to meaning relations are acceptable. The name given the transformation in Lees itself suggests the difference in attitude; rather than UNSPECIFIED AGENT DELETION, Lees referred to it as PASSIVE ELLIPSIS OF AGENT.

Arguments II and III

In Chomsky (1964: 70-74), we find that the relation has been tightened up to cover its present range of data.

An elliptical sentence is not simply one that is subject to alternative interpretations. But if it is true that the interpretation of a sentence is determined by the structural descriptions of the strings that underlie it (as supposed in the theory of transformational grammar), then the degree of ambiguity of a sentence should correlate with the number of different systems of structural description underlying it. In particular, if the condition that we have proposed is not met, the 'elliptical' sentences given above should be multiply, in fact, infinitely ambiguous, since they should have infinitely many sources. Thus 'the car was stolen' could derive from 'the car was stolen by the boy, ... by the tall boy, ...by the tallest of all the boys in the school' etc. In fact, the proposed condition establishes that each such sentence is derived from a single source with an unspecified Noun Phrase instead of from infinitely many sources with different Noun Phrases, consistently with the manner in which these sentences are interpreted.

Chomsky is, in fact, suggesting two arguments for the free deletion case:

> Argument II – Surface strongs with deleted agents are interpreted in the same way as other surface strings which are identical word for word and have, in addition, an overt agent Noun Phrase following the preposition *by*, where the Noun Phrase involved is the 'designated representative'. The designated representative in the case in question is *someone/something*. Specifically, the following two strings would be related by the transformation UNSPECIFIED AGENT DELETION.

(1) (a) The car was stolen by someone.
(b) The car was stolen.

> Argument III – The second argument is methodological rather than empirical. The class of grammars which are possible candidates for an

adequate grammar of English is smaller under the assumption that all items which are deleted must be recoverable.[2] If the transformation in question is allowed to delete any of an infinite number of Noun Phrases, the recoverability requirement is violated, and the class of grammar which must be considered is larger.

These considerations appear to be the only ones in the literature in favor of a free deletion account of the missing unspecified agent cases. We turn now to arguments for the OBJECT DELETION case.

Argument 1

Once again, it is in Lees (1960:33) that one finds the first published reference to the OBJECT DELETION transformation.

It has already been mentioned in the discussion of kernal sentences that the object of certain transitive verbs is deletable, as is the case with *steal*:

Pseudo-intransitive (V_{t32})
The boy steals scissors.
The boy steals.
. . . . .

. . . . .

The rule given by Lees is:

Pseudo-intransitive
(T1)

$$X + V_{t32} - \text{(of) Nom} - Y \dashrightarrow X + V_{t32} - Y$$

In Chomsky (1962:229), the same transformation is cited as being part of the grammar of English. The examples presented there include:

Men eat food	----->	Men eat
Men smoke pipes	----->	Men smoke
Men drink beer	----->	Men drink

In the same section as the one quoted above in the discussion of the motivation for the UNSPECIFIED AGENT DELETION, Chomsky presents two arguments which support the OBJECT DELETION transformation as well as the UNSPECIFIED AGENT DELETION: Argument II, the argument which refers to the fact that the set of surface structures which appear with deleted objects are understood in just the same way as these same strings with the addition of the overt unspecified (designated representative) Noun Phrase;

and Argument III the methodological argument concerning the recoverability constraint on grammars. The relevant sentences for OBJECT DELETION which parallel the strings (1a) and (b) for UNSPECIFIED AGENT DELETION are:

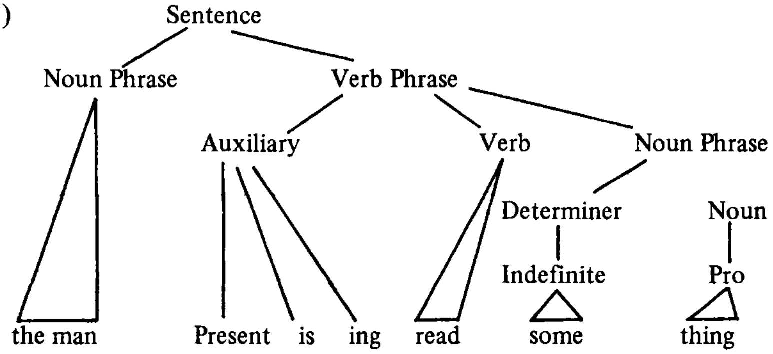
(2) (a) The boy is stealing something.
(b) The boy is stealing.

Argument IV

A fourth argument can be found in the Katz and Postal monograph, *An Integraged Theory of Linguistic Description* (1964:81-84). They begin with examples such as:

(3) The man is reading something. (K-P 52)
(4) The man is listening to something. (K-P 53)

The tree structure (5) is identified as the structure underlying both (3) and (4).

(5)


Katz and Postal then go on to comment:

Someone who hears (52), or its paraphrase on a reading (51) (that is, 'The man is reading' JTG) learns that what is being read is something with writing on it; one who hears (53) learns that what is being listened to is an audible sound... There is a definite regularity which represents the meaning of each occurrence of a pro-form in (51) - (54) regardless of whether the pro-form is finally deleted. The semantic information that someone obtains in the case of a pro-form is just the combination of semantic information which comes from the reading of the pro-form, i.e. the semantic markers assigned to the pro-form in its dictionary entry, plus those semantic markers which state the *selectional restrictions* on amalgamation with the set of readings for the element in the position to be amalgamated with that pro-form.

The authors then point out that if the projection rules which are needed independently of the cases under consideration were to receive as input the structure (5) as the underlying structure of both the surface string with the pro-form present and the one with the null object, then no new projection rules would be required for the characterization of the meaning of the string with the null object. This argument transfers to the case of the UNSPECIFIED AGENT DELETION where it is equally applicable.

Argument V

Perhaps the most intriguing of the arguments in the literature can be found in Lees (1960:33) where the paradigm quoted above appears in its full form; namely (6):

(6) (a) The boy steals scissors.
(b) The boy steals.
(*c) The stealing boy...

Although there is no comment in the text as to why the (c) variant is deviant, it is clear that the 'Pseudo-intransitive' case (6) is to be contrasted with the true 'Intransitive' which Lees cites immediately following the above.

(7) (*a) The boy shivers scissors.
(b) The boy shivers.
(c) The shivering boy...

The argument is implicit, but easily developed. Let us assume that pairs such as those of (8) and (9) are to be related by a rule called PREDICATE PREPOSING.

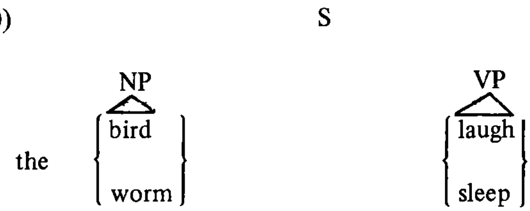
(8) (a) The bird is laughing.
(b) The laughing bird...

(9) (a) The worm is sleeping.
(b) The sleeping worm...

Clearly, the structure underlying the (a) versions of the above is (10).

Crucially, at no point in the derivation of the (a) structure is there a NP node dominated by the VP node. We see, then, that the structural index of the transformation PREDICATE PREPOSING would be:

(10)



(11) $X \; NP \; [_{VP} \; V \;]_{VP} \; Y$

Notice now the results of the PREDICATE PREPOSING transformation when applied to the (a) version of the following strings.

(12) (a) The dragon is eating.
(*b) The eating dragon...

(13) (a) The knight is drinking.
(*b) The drinking knight...

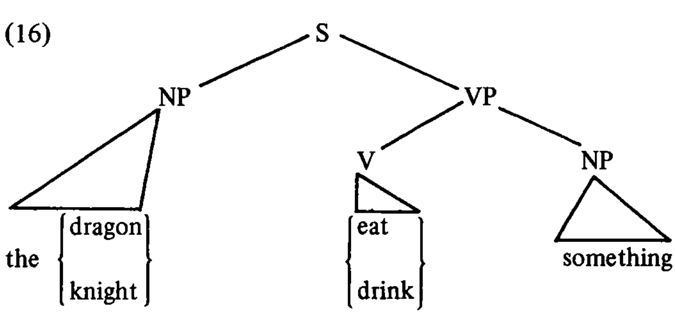
But if, as has been claimed above, the (a) versions of (12) and (13) are to be themselves derived from the more remote structures (14) and (15) respectively,

(14) The dragon is eating something.

(15) The knight is drinking something.

we are assured by the structural index of the PREDICATE PREPOSING transformation that the deviant strongs (12b) and 13b) will never be generated. This is the case since the (a) versions are of the form (16), being derived by OBJECT DELETION from the same structure as the overtly transitive strings (14) and (15).

(16)



The fact that the NP node dominated by the VP is present insures that the strings (12a) and (13a) will not be properly analyzable with respect to the structural index of PREDICATE PREPOSING. This account involves the assumption that the application of OBJECT DELETION removes the lexical item, but not the NP node which dominates it. The two sets of verbs are thus nicely distinguished.

EVALUATION OF THE TRADITIONAL ARGUMENTS

Arguments I, II, and III are identical (with different examples) for the two free deletion transformations being considered. Argument IV, which appears first in the attempt to motivate the OBJECT DELETION transformation, generalizes to UNSPECIFIED AGENT DELETION as well. Argument V is peculiar to OBJECT DELETION, and does not generalize.

Argument I is based on distributional facts alone. It says simply that if there is a grammatical surface structure of English which is composed of the ordered set of terms, t_1, t_2,...,t_n, then there is another set of ordered terms, t_1, t_2,..., t_{n-i}, which is composed of just that same set of terms less i members and which is equally grammatical. If, however, we accept various appeals to meaning as revelant in determining the set of possible transformational relationships in the grammar, then, as mentioned above, the disparity in meaning between the strings cited by Lees is too great to entertain a transformational relationship between them. Arguments II and III are themselves attempts to correct the domain of the transformations involved, restricting them to the deletion of category representative pro-forms only. Given this restriction, Argument I, based on purely distributional criteria, is acceptable.

Arguments II (which we will have occasion to refer to again) and III seem secure. Argument IV, on the other hand, is based on a particular theoretical approach to the mapping of sounds and meanings. It appears to have the following force: in any system of grammar which contains projection rules defined on the terminal symbols of Deep Structures (in the sense of Chomsky, 1965) which result in Amalgamated Paths (semantic representations associated with Deep Structures), if that set of projection rules includes a rule which amalgamates subjects with the remainder of the clause, then the transformational deletion of unspecified agents in derivations subsequent to the application of the PASSIVE transformation is supported. Similarly, if the set of projection rules includes one which amalgamates objects with the verb which governs their clause, then the transformational removal of pro-form objects, subsequent to the semantic interpretation on the Deep Structures containing these objects, is supported. To deny the transformational removal in these pro-forms in the relevant structures is tantamount in this type of system either to accepting two sets of projection rules defined on Deep

Structure subjects and objects – one of which is defined on lexical and pro-form subjects and objects, the other defined on empty or non-existent nodes – or to accept a new set of projection rules defined on empty or non-existent nodes in derived structures. This new set of projection rules would have precisely the same effect semantically as the original projection rules for the amalgamation of subjects and objects in Deep Structure for those structures which show up on the surface with the overt pro-form. The original projection rules would still be necessary for those structures with expressed pro-forms. Notice that this last criticism depends on the fact that projection rules are defined on terminal symbols, that is, lexical items.[3*] Within the more recently developed framework of Generative Semantics (cf. Lakoff, 1969), there is no commitment to projection rules, the meaning of the string being given directly by the Deep Structure. We may note in passing that typically the Deep Structure in a Generative Semantics system includes nodes which consist solely of semantic terms with no lexical item attached. We defer discussion of Argument V for a time.

THE FORCE OF THE ARGUMENTS

We may now address ourselves to the question of what the arguments reviewed do, in fact, demonstrate. It is clear, first of all, that there is no *syntactic* evidence that, in the derivation of strings which involve the application of free deletion transformation, there was ever any lexical item present.[4*] Specifically, none of the arguments show any indication of the presence at any point in the derivation of lexical items in the position which in the surface realization is null. The one argument (Argument IV) which supports the presence of an actual lexical item does not involve any syntactic considerations. This argument is, at best, an argument about the machinery required by a particular theoretical position which uses projection rules to map Deep Structures into semantic representations. As was mentioned above, in the Generative Semantics framework, the Deep Structure is the semantic representation of the string, and the nodes at that point dominate not lexical items (as required in the theory which Katz and Postal were motivating), but semantic material. Thus, in the newer theory Argument IV loses whatever force it originally had.

We may, at this point, re-phrase the question concerning the force of the traditional arguments for free deletion transformations: What is it that is deleted by the free deletion transformations? Logically, there are answers to this question.

I. Free deletion transformations delete constants from the terminal vocabulary, actual lexical items; specifically, the category representative.

II. Free deletion transformations delete nodes which dominate constants from the terminal vocabulary, actual lexical items; specifically, the category representative.

THE PLAUSIBILITY OF FREELY DELETING CONSTANTS

The following considerations argue against a system of grammar in which actual lexical items are removed by the set of free deletion transformations. First, as was mentioned above, there is no syntactic evidence of the presence of any constant, that is, any lexical item in the derivation of strings which putatively involve the application of one of the free deletion transformations. It seems, moreover, that one can do better than simply stating this negative fact. Consider the following surface structures which, under the present assumption, result from a derivation in which some lexical item has been removed by a free deletion transformation.

(17) (a) The window was broken.
(b) Big Brother was watching.
(c) Narcissus was talking.

Under the assumption that free deletion transformations delete constants, it is fair to pose the following question: Which constant has been deleted in the derivation of the surface structures of (17)? Unfortunately for this proposal, there seems to be no single constant in the above examples[5] * which captures the semantics of the missing argument. For example, the window in the (a) sequence can be understood to have been broken by *something* as well as *someone*. Likewise, in the (b) sequence, Big Brother is not understood to be watching *someone* or *something*, but rather ____ , where the blank stands for the non-existent English constant which combines all the semantics of *someone* and *something* except the animacy marking. Yet crucially, the sentences of (17) are not understood to be ambiguous in the sense that (18), say, is ambiguous.

(18) Spiro took Dick's mask off.

Rather it would be more accurate to say that the missing arguments are lexically indeterminate; that is, they have no lexicalization. Someone wishing to maintain the hypothesis that free deletion transformations involve the removal of actual lexical items would, in the above cases, be forced to make a wholly arbitrary choice as to which lexical item had been removed. Not only would the choice be unprincipled, but the result would necessarily be at odds with the semantic facts, no matter how the choice was made; that is, (17) has a meaning distinct from either (19a) or (b).

(19) (a) The window was broken by something.
(b) The window was broken by someone.

It appears that the choice of which lexical item might be selected is not limited to those mentioned above. Consider the sentences of (20).

(20)
$$\text{Max is } \begin{Bmatrix} \text{believed} \\ \text{said} \\ \text{claimed} \end{Bmatrix} \text{ to be a genius.}$$

My intuitions are that these strings are different in meaning from (21).

(21)
$$\text{Max is } \begin{Bmatrix} \text{believed} \\ \text{said} \\ \text{claimed} \end{Bmatrix} \text{ by someone to be a genius.}$$

Rather the sentences of (20) are much closer in meaning to those of (22).

(22)
$$\text{Max is } \begin{Bmatrix} \text{believed} \\ \text{said} \\ \text{claimed} \end{Bmatrix} \text{ by many (people) to be a genius.}$$

Further, it appears that there are other constructions similar to (17) in that there is literally no single constant to cover the semantic ground. Consider the sentences of (23).

(23) (a) Ruby ate more wurst than baloney.
(b) Ruby ate more _____ than baloney.

Of particular interest is the semantic material being represented by the symbol _____. If my intuitions are correct. the blank stands for the set of all edible things minus the edible item mentioned to the immediate right of the surface item *than.*[6*] In English at any rate, there is no single lexical item which covers just that semantic material. Such considerations lead one to abandon the first hypothesis as untenable.

THE PLAUSIBILITY OF FREELY DELETING NODES

Suppose that one were to maintain that the free deletion phenomena were still transformational in nature, but that the nodes dominating these constants were mentioned and deleted by the set of free deletion transformations. Clearly, as we have seen from the traditional arguments (Arguments II and III), the structural index of the free deletion transformation involved cannot mention just the node label *NP*, but to insure recoverability, it must distinguish the set of NP labels which dominate the category representatives from the set which do not. One might, therefore, create a new node label NPP, say, which would be limited in its distribution to the set of positions dominating the category representatives; that is, the set of constants believed to be involved in the free deletion phenomena. The node NPP would then appear in the structural index of each of the free deletion transformations, guaranteeing that this set of NP would be distinguished from the productive and, in fact, infinite set of NP in English. It is clear, I think, that such a solution would be quite ad-hoc. Further, insofar as one can interpret this sort of an approach, it seems at variance once again with the semantic intuitions regarding sentences such as (17). Since the nodal label NPP is serving as a variable over the set of constants thought to be involved in the free deletion phenomena, and since both the surface structures of (18) are well-formed, then the string (17) should be ambiguous between the readings of the two surface structures of (18). This proposal, as well as feature marking proposals, reduce essentially to the one which we have already considered in that the same criticisms obtain.

AN ALTERNATE SYSTEM

The arguments against viewing free deletion as deletion of a member of the terminal vocabulary, an actual lexical item, are compelling. The proposal to interpret free deletion as the deletion of a node is, if well-formed, subject to the same set of criticisms as the proposal to delete constants. In view of these findings, I suggest as an alternate possibility that the set of free deletion transformations which we have been considering be eliminated from the grammar entirely. In their place, I would propose a single mechanism, that of *optional lexicalization.*

(24) Optional Lexicalization[7]

If a node, n_i, in the structure, s_i, dominates unspecified semantic material, n_i is optionally lexicalized in the derivation of s_i.

Under this conception of grammar, the difficulties which arose in attempting to specify which lexical items is to be deleted disappear. Further, the fact that there is never any trace of the lexical item hypothesized under the notion of free deletion as the removal of a lexical item is explained naturally.

There never is, in fact, any lexical item present in the derivation in that argument position. Finally, the ad hoc node labels (or equivalently, the introduction of ad hoc features) introduced to distinguish the set of nodes – which dominate the set of constants believed to be involved in the derivation of strings which include an application of one of the free deletion transformations from the set of regular node labels – are wholly unnecessary. Notice that the mechanism of optional lexicalization makes no reference to the syntactic position of the node involved; it claims rather that any such node in any syntactic position is optionally lexicalizable. We have already seen examples of strings in which passivized agents and direct objects have failed to have a surface realization. The following sentences suggest that the phenomenon of optional lexicalization is, as claimed, not restricted to specified syntactic positions.

(25) (a) Big Brother hit Bug Nurse with something.
(b) Big Brother hit Big Nurse.

(26) (a) Spiro sent his daughter somewhere.
(b) Spiro sent his daughter.

(27) (a) Max came in order to talk to someone.
(b) Max came in order to talk.

(28) (a) Susan brought a cake for someone.
(b) Susan brought a cake.

The immediate objection to this generalization of the optional lexicalization mechanism is the deviancy involved in (29b), presumably resulting from the failure of an optionally lexicalizable argument to have a lexical realization in a privileged syntactic position.

(29) (a) Someone sent his son to war.
(*b) sent his son to war.

I think that this objection is ill-founded; it is neither the somewhat coherent semantic notion of agent (Fillmore, 1968a) which is involved in sentences like (29b) as (30b and c) show, nor is it the privileged syntactic position of surface subject as (31b and c) show that is required for the sentences of the type (29) to be well-formed.

(30) (a) Someone broke the window with something.
(b) Something broke the window.
(c) The window broke.

(31) (a) I heard that it was difficult for someone to find John.
(b) I heard that it was difficult to find John.
(c) I heard that John was difficult to find.

Rather, I would suggest that (29b) is deviant for the same reason that (32a and b) are.

(32) (*a) Raining.
(*b) turned out that Nancy left.

Namely, there appears to be a constraint in English (but not in Italian, for example) that the surface matrix clause has an overt surface subject NP, even if, as in (32), that term is semantically empty.[8] The second objection to the general claim about optional lexicalization might come from a consideration of sentences involving verbs from the set of absolutely transitive verbs, as in (33), for example.

(33) (a) Max shattered something.
(*b) Max shattered.

Fillmore (1968a;1968b) has developed a notation for the lexical marking of verbs which registers the difference between an optional argument (the object argument of the predicate *eat*, for example) and an obligatory argument (the object argument of the predicate *shatter*, for example) of a relation. By the use of simple and interlocking parenthesis, the dependencies among the arguments of a predicate are determined in the lexical entry for that predicate. Such a system of notation would provide the information necessary to distinguish the *shatter* from the *eat* case, thus overcoming the second objection. The claim made by this notation is that the number and types of arguments required by a particular relation are idiosyncratic; they cannot be predicted. This seems to me to be unsatisfactory. Unfortunately, I have only a preliminary suggestion as to how one might do better than these idiosyncratic markings.

Patrick Brogan (personal communication) has noticed that the set of so-called middle verbs in English are distinguished semantically from non-middle verbs in that the former are descriptions of the movement of their object argument, while the latter are not. To illustrate, we may contrast the verb *roll*, a middle verb, with *swallow*, a non-middle; consider the differential syntactic possibilities.

(34)	(a) The girl rolled the ball.	(a') The boy swallowed the ball.
	(b) The girl rolled.	(b') The boy swallowed.
	(c) The ball rolled.	(*c') The ball swallowed.

Notice that the verb *roll* describes the movement of the object argument *ball*, and leaves indeterminate the movement of the agent argument *the boy*. Relations such as *swallow* are not descriptions of the movement of the object argument. Consequently, there is no possibility of a middle construction with the verb *swallow*, that is, (34c') is ungrammatical. Brogan's hypothesis is that the set of middle verbs can be predicted from their semantics; namely, any verb which describes the movement of the object argument is a middle verb. (35) is a list of examples of such verbs; each of them may be substituted in the syntactic frame (36) and the result will be grammatical. Crucially, the interpretation of the argument which appears immediately before the verb position in the frame (36) is that of logical object.

(35) shatter, roll, break, bend, break, twist, turn, rotate, twist,...

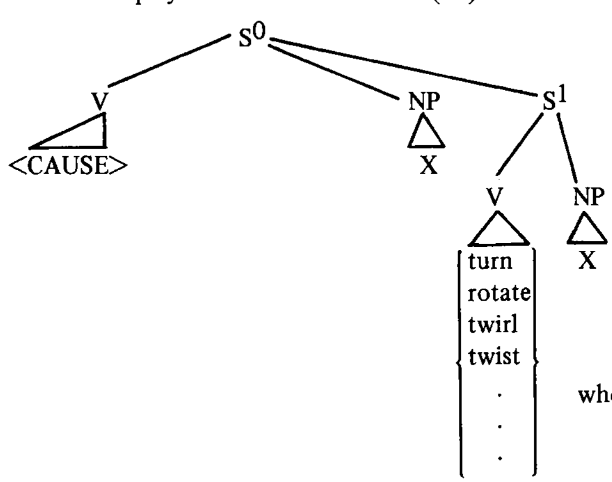
(36) Something ____ (+<past>).

Notice that the set of middle verbs is included in the set of absolutely transitive verbs. These verbs are required to have a lexical item in the logical object argument position in surface structures. An apparent counter-example to this claim is (37).

(37) Herman {turned / rotated / twirled / twisted / . / . / .}

The sequences of (37), I would claim, are not true counter-examples to the claim made above. Notice that the interpretation of (37) is the semantic representation displayed in the tree structure (38).

(38)



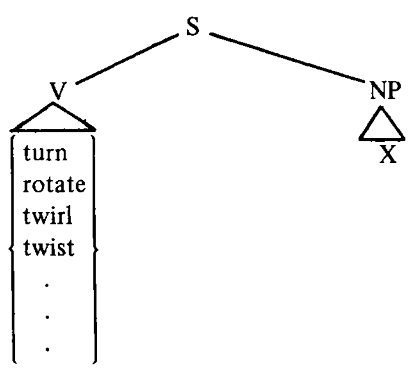
where X = Herman

In other words, the meaning of (37) is the same as that of (39).

(39) Herman$_i$ caused himself$_i$ to { turn / rotate / twirl / twist / . . . }

The fact that there is no overt object for the surface verbs *turn, rotate, twirl, twist,...* is explained given the underlying structure (38) and the transformation EQUI-NP DELETION and PREDICATE RAISING. The underlying structure for the surface strings of the form (36) is (40).

(40)



where X = something

That is, the surface middle constructions of (36) arise from an underlying structure which differs from the tree structure (38) only in that the higher predicate with its accompanying argument is not present. This difference in underlying structure captures the semantic distinction perfectly, as the causative reading is entirely lacking in the strings of (36). These middle constructions differ just in the absence of the causative interpretation from the sentences of (41) where the causative interpretation is present.

(41) Something was { turned / rotated / twirled / twisted / . . . }

The underlying structure of (41) includes the higher predicate of causation whose argument is the unspecified NP. It seems then the hypothesis advanced by Brogan finds a natural explanation within this framework, and examples such as those of (37) are seen as only apparent counter-examples. Notice that the selectional restrictions for agent NP functioning with middle verbs are just the selectional restrictions demanded by the verb of causation, while the selectional restrictions for the object argument of the surface transitive of a middle verb are just the selectional restrictions for the surface subject of the surface middle construction. That is, the surface subject of the surface transitive form of a middle verb is selected independently of that verb, only the causative predicate being relevant for the selectional restrictions. These facts are captured directly by the underlying structures where each predicate imposes selectional restrictions on its own arguments.

The suggestion which may allow us to escape marking the lexical entry for each verb for its optional and obligatory arguments is a simple extension of Brogan's hypothesis concerning the identification of middle verbs. It is clear that, for at least a subset of verbs, we can predict that they will be absolutely transitive specifically, for the set of middle verbs. This is equivalent in terms of our discussion to being able to predict which of the arguments of a relation will have an obligatory lexical representation in surface structure. Hence, given some predicate, p_i, with a set of possible arguments, $a_1,...a_n$, we can predict that if p_i describes the movement of one of its arguments, a_i, say, then a_i has an obligatory lexical representation. This principle can be extended beyond the set of middle verbs.

Suppose that we attempt to extend Brogan's hypothesis in some semantically natural way; specifically, we predict that for any predicate, p_i, which describes a physical attribute of one of its arguments, a_i, then a_i is obligatory with respect to p_i. We may begin to test this extenstion by considering sentences which contain predicates which describe the color of one of their arguments. In the cases below, the predicate describes the color of its object argument; therefore, our prediction is that these predicates will be included in the set of absolutely transitive surface verbs.

(42) (a) Richard reddened the wall.
(*b) Richard reddened.

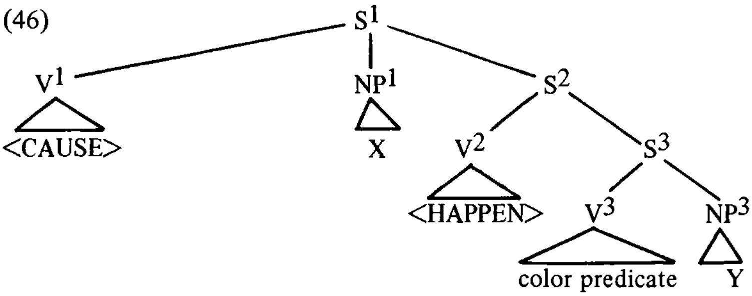
(43) (a) Richard blackened his hands.
(*b) Richard blackened.

(44) (a) Vern blued the metal.
(*b) Vern blued.

(45) (a) Huck whitened the fence.
(*b) Huck whitened.

Each of the (a) versions of the above pairs may be accurately represented by an underlying structure of the form (46).

(46)



where X = Richard, Vern, Huck, Y = the object arguements of the (a) versions of the above surface structures.

The structure (46) is an adequate semantic representation for the (a) versions of the pairs under consideration. Notice that for some dialects, certain of the (b) versions of the pairs cited are acceptable; for example, a possible interpretation of (42b) is:

(47) Richard blushed.

Crucially, for these cases, the interpretation is uniformly one in which the surface subject and the missing object argument are coreferential, paralleling the facts described in conjunction with the structures of (37). More exactly, an inspection of the structure (46) will reveal that just in case the node NP^3 bears the same index as the node NP^1, the structural conditions for the transformation EQUI-NP DELETION as met, and the putative counter-examples are seen to proceed from the proposed structure by independently motivated rules of the grammar.

I have been able to identify several other sets of predicates which support the general claim about the predicability of obligatory arguments – predicates of size and predicates of shape as presented in (48) and (49) respectively.

(48)

(a) Philip { widened / lengthened / raised = heightened / telescoped / collapsed / . / . } the thing that he was building.

(48)

(*b) Philip { widened / lengthened / raised = heightened / telescoped / collapsed / . . . } ∅.

(49)

(a) Diana { squared off / lined up / bi-sected / diagonalized / split / quartered / divided / . . . } the stuff that she had brought with her.

(*b) Diana { squared off / lined up / bi-sected / diagonalized / split / quartered / divided / . . . } ∅.

Once again, in some of the (b) versions of the above strings, there is an interpretation for the sequence on which it is well-formed. This interpretation is restricted in that the surface subject and missing surface object position argument are understood to be coreferential, as in the string *Diana lined up* where it is clear the meaning is the same as that of the string *Diana lined herself up* (with respect to something).

In addition to the above predicates, consider those which describe the physical attribute of the temperature (or more accurately, the change in temperature) of one of their arguments.

(50)

(a) Linda {heated / cooled / melted / warmed up / boiled / fried / . . .} the material.

(*b) Linda {heated / cooled / melted / warmed up / boiled / fried / . . .} Ø.

As we saw in the other cases, if any of the above strings, (b) versions, have a well-formed interpretation, the interpretation is uniformly one where the missing object argument is understood to refer to the same object as does the expressed subject term. This is consistent with the system being proposed.

It is interesting that, in all the cases where we have successfully predicted which of the arguments of a predicate has an obligatory lexical representation and have proposed an underlying structure, the semantic portion of the surface predicate which most directly desribes the physical attribute of the obligatory argument (*red* in *redden*, for example) appears as the deep predicate for that argument. As we noted above, the selectional restriction on the obligatory argument in surface structure is identical with the selectional restrictions which exist between that argument and the deep predicate (the set of things which may be red and the set of things which may be caused to become red are identical). If further extensions of the principle suggested here show similar patterns, it seems that it will be possible to use a system of underlying structures where the only selectional restrictions which may be imposed on an argument are those imposed by the predicate for which that argument node serves as an argument in underlying structure. Viewed in another way, such a pattern would assist in determining what is the set of elementary predicates for natural language. Hence, as Lakoff has pointed out (1970:58):

In natural logic (as contrasted with arbitrary logical systems – JTG), the operators and atomic predicates would not be chosen from an arbitrary vocabulary, but would be limited to those that can occur in the logical forms of sentences of natural language.

In summary, then, the general point of this chapter is that the range of data, formerly accounted for by separate free deletion transformations such as UNSPECIFIED AGENT DELETION and OBJECT DELETION, constitute a unitary phenomenon; the syntactic position of the missing argument is irrelevant for determining whether the argument may be omitted or not. Further, there is, on the one hand, no principled way of determining which lexical item is involved in the putative deletions cases; and, on the other hand, the interpretation of free deletion as the removal of nodes yield an undesirable ad hoc result. The proposal here, then, is to eliminate these free deletion transformations in favor of the mechanism of optional lexicalization. Thus, if a node, n_i, dominates what has been referred to traditionally as un unspecified argument, and that argument is optional with respect to its predicate, then n_i may have a null surface representation.[10] Obviously, the mechanism of optional lexicalization requires that obligatory argument position of a verb be distinguishable from optional ones. The notation developed by Fillmore which identifies which of the argument positions of a predicate are optional is adequate for this purpose. This notation claims, however, that such a determination is idiosyncratic. An extension of a suggestion made by Brogan regarding the prediction of middle verbs is offered as an initial semantic factor which allows one to avoid differentially marking each of the lexical entries for predicates for the arguments which are obligatory. Finally, the wider significance of the determination of obligatory versus optional arguments of a predicate is suggested for the underlying structures of English.

NOTES

1. Cf. Chomsky (1965: chapters 2 and 3) for a discussion of the defects of the first set of theories of transformational grammar. For a criticism of the theory presented in Chomsky (1965), cf. McCawley (1968), Lakoff (1969), and Postal (1970). Cf. Grinder (to appear) for a more historical treatment.
2. Cf. Matthews (1962) for a discussion of this constraint on grammars. In somewhat imprecise terms, for the class of grammars without the recoverability constraint, it is not possible to construct an algorithm for determining whether some arbitrary string of finite length is in the language generated by such grammars. In other words, the set produced by such a grammar would be undecidable.
3. I do not mean to imply that all members of the terminal vocabulary in the older framework were lexical items, but simply that all the nodes which dominated the terms thought to be deleted by the free deletion transformations dominated lexical items.
4. This would then, seem to be a case of absolute syntactic neutralization, paralleling the notion of absolute neutralization in phonology as discussed by Kiparsky (1968).
5. Notice, further, the difference in meaning of the term *someone* in the following pair:

(i) (a) Martha was seduced by someone.
(b) Michael was seduced by someone.

These are, perhaps, more cultural than linguistic facts.
6. Notice that (23b) is not understood as a paraphrase of the ungrammatical string (*i*).

(*i*) * Ruby ate more of the yams, bread, pizza, baloney, and wurst than of the baloney.

It seems to me that (*i*) is a tautology. Specifically, as pointed out in the text, one understands the blank symbol in (23b) to specifically exclude the item *baloney*.
7. This formulation used the phrase *unspecified semantic material* which itself stands in need of an independent and explicit characterization. I intend the term to refer to the material formerly involved in the free deletion transformation; that is, the mechanism of optional lexicalization is to account for the same range of data as the free deletion transformations did. Further work is necessary to provide an explicit account of the domain of the mechanism.
8. This constraint would seem to be most naturally stated as a negative surface structure constraint of the type studied by Perlmutter (1968).
9. There is a series of these verbs, such as the verb *redden*, to be found in Lakoff (1965).
10. The claim that the only obligatorily lexicalized arguments are those whose predicates describe their physical attributes or movements restricts the class of obligatorily lexicalized arguments too severely. Consider (*i*):

(*i*) (a) Max disturbed someone.
(*b) Max disturbed.
but
(c) Max is disturbing.

It may well be that some subset of the set of obligatorily lexicalized argument positions will have to be so-marked (idiosyncratically) in the lexicon.

3

A CONSTRAINT ON OPTIONAL LEXICALIZATION: CHAINING

In the previous chapter, I argued for the elimination of the set of transformations which were to account for missing unspecified NP in surface strings like (1) and (2) in favor of the mechanism of optional lexicalization.

(1) (a) The Bank of America was burned down by someone.
    (b) The Bank of America was burned down.

(2) (a) The National guardsmen received their pay from someone.
    (b) The National guardsmen received their pay.

I would like now to consider a constraint on this otherwise optional lexicalization of unspecified arguments. Consider the semantic difference between the sequences of (3) and (4).

(3) (a) The Bank of America was burned down by someone who understands the value of property.
    (b) Someone burned down the Bank of America and someone understands the value of property.

(4) (a) The National guardsmen received their pay from someone and he was pleased with their performance at Kent State.
    (b) The National guardsmen received their pay from someone and someone was pleased with their performance at Kent State.

In the (a) versions of the two pairs, there is a relation of stipulated coreference present; in the case of (3), between the terms *someone* and *who*, and in (4) (on one reading), between the terms *someone* and *he*. In the (b) versions, on the other hand, there is no relation of stipulated coreference present; rather the sequences are understood as independent, conjoined clauses, each containing an instance of the surface word *someone*. Each referent of each of the terms *someone* is understood to be a distinct individual. This observation alone tells of the necessity of having a device to register coreference and its negation. Such a result is not surprising. Chomsky, as early as *Aspects* (1965: 145), suggested that the difference in the understanding of the referential properties of the pairs such as those above be captured by the assignment of indices in Deep Structure to each of the nominal nodes. Further, certain of the transformations in the grammar were to be sensitive to these indices. For example, the Reflexivization transformation was cited by Chomsky as requiring that the two nominals involved have the same index. We adopt this convention for purposes of discussion. Specifically, the same index appearing on two different nodes in a tree structure will indicate stipulated coreference, the relation which we saw held between nodes which dominate certain elements in the (a) versions of (3) and (4). This stipulated coreference relation contrasts with that of assertive coreference (Postal, 1968), as seen in (5) holding between the underlined NP.[1]

(5) *The one who has blood on his hands* is *Nixon*.

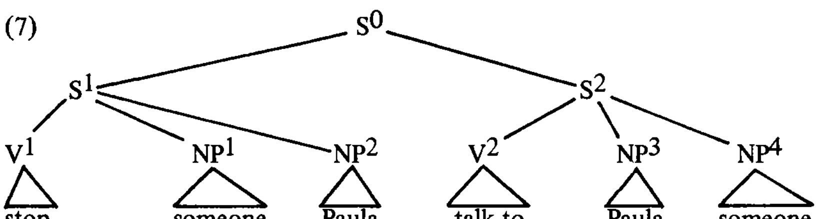
Notice that under the schema proposed for the marking of coreference, the index is assigned to the node, never to the lexical item itself. Thus, in this system coreference is a relation which is said to hold between nodes in a tree structure.

Given that coreference is a node-node relation, and given the proposal about accounting for the missing unspecified arguments in structures such as (1) and (2) by optional lexicalization, consider the contrast semantically among the three sequences of (6).

(6) (a) Paula was stopped by someone and she talked to him over her.
(b) Paula was stopped by someone and she talked.
(c) Paula was stopped and she talked to him.

Clearly, all three of the strings of (6) are fully grammatical. It is equally obvious that the three strings correspond to three different semantic representations. The differences between the three strings are then seen to correspond to the differential index assignment to the nodes involved in the tree structure underlying (6), that is, (7).

(7)



where the items appearing witin angled brackets are semantic, non-lexical items.

The following table indicates the assignment of indices to the nodes in question; NP^1 (<someone>) and NP^4 (<someone>).

(8)	NP^1		NP^4	corresponding surface structure	result
assignment	i	$=$	i	(6a)	coreference
of	i	$\neq$	j	(6b)	non-coreference
indices	i	$\neq$	j	(6c)	non-coreference

The sequence (6b) differs from (6c) in that in the former case the NP^1 node has been lexicalized and the NP^4 node has not, while the converse situation obtains in the latter case. This is but another example of the process of optional lexicalization discussed at some length in the previous chapter. The interesting case is (6a). In the underlying structure of (6a), we find the same index appearing on the two nodes in question. Correspondingly, in the surface structure the relation of coreferentiality is understood to hold between the lexical items *someone* and *him*. Another surface realization of the structure which underlies (6a) is (9).

(9) Someone stopped Paula and she talked to him.

In a parallel manner, the relation of coreference is understood to obtain between the surface lexical items *someone* and *her*. Thus, we see that the process of pronominalization, a process which is sensitive to referential indices, is used to indicate coreference in the surface structure. The difficulty is that if the NP argument nodes were in fact optionally lexicalizable, then the strings (6b) and (c) and also (10) should be surface realizations of the same underlying structures and should be synonymous. Clearly, they are not.

(10) Paula was stopped and she talked.

I take these facts to show the need for a constraint on the otherwise optional lexicalization of unspecified arguments; namely, if a node, n, is assigned some index, and n appears in a deep structure which contains some other node which bears the same index, then n is obligatorily lexicalized. Developing the terminology, I will refer to a set of nodes in some deep structure which bear the same index (a set of coreferential nodes) as a *chain of coreference*. Any node involved in such a chain will be said to be chained by its participation in that set. The constraint will be called the Chaining Constraint.[2]

(11) The Chaining Constraint

If a node, n, is an unspecified argument, and is a member of a chain of coreference, the n must have a lexical realization at some point in the derivation of the sentences which contains it.

The following are further examples of the same process: the symbol "≠" before the (b) and (c) versions of each of the following sets is intended to indicate that the sequences (grammatical or not) are not members of the same derivation as the (a) version; a comparison of the various versions with one another will reveal semantic differences paralleling those of (6a, b, c), (9) and (10).

(12) (a) Kathleen brushed the iguana with something$_i$ and it$_i$ broke her ring.
(≠b) Kathleen brushed the iguana and something broke her ring.
(≠c) Kathleen brushed the iguana with something and her ring was broken.

(13) (a) Galahad wanted to send his sister *somewhere* and she wanted to talk to someone *there*.
(≠ b) Galahad wanted to send his sister and she wanted to talk to someone somewhere.
(≠c) Galahad wanted to send his sister somewhere and she wanted to talk to someone.

(14) (a) Merryweather bought a book for someone$_i$ and she has never talked to him$_i$.
(≠b) Merryweather bought a book and she has never talked to anyone.
(≠c) Merryweather bought a book for someone and she has never talked.

(15) (a) Arlene read something$_i$ and it turned out that a friend of hers had written it$_i$.
(≠b) Arlene read and it turned out that a friend of hers had written something.
(≠c) Arlene read something and it turned out that a friend of hers had written.

In the (b) and (c) strings of the above sets, the underlying structure of the (a) version has failed to surface as the result of a well formed derivation, because one of the two unspecified argument nodes failed to have a lexical realization; hence the need for the Chaining Constraint to block such derivations. Notice that the effect of the Chaining Constraint is to insure the maintenance of a relation of coreference as the deep structure is mapped into a particular surface structure by providing lexicalization for the arguments over which the process of pronominalization is to be stated.

The process of pronominalization displayed above does not exhaust the inventory of devices available in the grammar of English to designate certain argument positions as being filled by a linguistic reflex of the same referent. In the case of relative clauses,[3] patterns not unlike those we have already seen obtain; consider the following pairs:

(16) (a) Teddy ate something which was green.
(≠b) Teddy ate which was green.

(17) (a) Rick was attacked by someone who was sick.
(≠b) Rick was attacked who was sick.

The head of the relative clauses in the (b) versions of the above examples has failed to have a lexical representation, but is clearly involved in a chain of coreference with the relative pronoun terms. Thus, the (b) strings are in violation of the Chaining Constraint, and their deviancy is naturally explained. In the following pairs, again the (b) versions are ill-formed. Under the assumption that the (a) structures of (16) and (17) are remote structures in the derivation of the surface structures (18) and (19), the deviancy of the (b) strings of (18) and (19) is automatically accounted for, as again, the head of the (reduced) relative clauses have failed to have a surface realization.

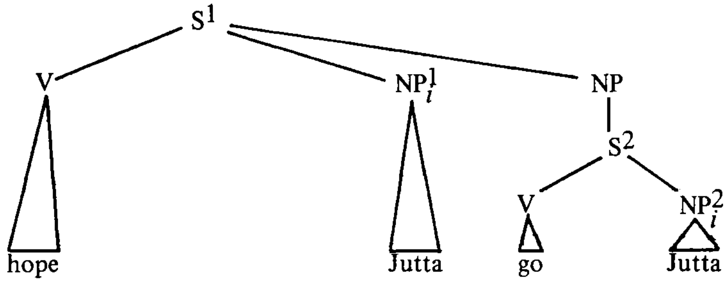
(18) (a) Teddy ate something green.
(≠b) Teddy ate green.

(19) (a) Rick was attacked by someone sick.
(≠b) Rick was attacked (by) sick.

Notice that the terms *who* and *which* which appear in the sequences (16) and (17) do not occur in the derived strings (18) and (19). But these terms are clearly involved in a chain of coreference with their antecedents *someone* and *something*; respectively; their failure to appear without causing some residual deviancy requires an explanation. I defer the discussion of the principle involved for a time.

A third major way in which natural languages mark the relation of coreference is that of non-free deletion transformations. The best studied of these transformations is called EQUI-NP DELETION. Typically, formulations of these transformations contain, in addition to the usual two components, the structural index and the structural change, a third statement; one which requires that the two terms mentioned in the statement bear the same referential index. EQUI-NP DELETION has the effect of eliminating the subject term (NP^2) of an embedded clause (S^2) just in case it bears the same referential index as some commanding nominal node. The following tree (20) is related to the surface structure (21) by a derivation which includes the application of the transformation EQUI-NP DELETION.

(20)



(21) Jutta hopes to go.

Clearly, the effect of the operation is to specify that otherwise obligatory terms have a null representation in surface structure. The Chaining Constraint specifies that normally optional terms (unspecified nominal nodes) are obligatorily lexicalized if involved in a chain of coreference. The sum effect of the two operations is that the nodes predicted by the Chaining Constraints to have an obligatory lexical representation in the surface structure are removed by the deletion operation, EQUI-NP DELETION. Substituting unspecified terms under the nodes NP^1 and NP^2 for the term *Jutta* but maintaining the index markings, we have the surface string (22).

(22) Someone hopes to go.

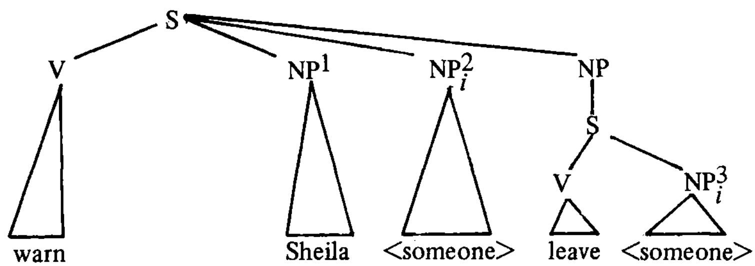
More specifically, in terms of the description just given, both of the nodes NP^1 and NP^2 are by the Chaining Constraint to dominate obligatorily lexicalized terms at some point in the derivation. However, because a specified structural relation, EQUI-NP DELETION, exists between NP^1 and NP^2 in the derivation of (22),[4] the node NP^2 need not have a representation in surface structure. The term *someone* dominated by NP^1 is usually referred to as the controller (after Postal, 1968). By the Chaining Constraint, this node is required to have a lexical representation at some point in the derivation. The fact that it was involved in the EQUI-NP DELETION transformation does not effect this constraint as it served as the controller NP, not as the term to be deleted. Thus, the Chaining Constraint is fully operative. The effect of violating it cannot be seen in the case of (22) as the controller node NP^1 occupies the surface subject position, an obligatory lexical position. The matrix of the verb, *warn*, can be used to show the effect of violating the Chaining Constraint.

(23) (a) Sheila warned someone that she would leave.
(b) Sheila warned that she would leave.

The (b) version of the above pair shows that the argument position is an optionally lexicalizable term when the argument is unspecified and unchained. But the fact that the (b) version of (24) is ungrammatical shows the effect of violating the Chaining Constraint; specifically, the structure underlying the (a) version of (24) is (25).

(24) (a) Sheila warned someone to leave.
(≠b) Sheila warned to leave.

(25)



In the derivation of the surface string (24a) the argument position NP^2 has served as controller for the application of the EQUI-NP DELETION transformation which reduces the NP^3 node to zero in the surface. NP^2 and NP^3 bear the same referential index as required by EQUI-NP DELETION. The fact that they are coreferential causes them to fall under the scope of the Chaining Constraint. The derivation of (24b) differs from that of (24a) only in that the process of lexicalization has failed to apply to the unspecified term under the NP^2 node. But as that node bears an index identical to the index on the NP^3 node, the surface structure (24b) is in violation of the Chaining Constraint. Hence, the deviancy of (24b) is explained. The use of deletion operations to mark the relation of coreference is the subject of a later chapter; suffice it here to mention that a node specified for obligatory nodes has a null surface realization just in case they are so marked by a deletion transformation, such as EQUI-NP DELETION with its characteristic identity condition.

As was mentioned above, the relative clause structure involves a chain of coreference, as exhibited in (26).

(26) (a) The boy called up someone$_i$ who$_i$ was interesting.
(b) The boy called someone interesting.

The interpretation of the (a) sequence of (26) is clearly that the two surface terms *someone* and *who* refer to the same individual, whoever that individual may be. The (b) sequence is understood to be a paraphrase of the (a) sequence, yet one of the terms of the chain of coreference present in the (a) version is absent. If the absence of the term *who* in the (b) version were a result of the process of optional lexicalization, then the pair would be a clear counter-example to the Chaining Constraint. If, on the other hand, the process which removes the term *who* were shown to be transformational in character, then the Chaining Constraint would not be violated. The relation of the two sequences of (26) has been traditionally handled by the transformation called RELATIVE CLAUSE REDUCTION[5] which has as its effect the removal of the relative pronoun and the form of the surface verb *be*.

It is relatively easy to show that the absence of the relative pronoun *who* in pairs like (26) is the result of a transformational operation rather than attributable to the process of optional lexicalization. Consider the relationship between the two strings of (27).

(27) (a) The *boy who* was tired from his long day fell asleep.
(b) The boy tired from his long day fell asleep.

Since the process of optional lexicalization is restricted to the set of unspecified arguments, no reference can be made to it in an attempt to describe the relation of the (a) and (b) sequences of (27). Crucially, however, the relationship which holds between the (a) and (b) sequences of each of the pairs (26) and (27) is the same. We can immediately see that the grammar will, in any case, include a transformation which relates structures of the form suggested by the pair (26). This transformation, RELATIVE CLAUSE REDUCTION, is thus needed independently to account for pairs such as (27), and will, unless prevented by some special statement, establish the same relation between the strings of (26).

In general, we are interested in placing the tightest set of constraints consistent with the data on the mechanisms which we use in the grammar. In the case of optional lexicalization, one might propose that the set of properties which determine whether an argument is optionally lexicalizable is restricted to properties present in the Deep Structure. Transformations, on the other hand, are sensitive both to properties represented in the Deep Structure and to properties introduced at subsequent points in the derivation. If this line of argument is correct, then we would expect transformations, but not optional lexicalization, to be sensitive to derived syntactic structure. Now consider some alternative surface realizations of the sequence of (26).[6]

(28) (a) The boy called someone who was interesting up.
(b) The boy called someone interesting up.
(c) The boy called someone up who was interesting.
(*d) The boy called someone up interesting.

The (d) sequence of (28) is clearly ungrammatical; as such, it contrasts with the other five grammatical surface realizations of its underlying structure. If optional lexicalization were to account for the absence of the relative pronoun in strings such as (26) through (28), then the process would have to be made sensitive to the structural properties introduced by a derivation which includes the application of the transformations PARTICLE MOVEMENT and EXTRAPOSITION FROM NP, that is, structural properties of derived phrase markers. Transformations, which have the function of relating contiguous trees in a derivation, contain a term called the structural index which is sensitive to derived structure and has the effect of selecting only trees of a particular structure as input. (28d) is ungrammatical, it seems, because the structural index of the transformation RELATIVE CLAUSE REDUCTION requires that, in the string under analysis, the relative pronoun be contiguous to its antecedent.[7] This statement excludes the ungrammatical (28d) while allowing the other realizations. Considerations such as these lead one to prefer the transformational solution.

The structure of the relative clause, rather than constituting a counterexample to Chaining, is fully under the scope of this constraint. Consider the set of strings in (29).

(29) (*a) Michael ate in the frying pan.
(*b) Pete drank in the green bottle.
(*c) Janice sang in the newspaper.

These strings are judged either to be deviant or they receive an interpretation parallel to the sequences of (30).

(30) (a) Michael ate in the dining room.
(b) Pete drank in the neighborhood bar.
(c) Janice sang on the sofa.

Crucially, however, the sequences of (29) can not be understood parallel to the structures of (31).

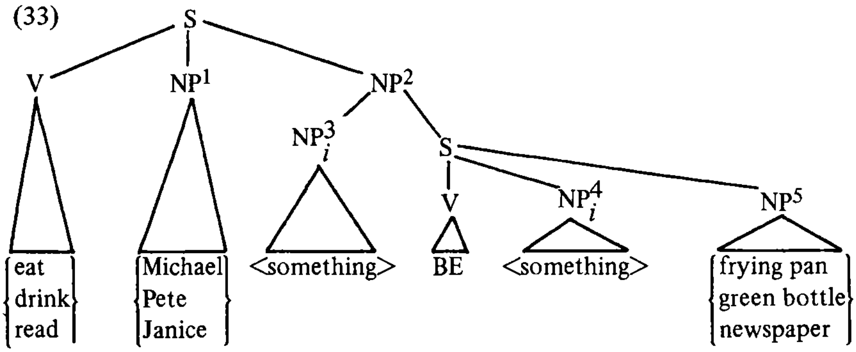
(31) (a) Michael ate something in the frying pan.
(b) Pete drank something in the green bottle.
(c) Janice sang something in the newspaper.

The difference is in the scope of the locative phrases. In the case of this last set, the scope of the locative phrases is the object argument. Thus, in each of these cases, there is a presupposition associated with the string to the effect that there is an object of the type specified by the object argument in the place indicated by the locative phrase. In the case of the sequences of (30) the scope of the locative is the surface subject argument. Similarly, the strings of (29), if they are at all interpretable, include locative phrases whose scope is the subject term. The strings of (29), if their locative phrases are meant to refer to the object term, are clearly ill-formed. The Chaining Constraint predicts this deviancy nicely; the derivation of (29) includes the tree structures underlying (31) which are in turn derived from (32) by relative clause reduction.

(32) (a) Michael ate something which was in the frying pan.
(b) Pete drank something which was in the green bottle.
(c) Janice read something which was in the newspaper.

All the sequences of (32) have an underlying tree of the form (33).

(33)



Notice that the Chaining Constraint is operative here as both the nodes NP^3 and NP^4 bear the same referential index. The relative clause reduction operation converts the tree structures (33) to those underlying (31). The strings of (31) violate the Chaining Constraint, as the node NP^3, which served as controller for the relative clause reduction operation and thus is chained, has failed to have a lexical realization in the surface structure. The derivation provides support for the Chaining Constraint.

SOME ADDITIONAL DATA

Given the notion of optional lexicalization and the accompanying Chaining Constraint, we can note that there are certain general predictions about the grammar which emerge. Consider the generalized case: given any particular deep structure, one can find by inspection the set(s) of coreferential nodes. These are said to form a chain. The nodes in the chain are either specified or unspecified. If specified, they will have a lexical representation in any system of grammar. If unspecified, the Chaining Constraint requires their lexicalization. We can predict that all chained nodes will appear in the surface structure, unless they are involved in a deletion transformation as the term to be reduced to null. If there are terms under certain chained nodes which are reduced to null by such transformations, we are guaranteed that there will be a lexical representative of that chain in the surface structure in a specified structural configuration with reference to the null position; namely, the controller. This is the case because such deletion transformations have a condition of referential identity as part of their structural index. Specifically, they demand a relation of coreference between the nodes dominating both the controller and the deleting term. The controller may itself, subsequently, be deleted under identity with a dominating coreferential node which, in turn, serves as controller. Thus, we are guaranteed at least the last controller's presence in surface structure. In the case where the proper structural configuration for the deletion transformations never arises in the derivation, the relation of coreference will be marked in the surface structure by the process of pronominalization. Parallel to the controller behavior in the case of the deletion transformations, the pronominalization processes also involve the relation of coreference and, specifically, the counterpart of the controller, the antecedent. We may look for counter-examples to this general schema by identifying the remnants of some pronominalization process, thus, necessarily implying the existence of a chain of coreference in the deep structure, and checking to see whether there is an antecedent/controller term present.

THE PERFORMATIVE ANALYSIS

I will assume that the occurrence of the reflexive forms in surface structure is an unequivocal indication of the presence in the underlying structure of a chain. Consider the strings of (34).

(34)

	me		myself.
	you		yourself/yourselves
	Max		himself
(a) It was difficult for	Marie	to shave	herself
	us		ourselves
	Max and Marie		themselves

The (a) versions of (34) differ from the (b) versions only in that the nominal which serves as the antecedent for the reflexive form does not appear in the latter version. According to the description presented above of the processes which may apply to chains of coreference, the result of the failure of an

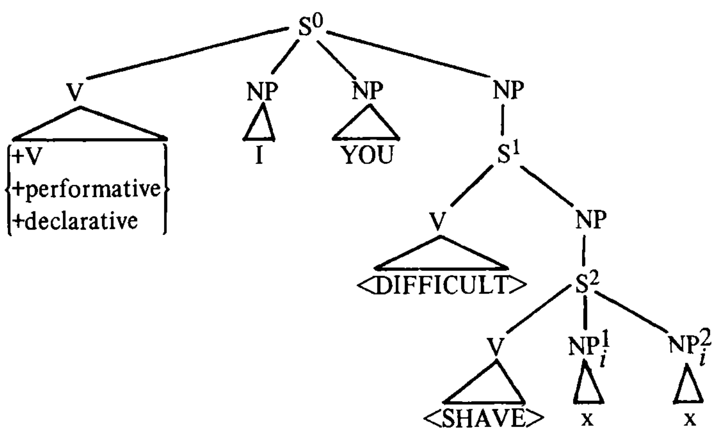
(34)

(b) It was difficult to shave { myself / yourself / *himself / *herself / ourselves / *themselves }

antecedent to appear in surface structure should render the string ungrammatical unless some dominating coreferential node is present and occupies a controller position with respect to the missing antecedent. Clearly, the surface structures of (34b) contain no such controller.

Ross (1968) has argued for the existence of a performative sentence which dominates the usual declarative surface form. Using (34a) as an example, Ross' proposal would demand that its underlying structure be (35).

(35)



The fact that the surface structure (34a) shows only the structure from the S^1 node and below is a function of the claim that their derivation includes the application of the rule of PERFORMATIVE DELETION which has as its effect the deletion of the entire S^0 clause except for the embedded sentence S^1 which shows up as the surface matrix clause in (34). The existence of the transformation EQUI-NP DELETION[8] and the referential restrictions on the arguments which can occur in the performative account exactly for the distribution of grammatical versus ungrammatical strings which result when the antecedents of the reflexives are removed. That is, the ill-formed strings in the (b) version of (34) result from the fact that an antecedent has failed to have a surface realization, yet there was at no point in the derivation a coreferential node which could have served a controller for the application of EQUI-NP DELETION. The deletion of the terms which served as antecedents for the reflexive forms listed in (36b) proceeds by the regular application of

EQUI-NP, where the nodes of the corresponding elements in (36a) serve as controller for the deletion of the terms under the node NP^1.

(36) (a)	I	(b) myself
	YOU	yourself/yourselves
	I + YOU	ourselves

It is interesting to note that the set of pronouns whose antecedent may be deleted in the frame (37) is just the set of pronouns whose reference is fixed when they occur in any particular string of English.

(37) It was difficult for ___ to shave _____ -self.
___ to report _____ own father.

We may then add a third column to the table (36), one which identifies the referent, that is, (38).

(38) (a)	I	(b) myself, my	(c) speaker of utterance
	YOU	yourself/yourselves, your	addressee(s) of utterance
	I + YOU	ourselves, our	speaker + addressee(s)

Notice that even after the application of EQUI-NP DELETION and PERFORMATIVE DELETION, that is, in a case such as the grammatical strings of (34b) where the deletion of the performative has eliminated the NP node which served as controller for the application of EQUI-NP, thus stranding empty and pronominalized nodes without an antecedent/controller node, the referent of the anaphors is fixed. More significantly, the form of the anaphors stranded allows one uniquely to reconstruct not only the referent, but the *relation of coreference*; in other words to reconstitute the chain of coreference. I will refer to the set of anaphors which appear in column (b) of (38) as anaphors of non-variable reference. This set contrasts, then, with the set of anaphors of variable reference as listed in (39).

(39)	herself	himself	themselves	itself
	her	him	them	it
		his	their	its

ONE'S DELETION

Postal (1968) has argued for the inclusion in the set of English transformations of a transformation called ONE DELETION which relates the two versions of the following pairs.

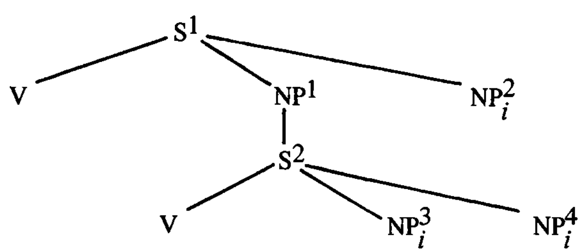
(40) (a) Shaving oneself is no fun for one.
(b) Shaving oneself is no fun.

(41) (a) Enjoying oneself is important for one.
(b) Enjoying oneself is important.

(42) (a) Taking one's own temperature is amusing for one.
(b) Taking one's own temperature is amusing.

Postal points out that, in general, the occurrence of a reflexive is limited to cases where a single clause contains two instances of a node bearing the same index. Assuming this is correct, if the deleted term which would serve as surface subject for the subject embedded clauses in (40) through (42) were dominated by a node which bore the same referential index as the node which dominated the term *one* in those structures, then the derivation of those strings would include an application of EQUI-NP DELETION which removes the embedded subject term. Consider the generalized tree structure (43) which represents the structure underlying the strings (40) through (42).

(43)



On the first cycle, the reflexive transformation marks NP^4 for a reflexive form as it meets both the Clause Mate and coreferential requirements of the REFLEXIVE transformation. On the second cycle, the transformation EQUI-NP DELETION finds, and the term under NP^3 is deleted under identity of reference with NP^2. Finally, the transformation proposed by Postal called ONE DELETION removes the term under the NP^2 node. If this account of the derivation of the (b) version of the pairs (40) through (42) is accurate, then these strings are counter-examples to the general schema developed here. Clearly, the chain of coreference in (45) includes the nodes NP^2, NP^3 and NP^4. The node NP^4 appears in surface structure as the schema predicts. The failure of NP^3 to have a surface lexical representation is accounted for by EQUI-NP DELETION. The absence of a lexical form for the NP^2 follows from the claim that there exists in the grammar the transformation ONE DELETION. Notice, however, ONE DELETION is just the category of transformation which we have attempted to eliminate from the grammar; namely, a transformation which deleted a term without a controller being involved, a deletion transformation without an identity condition. The optimal result would be to collapse the putative ONE DELETION with the general process of optional lexicalization, thus eliminating this free deletion transformation from the grammar.

Postal, in the same article, argued for a distinction between the distribution of the *one* and the unspecified NP terms. If we accept the claim that the predicate *was fun* is an example of a predicate associated with the *one* argument, and that the predicate *was considered* is a predicate associated with the unspecified NP argument, then the contrasts in the following pairs show the distributional differences between the term *one* and unspecified NP terms.

(44) (a) Knowing French was fun.
(b) Learning French was fun.

(45) (*a) Knowing French was considered.
(b) Learning French was considered.

Thus, predicates associated with the *one* argument accept both stative and non-stative predicates embedded directly beneath them; (44a and b), respectively. Predicates associated with the unspecified NP arguments accept non-stative but no stative predicates directly below them.

In addition to the argument offered by Postal, there are a number of other observations which may be offered concerning the differences between *one* and the unspecified argument.

I. Enumeration

The set of individuals intended to be represented by the form *someone* may be enumerated as a list subsequent to the appearance of that form as in (46).

(46) (a) Going skiing will be fun for someone: Mary, Sue, Pete, Sam,...
(b) Destroying those draft files will be important for someone: Pete, Joe, Sam,...

The set of individuals intended to be represented by the form *one* in the same environment may not be enumerated.[9]

(47) (*a) Going skiing will be fun for one: Mary, Sue, Pete, Sam,...
(*b) Destroying those draft files will be important for one: Pete, Joe, Sam,...

II. Conjunction

The form *someone* conjoins with lexical NP in an unrestricted manner as suggested by the strings of (48).

(48) (a) Mary and someone are talking.
(b) Mary is talking to Brenda and someone.
(c) Mary gave the stuff to Brenda and someone.

The form *one*, on the other hand, will not enter into conjunctive relations with other terms.[10]

(49) (*a) Mary and one are talking.
(*b) Mary is talking to Brenda and one.
(*c) Mary gave the stuff to Brenda and one.

III. Disjunction

The form *someone* enters freely into disjunctive relations with lexical NP as demonstrated by the strings of (50).

(50) (a) Ursie or someone is speaking.
(b) Roger is speaking to Ursie or someone.
(c) Paul gave the stuff to Ursie or someone.

The form *one*, however, will not enter into disjunctive relations with other forms.

(51) (*a) Ursie or one is speaking.
(*b) Roger is speaking to Ursie or one.
(*c) Paul gave the stuff to Ursie or one.

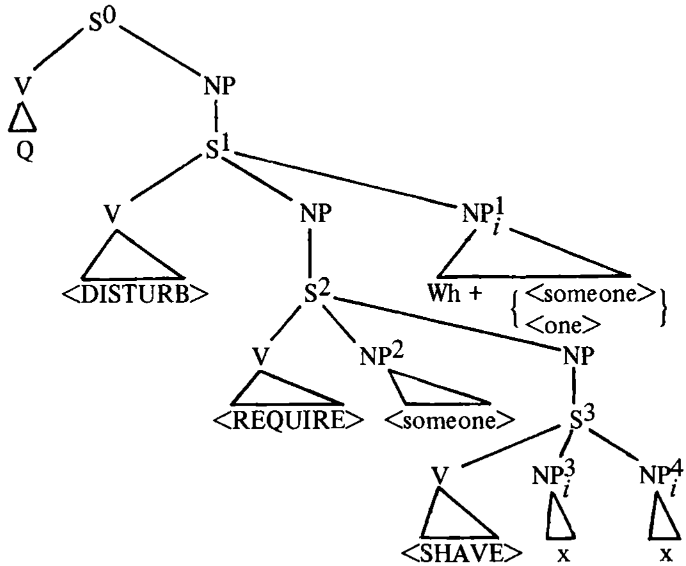
IV. Cross Over Violations

Postal (1968) has argued extensively for a principle which will mark derivations as ill-formed, if in the course of that derivation a movement transformation has applied to a tree structure containing more than one node bearing the same index in such a way as to cause a reversal in the linear order of the coreferential nodes with respect to each other. While the final form of the principle is quite complex, we may extract the following case for use in distinguishing between the distribution of *one* and *someone* forms in the grammar. In all cases of Cross Over Violations resulting from the application of the WH MOVEMENT transformations, it is immaterial whether the coreferential NP node being crossed (the stationary node) is within the same clause or more deeply embedded; the result is always clearly ungrammatical. Notice, however, the distinction between (52a and b).

(52) (*a) Who did being required to shave himself disturb the most?
(b) Who did being required to shave oneself disturb the most?

The underlying structure of both versions of (52) is essentially that of (53).

(53)



Clearly, in both cases, the NP^1 node has served as controller for the application of EQUI-NP DELETION which removed the term under the node NP^3. It is also clear that the transformation WH-Q MOVEMENT causes the node NP^1 to describe a path which crosses over the coreferential node NP^3; hence, the deviancy of the (a) version is explained by a more general principle. Exactly the same derivational history obtains for the (b) version as did for the (a) version; the surface realization is, however, acceptable. The difference emerges again in the pair (54).

(54) (*a) I wonder who being required to shave herself will disturb.
(b) I wonder who being required to shave oneself will disturb.

On the one hand, the fact that EQUI-NP DELETION operates using terms which ultimately surface as the surface lexical item *one* shows that referential indices are involved; that is, the notion of reference is applicable to such cases. On the other hand, the fact that one of the most general coreference constraints in the grammar fails for the case of *one* suggests that the referential properties of the set of terms which has the surface form *one* or its derivatives is somewhat different than the *someone* case. Semantically, the difference could be captured by the use of McCawley's (1968:153, 164) set exhaustion quantifier, a universal quantifier restricted to the set defined for that argument slot. Consider strings such as (55).

(55) (a) Mary and all the people in the room are talking.
(b) Mary is talking to Brenda and all the people in the room.
(c) Mary gave the stuff to Brenda and all the people who are in the room.

My intuitions with respect to the sequences of (55) are that either they are ill-formed in the same way that the parallel strings of (49) are; or that either Mary in (55a) is not a person or is not among the set of people who are in the room, or that in (55b and c) Brenda is either not a person or is not among the set of people who are in the room. In other words, the strings of (55) are well-formed only in the case where the set of people referred to (defined by the restrictive relative clause) in the conjunction does not include the individual mentioned as the other member of that conjunction (cf. note 10). Similarly, the Cross Over distinction shows up in the case where the crossing node is a member of the set specified by the crossed node.

(56) (*a) Who did being required to shave himself disturb the most?
(b) Who did everyone's being required to shave themselves disturb the most?

Notice further that, while (57a and b) are both possible, (58) is not.

(57) (a) Going skiing will be fun for someone: Pete, Judy, Steve,...
(b) Going skiing will be fun for all the people in the club: Pete, Judy, Steve,...

(58) *Going skiing will be fun for all the people who will go: Pete, Judy, Steve,...

In both cases of (57), the list presumably arises through a conjunction of individuals which the speaker has in mind. This list can be represented in surface structure by the unspecified NP *someone* as in (57a) or by some property which characterizes each of the individuals on the list (*all the people in the club*). In the case of (58), however, there literally can be no underlying list; the composition of the set of individuals will be known only by their participation in some *future* event (cf. note 9). This parallel syntactic behavior of the term *one* and definite descriptions of set of individuals is striking. I suggest, then, that the surface term *one* has as its underlying representation the set exhaustion quantifier.

While it is true that there are sentences in which the term *one* contrasts in some way with other terms (59), it is, apparently, always the case that the 'freely deletable' *one* is understood to mean only the set exhaustion quantifier for the set described in the surface structure.

(59) One who believes in God should never attempt to talk to one who does not.

The sequence (60a) is never understood as a paraphrase of (60b).

(60) (a) Going skiing will be fun (for one).
(b) Going skiing will be fun for one who knows how to ski.

Given these facts, it seems that there is no barrier to collapsing the former unspecified NP cases and the *One* DELETION both to the process of optional lexicalization. It is interesting that the set of anaphors which may be stranded by the optional lexicalization of the set exhaustion quantifier node shares a property with the set of anaphors stranded by the deletion of the performative clause; that is, the set is one of non-variable reference. Using the syntactic environment (39) as an illustration, we have:

(61) (a) It was difficult for one to shave oneself.
(b) It was difficult to shave oneself.
(c) It was difficult to shave.

Notice that the fact that the anaphor *oneself* occurs in (61b) and the fact that it is an anaphor of non-variable reference allow the immediate reconstruction both of the antecedent and of the coreference relation itself. (61b) is, of course, not the result of some application of the EQUI-NP transformation with some controller in the performative, but rather a case of optional lexicalization, as is (61c).

Collapsing the ONE DELETION phenomena with the process of optional lexicalization requires a re-statement of the Chaining Constraint which makes reference to the variable versus non-variable distinction between the two cases.

(62) The Chaining Constraint for Unspecified Arguments.
If a node, n_i in some structure, S_i, dominates an unspecified argument,

and n is a member of a chain of variable coreference, then n must have a lexical realization at some point in the derivation of S_i.

The term *Unspecified Argument* is understood to refer to both the Unspecified NP cases formerly handled by UNSPECIFIED NO DELETION and the cases handled by ONE DELETION.

This move leaves only one case of free deletion in the grammar; that of PERFORMATIVE DELETION.[11] This transformation is the only deletion transformation which has no identity condition associated with it. It differs from the other cases formerly handled by free deletion transformations in that in PERFORMATIVE DELETION an entire clause is deleted, including a predicate and two of its three arguments.

NOTES

1. The typical example of assertive coreference involves the so-called identity form of the copula, as in (5) in the text. The two types of coreference have differential syntactic behaviors. For example, (*i*) but not (*ii*) is possible (italicized forms are intended to represent coreferents).

(*i*) *Who* did Max say *the one who has blood in his hands* is?
(*ii*) **Who* did Max say *the one who has blood on his hands* perjured?

2. Cf. Grinder (1971) where, under the asusmption that the grammar contained free deletion transformations, a constraint called the Chaining Constraint was developed to account for roughly the same class of data.
3. Notice that non-restrictive relative clauses modifying the object argument seem to be impossible in these cases.

(i) *Teddy ate something, which was green.

I have no explanation for this fact.
4. That is, the optionality of certain nodes, having a lexical form in the surface realization of some underlying structure, cannot be determined by an inspection of the relations which hold in that underlying structure. This is the case, as there are cases where the proper structural configuration for the application of EQUI-NP DELETION arises only through the application of other transformations. Consider the difference between (*i*) and (*ii*) below.

(*i*) John_i wanted Mary to kiss $\left\{ \begin{array}{l} {}^*\emptyset \\ \text{him}_i \end{array} \right\}$
(*ii*) John wanted to be kissed by Mary.

In (*i*), the second occurrence of the argument *John*, represented by the pronoun *him*, is required. In (*ii*), arising from the same underlying structure, the application of the PASSIVE transformation on an earlier cycle has created the correct structural environment for the application of EQUI-NP DELETION by moving the node dominating the second occurrence of the term *John* into the derived subject position in the embedded clause.
5. I assume for the ensuing discussion that the transformation RELATIVE CLAUSE REDUCTION removes the relative pronoun, but that the reduction/insertion of the form

of the verb *BE* is handled by another process.
6. There is a dialect split on sentences such as (28c) with some speakers finding it ill-formed.
7. The account is complicated by sentences such as:

(*i*) The boy left who was sick.
(*ii*) The boy left sick.

While this complicates the conditions for the transformational account, the optional lexicalization hypothesis is even less likely to account for this in a natural way as derived structure is involved.
8. The argument depends on the ability of EQUI-NP DELETION to apply over the recursive symbol S. The argument that is necessary, independent of the present data, will be made in the succeeding chapter. Also cf. Grinder (1970).
9. This distinction concerning the possibility of enumeration suggests that the syntax of natural language may, in this case, at least be sensitive to the difference of descriptions arrived at through intensional definitions, (58), versus those arrived at through extensional definitions.
10. Perhaps it would be most natural to capture this fact by stating that there is a general constraint that a referential index may occur only once in any particular set of conjuncts. Once again a syntactic difference arises between stipulated and assertive coreference, (*i*) and (*ii*) respectively.

(*i*) **John* and *John* arrived.
(*ii*) *John* and *the man who won the race yesterday* are the same person.

11. It seems somewhat unnatural to attempt to extend the process of optional lexicalization to the case of PERFORMATIVE DELETION as the extension would have to include reference to the fact that there are dependencies involved in the performative case which have no counterpart in the previous cases. For example:

(*i*) (*a) I you that John is here.
(*b) Say you that John is here.

The point being that except for the addressee argument, if one piece of the clause has a lexicalization, the entire clause must.

4

DELETION PATH PHENOMENA

This chapter considers the topic of deletion operations internal to chains of coreference. More specifically, the attempt will be made to give an explicit characterization of the set of structural relations which must exist between two nodes for one of them to have a null surface form. Deletion path is the explicit statement of the set of structural conditions which must obtain in the derivation of a sentence for the relation of coreference to be successfully established in surface structures between a lexicalized node and a null anaphor, however it be stated.

While intrigued by the Jackendoff/Postal suggestion that one may predict which of the set of arguments of a predicate may serve as controller for the application of EQUI-NP DELETION by semantic considerations, I have nothing positive to offer. Notice that by the Chaining Constraint developed in Chapter Two any particular controller is involved in a chain of coreference and is thus an obligatory node. Jackendoff's observation that the controller is the NP which has the position semantically of being able to execute the action described has a natural interpretation in the Generative Semantics model; namely, one of the conditions which a node must meet in order to qualify as the controller for an application of EQUI-NP DELETION is that it be the argument of the predicate <CAUSE> in underlying structure.

We may begin by attempting to provide a principled account of a set of sentences involving a NP deletion operation hitherto unnoticed,[1] which I refer to as SUPER EQUI-NP DELETION. I will argue that while superficially quite distinct from the rule of EQUI-NP DELETION first proposed by Rosenbaum (1965,1967), a deeper analysis allows the rules to be collapsed. The existence of the generalized rule of EQUI-NP DELETION provides a partial account of some previously unexplained grammatical phenomena. The first section of the discussion is concerned with establishing the existence of the deletion transformation:

SUPER EQUI-NP DELETION is the rule which has operated in the derivation of sentences such as:

(1) (a) Harry thought that it would be difficult to leave.
(b) Maxine decided that it would be unnecessary to move.
(c) Eric insisted that it would be ridiculous to call for help.

Specifically, SUPER is the only rule which distinguishes the derivations of (1a,b, and c) from (2a,b, and c) respectively.

(2) (a) $Harry_i$ thought that it would be difficult for him_i to leave.
(b) $Maxine_i$ decided that it would be unnecessary for her_i to move.
(c) $Eric_i$ insisted that it would be ridiculous for him_i to call for help.

The strongest argument possible is simultaneously the simplest; namely that the sentences in (1) and (2) are synonymous,[2] and that verbs like *leave, move, call* require either an expressed subject NP when they occur in surface strings (2), or an explicit statement to account for their ability to occur without such an NP in certain environments without making the sentence in which they appear deviant (1). SUPER EQUI-NP DELETION is such a statement.

Notice that there exists the usual full range of restrictions between the subject of the surface matrix sentence and the verbal forms which occur in the most deeply embedded sentence.

(3) (*a) Harry thought that it would be difficult to occur on Equinox this year.
(*b) Maxine decided that it would be unnecessary to swarm near the river.
(*c) Eric insisted that it would be ridiculous to elapse.

These restrictions correspond, of course, to the restrictions displayed by sentences where the subject of the most deeply embedded verb is the same as the subject of the above surface matrix sentences.

(4) (*a) $Harry_i$ thought that it would be difficult for him_i to occur on Equinox this year.
(*b) $Maxine_i$ decided that it would be unnecessary for her_i to swarm near the river.
(*c) $Eric_i$ insisted that it would be ridiculous for him_i to elapse.

(5) (a) Harry thought that it would be difficult for the celebration to occur on Equinox this year.
(b) Maxine decided that it would be unnecessary for the bees to swarm near the river.
(c) Eric insisted that it would be ridiculous for the lease to elapse.

The sentences of (5) show that such verbs as *occur, swarm, elapse* may occur in such constructions if their NP subjects meet certain restrictions. The fact that the sentences of (3) are ungrammatical follows automatically from the fact that the sentences of (4) are ungrammatical, given the existence in the grammar of a deletion transformation with an identity condition which deletes the subject NP of the most deeply embedded sentences of (4).

A third argument for the existence of the rule of SUPER EQUI-NP is provided by sentences where reflexivization and related processes which display the clause mate restrictions have occurred.[3]

(6) (a) Barbara$_i$ explained why it was so natural to enjoy herself$_i$ while singing the Gita.
(b) Michael$_i$ predicted that it would be trivial to design his$_i$ own computer.
(c) Kathleen$_i$ claims that it is enjoyable to hold her$_i$ breath for days at a time.

(7) (*a) Barbara explained why it was so natural to enjoy himself while singing the Gita.
(*b) Michael predicted that it would be trivial to design her own computer.
(*c) Kathleen claims that it is enjoyable to hold his breath for days at a time.

The fact that the sentences of (6) are grammatical but not the sentences of (7) is explained naturally by the fact that the sentences of (8) and (9) but not (10) and (11) are grammatical and by the existence of the rule of SUPER EQUI-NP DELETION.

(8) (a) Barbara$_i$ explained why it was so natural for her$_i$ to enjoy herself$_i$ while singing the Gita.
(b) Michael$_i$ predicted that it would be trivial for him$_i$ to design his$_i$ own computer.
(c) Kathleen$_i$ claims that it is enjoyable for her$_i$ to hold her$_i$ breath for days at a time.

(9) (a) Barbara enjoys herself while singing the Gita.

(b) Michael will design his own computer.
(c) Kathleen holds her breath for days at a time.

(10) (*a) Barbara explained why it was so natural for her to enjoy himself while singing the Gita.
(*b) Michael predicted that it would be trivial for him to design her own computer.
(*c) Kathleen claims that it is enjoyable for her to hold his breath for days at a time.

(11) (*a) Barbara enjoys himself while singing the Gita.
(*b) Michael will design her own computer.
(*c) Kathleen holds his breath for days at a time.

Another set of arguments can be provided by considering any other deletion transformation; say, the APPAREL PRONOUN ELISION TRANSFORMATION. On the basis of sentences such as the following, Postal (1970b) postulated the existence of such a transformation.

(12) (a) Max took Sally's clothes off.
(b) Jack put Ann's coat on.
(c) Martha slipped Jeremy's pants off.

The sentences of (12) are ambiguous for most speakers of English, the two meanings of such strings being

$$\mathrm{NP}_i \begin{Bmatrix} \text{take} \\ \text{put} \\ \text{slip} \\ \ldots \end{Bmatrix} \quad \mathrm{NP}_j\text{'s} \begin{Bmatrix} \text{clothes} \\ \text{coat} \\ \text{pants} \\ \ldots \end{Bmatrix} \quad \text{off} \begin{Bmatrix} \mathrm{NP}_i \\ \mathrm{NP}_j \end{Bmatrix}$$

That is, the ambiguity is concerned with who had the item of apparel on before the action described in the sentences with the preposition *off*, and who has the item of apparel on after the action described in the sentences with the preposition *on*. Thus the sentences of (12) have as deeper underlying structures those suggested by the strings of (13).

(13) (a) Max_i took Sally_j's clothes off $\begin{Bmatrix} \text{Max}_i \\ \text{Sally}_j \end{Bmatrix}$
(b) Jack_i put Ann_j's coat on $\begin{Bmatrix} \text{Jack}_i \\ \text{Ann}_j \end{Bmatrix}$
(c) Martha_i slipped Jeremy's$_j$ pants off $\begin{Bmatrix} \text{Martha}_i \\ \text{Jeremy}_j \end{Bmatrix}$

Now consider the sentences of (14).

(14) (a) Max_i felt that it would be a waste of time to take $Sally_j$'s clothes off.
(b) $Jack_i$ said that it was really far out to put Ann_j's coat on.
(c) $Martha_i$ suspected that it would be easy to slip $Jeremy_j$'s pants off.

In particular, notice that the sentences of (14) possess the same ambiguity as the sentences of (12). Just as the ambiguity of (12) is accounted for by the existence of a deeper level of structure (13) and the transformation APPAREL PRONOUN ELISION, so in a parallel manner the ambiguity of the sentences of (14) is accounted for by the existence of a deeper level of structure (15), and the transformations APPAREL PRONOUN ELISION and SUPER EQUI-NP DELETION.

(15) (a) Max_i felt that it would be a waste of time for Max_i to take $Sally_j$'s clothes off $\left\{\begin{matrix} Sally_j \\ Max_i \end{matrix}\right\}$
(b) $Jack_i$ said that it was really far out for $Jack_i$ to put Ann_j's coat on $\left\{\begin{matrix} Ann_j \\ Jack_i \end{matrix}\right\}$
(c) $Martha_i$ suspected that it would be easy to slip $Jeremy_j$'s pants off $\left\{\begin{matrix} Jeremy_j \\ Martha_i \end{matrix}\right\}$

Finally, notice that the controllers involved in the transformation SUPER EQUI-NP behave with respect to their anaphors, null or pronominal, precisely as the controllers of EQUI-NP DELETION behave with respect to their anaphors.

(16) (a) That America claimed that it was difficult to control Vietnamese aggression in Vietnam surprised no one.
(b) America's claim that it was difficult to control Vietnamese aggression in Vietnam surprised no one.
(c) The American claim that it was difficult to control Vietnamese aggression in Vietnam surprised no one.

In (16) the deleted subject NP of the embedded verb *control* is understood to be coreferential with the NP *America.* This is so even in the case of (16c) where the node dominating the item *American* must surely be other than NP. Postal (1970b) refers to such cases as Pseudo Adjectives. To see that the parallelism is indeed perfect, consider the apparently ad hoc fact that while Pseudo Adjectives may serve as antecedents for null stretches of surface structure, they may not so serve for pronominal elements. This is precisely the case in (17) and (18) where EQUI and SUPER-EQUI respectively have applied. Having deleted the embedded subject, the item *America(n)* now serves as the antecedent for the pronoun *her*.

(17) (a) That America$_i$ attempted to suppress her$_i$ own people surprised no one.
(b) America$_i$'s attempt to suppress her$_i$ own people surprised no one.
(*c) The American$_i$ claim that it was difficult to control her$_i$ own troops in Vietnam surprised no one.

THE RULE

Consider now the difficult question of the form of the rule of SUPER EQUI-NP DELETION. Clearly, since the deletion can cross the boundaries of the recursive symbol S, the structural index of the rule must contain an essential variable positioned between the controller and the deleting term. (19) is an example of the process where the deletion has occurred over a somewhat longer stretch of material than we have seen in previous examples.

(19) (a) Sam$_i$ claimed that it was clear that it had turned out that it seemed likely that it would be impossible for him$_i$ to prepare himself$_i$ for the exam in time.
(b) Sam$_i$ claimed that it was clear that it had turned out that it seemed likely that it would be impossible to prepare himself$_i$ for the exam in time.

Perhaps even more obvious than the fact that the process is essentially unbounded is the fact that it is sensitive to the material intervening between the potential controller and the NP to be deleted.

(20) (a) Sam$_i$ claimed that Maxine$_j$ wanted Sam$_i$ to leave.
(b) Sam$_i$ claimed that Maxine$_j$ wanted him$_i$ to leave.
(c) Sam$_i$ claimed that Maxine$_j$ wanted to leave.

The deleted subject of the verb *leave* in (20c) cannot be understood as coreferential to the subject of the verb *claim*. This brings us to a consideration of the notion of possible controller.

The Notion of Possible Controller

It is well known that although the transformation EQUI-NP DELETION has been intensively studied, as yet no principled account of which of the arguments of a verb may serve as the controller in that transformation has been successfully offered. Thus in the ensuing discussion I shall ignore that aspect of the notion of the possible controller with respect to the transformation SUPER EQUI-NP DELETION, my expectation being that a principled solution to this problem in the case of EQUI will automatically provide a solution to the problem in the case of SUPER EQUI-NP. The characterization of a possible controller which I will offer here treats a problem which arises only with respect to SUPER EQUI, namely, why (21b, c and d) but not (21e) are possible.

(21) (a) John_i said that $\left\{\begin{array}{l}\text{John}_i\text{'s making a fool of John}_i \text{ in public}\\ \text{Sue}_j\text{'s making a fool of Sue}_j \text{ in public}\end{array}\right\}$ disturbed Sue_j.
(b) John said that making a fool of herself_j in public disturbed Sue_j.
(c) John_i said that making a fool of himself_i in public disturbed Sue_j.
(d) John_i said that it disturbed Sue_j to make a fool of herself_j in public.
(*e) John said that it disturbed Sue_j to make a fool of himself_i in public.

The (e) version differs from the (c) version only in that the transformation EXTRAPOSITION has applied.[6] The effect of this transformation is to move a clause to the right, specifically, to the end of the clause which immediately dominates it. In sentences (b) and (d) above, EQUI-NP DELETION has applied; in (c) and (*e) SUPER EQUI has applied. Thus, the general form of the surface string represented schematically by (22) is ambiguous in the sense that either NP^1 or NP^3 could have served as the controller for NP^2, NP^1 in the transformation SUPER EQUI-NP and NP^3 in EQUI.

(22) (a) NP^1 verb NP^2's verb+ing reflexive verb NP^3
(b) NP^1 verb _____ verb+ing reflexive verb NP^3

We may say then that in a formula like (22) there are two possible controllers. Observe, now, that the ungrammatical (e) version of (21) differs quite radically from all the other versions in that the NP which is the potential although not actual controller for the deletion which has operated in (21e) intervenes between the actual controller and the deleted coreferential element. Making use of this fact, I propose the Intervention Constraint.

(23) The Intervention Constraint:
SUPER EQUI-NP DELETION between NP^a and NP^b is blocked if there exists a possible controller NP^c in the deletion path.

The term *deletion path* can be defined (as a first approximation) as follows:

(24) Deletion Path:
An element, e_i, is said to be in the deletion path of a deletion transformation, T_i, involving a controller, C_i, and a term to be deleted, t_i, if e_i lies between C_i and t_i in the order specified by precedence at the point of application of T_i.

Applying the notion of deletion path to the sentences of (21) we see the following configurations.

(21) (b) $[\text{John}]_{e_i}$ . . . . . . $[\text{Sue}]_{t_i}$ . . . . $[\text{Sue}]_{C_i}$
(c) $[\text{John}]_{C_i}$ . . . . . $[\text{John}]_{t_i}$ . . . . . . $[\text{Sue}]_{e_i}$
(d) $[\text{John}]_{e_i}$ . . . . . . $[\text{Sue}]_{C_i}$ . . . . . . $[\text{Sue}]_{t_i}$
(*e) $[\text{John}]_{C_i}$ . . . . . $[\text{Sue}]_{e_i}$ . . . . $[\text{John}]_{t_i}$

where C_i is the actual controller
e_i is a possible controller
t_i is the deleting term

As we can see in the order specified by precedence, it is only in the case of (e) that a possible but not actual controller occurs between the actual controller and the deleting term. Thus, the Intervention Constraint is applicable only in the case of (e). Since the Intervention Constraint blocks (21e), the grammatical surface realization for (21e) is (25).

(25) John_i said that it disturbed Sue_j for him_i to make a fool of himself_i in public.

Thus far we have only considered the interaction between two possible controllers, one an EQUI-NP controller and the other a SUPER EQUI-NP controller. The case of the interaction of two SUPER EQUI-NP controllers provides an additional test of the proposed constraint.

(26) (a) Eric_i said that Roxanne knew that it would be difficult for him_i to criticize himself_i.
(*b) Eric_i said that Roxanne knew that it would be difficult to criticize himself_i.

(27) (a) Eric said that Roxanne$_i$ knew that it would be difficult for her$_i$ to criticize herself$_i$.
(b) Eric said that Roxanne$_i$ knew that it would be difficult to criticize herself$_i$.

The above configurations support the constraint. As can be seen below, both EQUI and SUPER EQUI allow backward (right to left) deletion of a coreferential NP in subject position if that NP is commanded.

(28) (a) John$_i$'s talking to John$_i$ soothed John$_i$.
(b) Talking to himself$_i$ soothed John$_i$.

(29) (a) That Sam$_i$'s gaining complete control over Sam$_i$'s own follicles was impossible angered Sam$_i$.
(b) That gaining complete control over his$_i$ own follicles was impossible angered Sam$_i$.

The relevant examples of the interaction between possible controllers in the backward deletion condition are easy to construct.

(30) (a) That Pete$_i$'s washing Pete$_i$ with liquid oxygen disturbed Pete$_i$ surprised Eileen.
(b) That washing himself$_i$ with liquid oxygen disturbed Pete$_i$ surprised Eileen.

(31) (a) That Eileen$_i$'s washing Eileen$_i$ with liquid oxygen disturbed Pete surprised Eileen$_i$.
(*b) That washing herself$_i$ with liquid oxygen disturbed Pete surprised Eileen$_i$.

(32) (a) That that Pete$_i$'s washing Pete$_i$ was difficult disturbed Pete$_i$ surprised Eileen.
(b) That that washing himself$_i$ was difficult disturbed Pete$_i$ surprised Eileen.

(33) (a) That that Eileen$_i$'s washing Eileen$_i$ was difficult disturbed Pete surprised Eileen$_i$.
(*b) That that washing herself$_i$ was difficult disturbed Pete surprised Eileen$_i$.

As predicted by the Intervention Constraint, ungrammaticality occurs when the pattern where a possible controller intervenes between the actual controller and the deleting term obtains. Consider, however, the alternative surface realizations of the last set of sentences where the transformation EXTRAPOSITION has applied.

(34) (a) That $Pete_i$'s washing $Pete_i$ disturbed $Pete_i$ surprised Eileen.
(b) That it disturbed $Pete_i$ to wash $himself_i$ surprised Eileen.

(35) (a) That $Eileen_i$'s washing $Eileen_i$ disturbed Pete surprised Eileen.
(*b) That it disturbed Pete to wash $herself_i$ surprised $Eileen_i$.

The pattern displayed by both (34b) and (35a) predicts that the output of the application of SUPER EQUI-NP DELETION will be grammatical, as no possible controller intervenes between the actual controller and deleting term. In (35b) unfortunately, although the pattern is

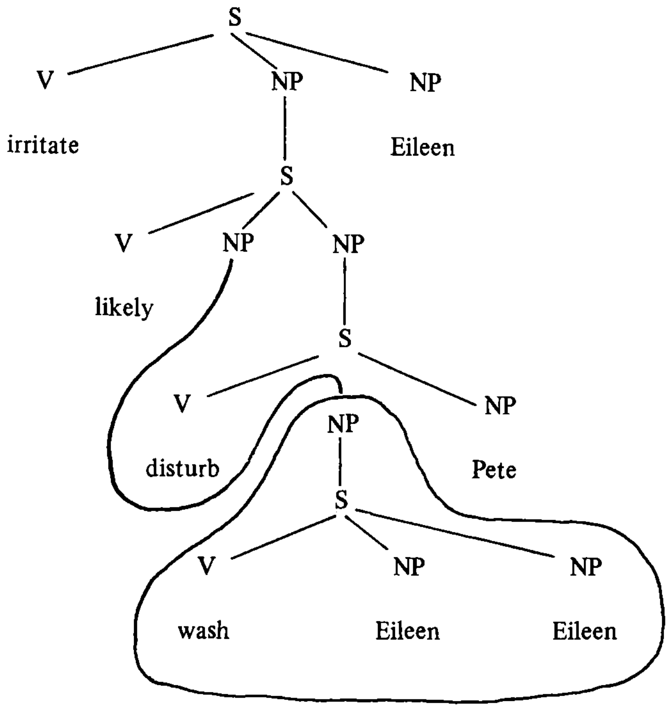
$$[\text{Pete}]_{e_i} \ldots\ldots [\text{Eileen}]_{t_i} \ldots\ldots [\text{Eileen}]_{C_i}$$

in the surface structure, the result is ungrammatical. Also of particular importance is the fact that while (31b) and its parallel (36b) are impossible, (36c) is grammatical.

(36) (a) That is was likely that $Eileen_i$'s washing $Eileen_i$ would disturb Pete irritated $Eileen_i$.
(*b) That it was likely that washing $herself_i$ would disturb Pete irritated $Eileen_i$.
(c) That washing $herself_i$ was likely to disturb Pete irritated $Eileen_i$.

The above results, in particular the contrasts between (31b), (36b) and (36c), and between (34b) and (35b), show that the relation of precedence alone is inadequate as a defining order for deletion path. In each of the above cases where the order specified by precedence fails to distinguish between two strings fitting that configuration, one of them grammatical, the other not, the command relations are drastically different. In the above cases which are ungrammatical, the possible antecedent commands the deleted term. The converse is true for the member of the pairs meeting the same pattern as defined by precedence but yielding a grammatical string. Specifically, notice the difference between (36b) and (36c). The order specified by precedence is identical, but in (36b) and not in (36c) the possible antecedent *Pete* commands the deleting term. (36b) and (36c) are related by the transformation RAISING. The effect of this transformation is to remove the term to be deleted from the portion of the three commanded by the possible antecedent *Pete*, thus allowing SUPER EQUI-NP an unobstructed deletion path.

The correct reformulation of the definition of deletion path seems to be (37).



(37) Deletion Path:
An element, e_i, is said to be in the deletion path of a deletion transformation, T_i, involving a controller C_i and a term to be deleted, t_i, if at the time of application of T_i

(*a*) e_i bears more primacy relations with respect to t_i than does C_i

or (*b*) C_i and e_i bear the same primacy relation(s) with respect to t_i and e_i lies between C_i and t_i in the linear order specified by precedence.

First, considering condition (*a*): since the controller in any deletion transformation must command the deleting term, the only case which will arise is the case where e_i commands and precedes, and C_i only commands the deleting term as in (35b) (repeated here for convenience).

(35) (*b) That it disturbed Pete to wash herself$_i$ surprised Eileen$_i$.

Cases such as (39) also fall under the scope of condition (a).

(38) (a) The girl$_i$ who Max loved said that it would be difficult for her$_i$ to

excuse herself$_i$ from the party before midnight.

(b) The girl$_i$ who Max loved said that it would be difficult to excuse herself$_i$ from the party before midnight.

(39) (a) The girl who Max$_i$ loved said that it would be difficult for him$_i$ to excuse himself$_i$ from the party before midnight.

(*b) The girl who Max$_i$ loved said that it would be difficult to excuse himself$_i$ from the party before midnight.

Condition (*b*) covers the cases where both C_i and e_i both precede and command t_i, and e_i intervenes; and also the cases where neither C_i or e_i precede (the right to left or backward deletion), but both command, and e_i intervenes between C_i and t_i as, for example, in (31b), (33b) and 36b). The applicability of the Intervention Constraint remains indeterminate until the order of SUPER EQUI-NP is fixed with respect to other transformations: in particular those permutation transformations which radically alter the deletion path.

The Ordering of SUPER EQUI-NP

In attempting to fix the order of SUPER EQUI-NP with respect to other grammatical processes, we are particularly interested in those which might remove possible controllers from the deletion path of SUPER EQUI. The following set of sentences offers convincing evidence that SUPER EQUI must be ordered prior to the movement transformations WH-Q FRONTING and WH-REL FRONTING.

(40) (a) John$_i$ said that Wh-someone wanted John$_i$ protect John$_i$.

(b) Who did John$_i$ say wanted him$_i$ to protect himself$_i$?

(*c) Who did John$_i$ say wanted to protect himself$_i$?

(41) (a) I recognized the man$_j$ John$_i$ said Wh-man$_j$ wanted John$_i$ protect John$_i$.

(b) I recognized the man$_j$ who$_j$ John$_i$ said wanted him$_i$ to protect himself$_i$.

(*c) I recognized the man$_j$ who$_j$ John$_i$ said wanted to protect himself$_i$.

The two movement transformations WH-Q FRONTING AND WH-REL FRONTING, in effect, remove possible controllers (the circled NP in the (a) versions above) from the deletion path of SUPER EQUI. If SUPER EQUI were ordered to apply after these movement transformations, it would have as input the structures of the (b) versions above. It is clear that in the (b) versions the Intervention Constraint is inoperative, as there is no possible NP controller in the deletion path of SUPER EQUI. Thus the ungrammatical strings, (c), would be generated. We may conclude that the order is

(42) SUPER EQUI-NP DELETION
WH-Q FRONTING and WH-REL FRONTING

Perhaps more enlightening is the ordering of SUPER EQUI with respect to the sequence RAISING and PASSIVE. While the rules which we have thus far considered remove possible controllers, they have specifically been argued to be non-cyclic.[7] Thus one may only conclude that the transformation SUPER EQUI must be either cyclic, or non-cyclic and ordered before the WH-FRONTING rules. The sequence RAISING and PASSIVE has the same functional effect and, in addition, these transformations are known to be cyclic.

(43) (a) Elmer_i claimed that Jennifer knew that it was necessary for him_i to brush his_i own teeth.
(*b) Elmer_i claimed that Jennifer knew that it was necessary to brush his_i own teeth.
(*c) Elmer_i claimed Jennifer to have known that it was necessary to brush his_i own teeth.
(*d) Jennifer was claimed by Elmer_i to have known that it was necessary to brush his_i own teeth.

Notice that the ungrammaticality of (43d) above shows that SUPER EQUI must be ordered before PASSIVE on the cycle where the two NP are interchanged by the PASSIVE. Since RAISING is known by independent arguments to precede PASSIVE, we must find additional evidence for the ordering of SUPER EQUI and RAISING.[8] Note, however, that the effect of RAISING is to move the NP subject of an immediately dominated clause into object position of the dominating clause, thus creating new clause mates. In (44) we show that the application of the rule of SUPER EQUI-NP deletion, where some NP, NP_i, is the controller, is not blocked by an intervening NP, NP_j, if NP_i and NP_j are clause mates.

(44) (a) Tom_i told Harriet_j that it would be tough for $\left\{\begin{array}{l}\text{him}_i\\ \text{her}_j\end{array}\right\}$ to prevent $\left\{\begin{array}{l}\text{himself}_i\\ \text{herself}_j\end{array}\right\}$ from crying at the wedding.
(b) Tom_i told Harriet_j that it would be tough to prevent $\left\{\begin{array}{l}\text{himself}_i\\ \text{herself}_j\end{array}\right\}$ from crying at the wedding.

Since (44) demonstrates that clause mates are not possible intervening NP with respect to SUPER EQUI,[9] then we may conclude that SUPER EQUI must apply before the raised NP becomes a clause mate, that is, SUPER EQUI must be ordered before RAISING. This last finding causes the following addition to the definition of deletion path:

(45) Deletion Path

An element, e_i, is said to be in the deletion path of a deletion transformation, T_i, involving a controller, C_i and a term to be deleted, t_i, if at the time of application of T_i:

(*a*) e_i bears more primacy relations with respect to t_i than does C_i

(*b*) C_i and e_i bear the same primacy relation(s) with respect to t_i, and e_i lies between C_i and t_i in the linear order specified by precedence, and C_i and e_i are not clause mates.

More striking, however, is the fact that the above arguments have led us to the point where it is no longer clear that it is possible to distinguish the rules of SUPER EQUI-NP DELETION and EQUI-NP DELETION. Specifically, we have seen that SUPER EQUI-NP DELETION is ordered cyclically at precisely the *same point in the cycle* as is EQUI-NP DELETION. Given the clause mate amendment to the definition of deletion path, which is operative also in the case of the Rosenbaum rule of EQUI-NP as (46) shows,

(46) $John_i$ promised Sam to go.

one need only change the Intervention Constraint as follows:

(47) The Intervention Constraint

EQUI-NP DELETION between two NP, NP^a and NP^b, is blocked if there exists a possible controller, NP^c, in the deletion path.

Having made this adjustment, the two rules collapse.[10]

SOME ADDITIONAL DATA

Edes has observed with insight that sentences such as (48) display what she has called the Split Antecedents Phenomenon.[11]

(48) (a) Max_i said that $they_{ij}$ were forced into marriage before Sue_j had a chance to tell her_j side.

(b) Max_i said that $they_{ij}$ were happily married, and Sue_j agreed.

The analogous phenomenon, the Split Controller Phenomenon,[12] is possible in the case of deletion as the sentences in (49) show:

(49) (a) Harry$_i$'s claim that it would be necessary for them$_{ij}$ to burn down their$_{ij}$ own dorm alarmed Sam$_j$.
(b) Harry$_i$'s claim that it would be necessary to burn down their$_{ij}$ own dorm alarmed Sam$_j$.

(50) (a) Harry$_i$ said that Joan$_j$ knew that it was necessary for them$_{ij}$ to report their$_{ij}$ own father to the authorities.
(b) Harry$_i$ said that Joan$_j$ knew that it was necessary to report their$_{ij}$ own father to the authorities.

(51) (a) That their$_{ij}$ covering themselves$_{ij}$ with mud disturbed Spiro$_i$ amused Dick$_j$.
(b) That covering themselves$_{ij}$ with mud disturbed Spiro$_i$ amused Dick$_j$.

The sentences (50b) and (51b) present special difiiculties for the analysis. In (50b) the following situation obtains.

Harry$_i$ .... Joan$_j$ .... Harry$_i$ and Joan$_j$

And in (51b):

Spiro$_i$ and Dick$_j$ .... Spiro$_i$ .... Dick$_j$

The conjunct has in both cases been deleted by two NP not dominated by the same S node; that is, non-clause mates, the split controller case. Given the present formulation of the Intervention Constraint and the definition of deletion path, such an operation should be impossible, as the NP controller *Joan$_j$* in (50a) and the NP controller *Spiro$_i$* in (51a) intervene between the NP controller *Harry$_i$* and the conjunct to be deleted *Harry$_i$* in (50), and the NP controller *Dick$_j$* and the conjunct to be deleted *Dick$_j$* in (51). The difference between the two above cases and the ones which we considered before is that in the above cases, but not the others, the intervening NP controllers which are already (i.e., at the time of application of SUPER EQUI) involved in a coreferential NP deletion do not count as blocking elements in the deletion path. Some additional evidence that this is the correct solution is provided by the fact that properly nested deletion dependencies are possible with SUPER EQUI while improperly nested dependencies are not.

(52) (a) John$_i$ said that Laura$_j$ knew that her$_j$ torturing herself$_j$ would

make his_i criticising $himself_i$ seem trivial.

(b) $John_i$ said that $Laura_j$ knew that torturing $herself_j$ would make criticising $himself_i$ seem trivial.

(53) (a) $John_i$ said that $Laura_j$ knew that his_i torturing $himself_i$ would make her_j criticising $herself_j$ seem trivial.

(*b) $John_i$ said that $Laura_j$ knew that torturing $himself_i$ would make criticising $herself_j$ seem trivial.

Schematically:

(52) $John_i^1$ . . . . $Laura_j^2$ . . . . $Laura_j^3$ . . . . $John_i^4$

(53) $John_i^1$ . . . . $Laura_j^2$ . . . . $John_i^3$ . . . . $Laura_j^4$

In (52) the deletion between *Laura*^{2} and *Laura*^{3} occurs on the cycle before the deletion between *John*^{1} and *John*^{4}. Thus on the succeeding cycle the deletion operation between *John*^{1} and *John*^{4} may proceed as there are at that point no *possible* NP controllers intervening, but an *actual* NP controller, namely *Laura*^{2}. On the other hand, in (53) *John*^{3} serves as the intervening possible NP controller blocking the deletion operation between *Laura*^{2} and *Laura*^{4}; and *Laura*^{2}, in turn, serves as the intervening possible controller preventing the application of the deletion transformation between *John*^{1} and *John*^{3}. The contrast between (52b) and (53b) would follow from the same distinction which would allow the Split Controller cases and still preclude previous ungrammatical strings.

Picture NP Reflexivization[13]

The existence of the generalized rule of EQUI-NP DELETION along with the Intervention Constraint and the definition of Deletion Path makes the explanation of a portion of the so-called Picture NP Reflexives possible.

(54) (a) John said that the picture of himself irritated Max.

(b) John said that Max was irritated by the picture of himself.

The coreferent of *himself* in (54a) is ambiguous, being either *John* or *Max*, while in (54b) only the interpretation where *Max* is the coreferent is possible. Notice that such a pattern is consistent with the Intervention Constraint as in (54b) but not (54a); the possible NP controller *Max* constitutes an intervening NP blocking the deletion of the putative subject of *picture, John,* by the controller *John*, the subject of the verb *said*. The rule and the constraint also predict the grammaticality pattern of the following.

(55) (a) John$_i$ showed Max$_j$ $\left\{\begin{array}{l}\text{Max}_j\text{'s picture of Max}_j.\\ \text{John}_i\text{'s picture of John}_i.\end{array}\right\}$

(b) John$_i$ showed Max$_j$ $\left\{\begin{array}{l}\text{Max}_j\text{'s}\\ \text{John}_i\text{'s}\end{array}\right\}$ picture of himself$_{ij}$.

(c) John$_i$ showed Max$_j$ the picture of himself$_{ij}$.

(56) (a) John$_i$ showed Max$_j$'s picture of Max$_j$ to Max$_j$.
(*b) John$_i$ showed the picture of himself$_j$ to Max$_j$.

(57) (a) John$_i$ showed John$_i$'s picture of John$_i$ to Max$_j$.
(b) John$_i$ showed the picture of himself$_i$ to Max$_j$.

As predicted by our constraint, (55c) is ambiguous as there are two NP controllers which are *clause mates* available, both bearing both primacy relations to the NP to be deleted. In contrast with (57b), (56b) is not possible, as the possible controller *John* bears more primacy relations with respect to the NP to be deleted than does the actual controller. It is necessary to order the generalized deletion transformation EQUI-NP subsequent to DATIVE MOVEMENT, as (56) shows. This is consistent with the ordering which we previously found to be correct for EQUI-NP, namely, pre-PASSIVE, as it has been independently argued that DATIVE MOVEMENT must precede PASSIVE. Thus we have the ordering:

DATIVE MOVEMENT
EQUI-NP
PASSIVE

Unfortunately, the analysis has nothing to contribute to an explanation of the picture NP reflexives where the reflexive form commands the controller and there is no indication of RAISING.[14]

(58) The picture of himself$_i$ which John$_i$ found hanging in the post office irritated him$_i$.

(59) The picture of himself$_i$ which I thought Sam$_i$ would resent was destroyed in the fire.

Whether the fact that the previous sentences are explicable in terms of the generalized transformation is spurious, I cannot say.

Postal (1970a) has noticed the fact that in the following sentences the deletion of the embedded subject NP is unusual in the sense that the controller for the deletion is not in the immediately dominating clause.

(60) (a) $John_i$ said that his_i shaving $himself_i$ was like his_i torturing $himself_i$.
(b) $John_i$ said that shaving $himself_i$ was like torturing $himself_i$.

(61) (a) $Pete_i$ told Sam_j that his_{ij} criticising $himself_{ij}$ was like his_{ij} torturing $himself_{ij}$.
(b) $Pete_i$ told Sam_j that criticising $himself_{ij}$ was like torturing $himself_{ij}$.

(62) (a) $Pete_i$ said that Sam_j believed that his_{ij} criticising $himself_{ij}$ was like his_{ij} torturing $himself_{ij}$.
(b) $Pete_i$ said that Sam_j believed that criticising himself $\begin{Bmatrix} *i \\ j \end{Bmatrix}$ was like torturing himself $\begin{Bmatrix} *i \\ j \end{Bmatrix}$

It is clear that the deletion of the subject NP in the above case is a function of the generalized rule of EQUI-NP. In particular, the contrast in grammaticality between (61b) and (62b) shows the effect of the clause mate restriction on the notion of intervening NP.

(63) (a) My shaving myself is tantamount to my torturing myself.
(b) Shaving myself is tantamount to torturing myself.

The fact that (63b) is possible is also explained by the generalized rule of EQUI. Specifically, in this case the NP subject of the higher Performative sentence has served as the controller for the application of EQUI and has subsequently deleted by the rule of PERFORMATIVE DELETION (Ross, 1968). The fact that PERFORMATIVE DELETION may delete NP without a controller condition which would leave behind a controller NP coreferential with the deleted NP and any coreferential anaphors for which it has served as antecedent explains the difference in grammaticality in the following formula. The fact that the term *oneself* is also acceptable follows from the discussion in the last chapter.

(64) (a) {My, Your, His, Her, Our, Their, One's} shaving {myself, yourself, himself, herself, ourselves, themselves, oneself} is likely to be equivalent

to {my, your, his, her, our, their, one's} torturing {myself, yourself, himself, herself, ourselves, themselves, oneself}

(b) Shaving {myself, yourself, *himself, *herself, ourselves, *themselves, oneself} is likely to be equivalent to

torturing {myself, yourself, *himself, *herself, ourselves, themselves, oneself}

The fact that the only arguments which occur in the higher performative sentence are *I* and *You* explains how it is possible for the subject NP, coreferential with the reflexive forms *myself, yourself* and *ourselves* (the Split Controller Phenomenon), but not the forms *himself, herself* and *themselves*, to be deleted by EQUI-NP. The failure of the subject NP *one*, coreferential with the reflexive form, to appear is accounted for by optional lexicalization. Thus we can quite naturally account for the restricted distribution of reflexive forms in the formula above, as there is no structure underlying (64b) which is properly analyzable with respect to EQUI-NP DELETION unless the NP subject to be deleted is 1st, 2nd person, or 1st and 2nd person. The fact that the following contrast occurs is explicable by the Intervention Constraint, as the possible controller $John_i$ intervenes between the NP controllers in the performative and the deleting NP subjects.

(65) (a) John$_i$ knows that $\begin{Bmatrix}\text{my}\\ \text{your}\end{Bmatrix}$ shaving $\begin{Bmatrix}\text{myself}\\ \text{yourself}\end{Bmatrix}$ is like $\begin{Bmatrix}\text{my}\\ \text{your}\end{Bmatrix}$ torturing $\begin{Bmatrix}\text{myself}\\ \text{yourself}\end{Bmatrix}$

(*b) John$_i$ knows that shaving $\begin{Bmatrix}\text{myself}\\ \text{yourself}\end{Bmatrix}$ is like torturing $\begin{Bmatrix}\text{myself}\\ \text{yourself}\end{Bmatrix}$

Our *Ambiguity*

Many grammarians have noted that the first person plural personal pronouns in English are systematically ambiguous.

(66) (a) It will be difficult for us$_i$ to persuade ourselves$_i$ to leave.
(b) It will be difficult to persuade ourselves$_i$ to leave.

(67) (a) John$_j$ said that it will be difficult for us$_{i+j}$ to persuade ourselves$_{i+j}$ to leave.
(b) John$_j$ said that it will be difficult to persuade ourselves$_{i+j}$ to leave.
(?*c) John$_j$ said that it will be difficult to persuade ourselves$_i$ to leave.

The fact that the possible NP controller *John$_j$* intervenes between the controllers in the performative and the subject conjunct of the verb *persuade* does not permit the deletion unless that controller is an actual controller, as we found in the split controllers case; and thus only the interpretation where *John$_j$* is included in the pronoun *ourselves* is acceptable if the deletion has occurred. The analysis presented here predicts that if a first person plural pronoun is deleted by EQUI it will be interpreted as including any NP intervening between the controllers in the performative and the deleted pronoun. Specifically, the analysis predicts that (68b) is ungrammatical although (69b) is possible, as they are paralleled by (70) and (71) respectively.

(68) (a) Mary said that it would be unnecessary for us to get rid of our own wives.
(*b) Mary said that it would be unnecessary to get rid of our own wives.

(69) (a) John said that it would be unnecessary for us to get rid of our own wives.
(b) John said that it would be unnecessary to get rid of our own wives.

(70) *It will be unnecessary for you$_i$, Mary$_j$ and me$_k$ to get rid of our$_{i+j+k}$ own wives.

(71) It will be unnecessary for you$_i$, John$_j$ and me$_k$ to get rid of our$_{i+j+k}$ own wives.

SUMMARY

This chapter has concerned itself with the specification of the set of structural configurations which may obtain between two coreferential nodes in surface structure: one, the controller node, the second, the null anaphor. The notion of Deletion Path has been developed to explicate this set of configurations. It is clear, both from the data presented here and from other discussions of the EQUI-NP DELETION phenomenon (cf. especially Postal, 1968), that it is not possible to state which nodes of a chain of coreference may have a zero surface form by an inspection of either the deep structure or the surface structure, or both. Rather, as I have argued, the structural conditions which are necessary for the appropriate application of the generalized EQUI-NP DELETION transformation are those specified by the Deletion Path concept, at the point of application of the rule. Given this concept, the grammar is seen to contain the generalized transformation, EQUI-NP DELETION.

NOTES

1. This is not entirely true; Postal (1970, 80, note 31) pointed out in his discussion of Parallel Deletion that the controller in such sentences is not in the next higher sentences but is two clauses away.

The judgements on the data in this chapter are, needless to say, my own. I am aware that there are dialects for which many of the sentences which are ill-formed in my dialect are perfectly well-formed. From my discussions with speakers of these other dialects, I have found that my dialect seems to be the most restrictive (if the dialect has the rule at all), and therefore, in some obvious sense, the dialect which is most difficult to handle from a formal point of view. Further, the dialects which I have been made aware of seem to be easily accounted for by successive loosenings of the different parameters of the constraint arrived at here. The topic of dialects with respect to these deletion phenomena itself constitutes a full and fascinating subject which is, however, well beyond the scope of this study.

2. The sentences of (1) in the text are ambiguous. The second reading is quite vague, and arises from the failure of the optionally lexicalizable term *one* to have a surface lexical representation. The argument presented in the text is uneffected by this ambiguity.

3. The term *clause mate* is, I believe, Postal's. Two terms are said to be clause mates if they command each other.

4. Cf. Postal (1970).

5. Cf. Rosenbaum (1965,1967), Postal (1968a), Jackendoff (1969). As mentioned in the initial statements of this chapter, the latter makes the interesting claim that the determination of which of the arguments of a predicate can serve as the controller can be made on the basis of extensions of concepts developed by Gruber (1965).

6. The transformation EXTRAPOSITION has been argued to be a last-cyclic transformation (Ross, 1967). If EXTRAPOSITION were demonstrated to be last- or post-cyclic and the generalized EQUI-NP DELETION transformation were cyclic as it is argued here, then EXTRAPOSITION would have to be blocked in cases such as (20e) in the text. Such a statement is possible (a Global Derivational Constraint), although not particularly welcome.
7. Cf. Postal (1968b) for ordering arguments. One additional transformation which has been argued to be last- or post-cyclic is Y MOVEMENT. This rule appears in Ross (1967) where it is referred to as TOPICALIZATION. The deviancy of (*i*c) below shows that the generalized EQUI-NP DELETION transformation must precede Y MOVEMENT.

(i) (a) David$_i$ claimed that Judy knew that it was necessary for him$_i$ to talk to his$_i$ own father.
(b) Judy, David$_i$ claimed knew that it was necessary for him$_i$ to talk to his$_i$ own father.
(*c) Judy, David$_i$ claimed knew that it was necessary to talk to his$_i$ own father.

Notice that the rules of relevance for testing the constraint are chopping rules in the sense of Ross (1967), as copying rules are obviously unable to remove possible controller from the deletion path.
8. Cf. Postal (1968a) for the RAISING-PASSIVE-EQUI-NP ordering arguments.
9. While this seems to be the correct generalization, the verb *ask* is apparently a counter-example, as Paul Postal has pointed out to me.

(*i*) (a) Tom$_i$ asked Harriet$_j$ $\left\{\begin{array}{l}\text{if}\\ \text{whether}\end{array}\right\}$ it would be easy for $\left\{\begin{array}{l}\text{her}_j\\ \text{him}_i\end{array}\right\}$ to prevent $\left\{\begin{array}{l}\text{herself}_j\\ \text{himself}_i\end{array}\right\}$ from crying.
(b) Tom$_i$ asked Harriet$_j$ $\left\{\begin{array}{l}\text{if}\\ \text{whether}\end{array}\right\}$ it would be easy to prevent $\left\{\begin{array}{l}\text{?*herself}_j\\ \text{himself}_i\end{array}\right\}$ from crying.

10. As mentioned earlier, the problem of deciding which NP argument may serve as controller remains an unsolved problem, as it has been since Rosenbaum first proposed the rule. Notice that Deletion Path provides evidence for the unspecified argument node.

(*i*) (a) John$_i$ said that it was claimed that it would be difficult for him$_i$ to behave himself$_i$.
(*b) John$_i$ said that it was claimed that it would be difficult to behave himself$_i$.

The fact that (b) above is not possible is explicable naturally simply by pointing out that (c) is also impossible.

(*c) John$_i$ said that it was claimed by someone that it would be difficult to behave himself$_i$.

11. Cf. E. Edes (1968), also Postal (1968b:31).
12. Georgia Green pointed out (at the Chicago Linguistics Society Meeting, 1969) that Split Antecedents are not possible in a sentence such as:

(*i*) John$_i$ said that Mary$_j$ wanted to defend themselves$_{i+j}$ with a penknife.

I have no explanation for this fact.
13. Cf. Postal (1968b), Jackendoff (1969) for discussion.

14. Example (58) in the text is from Jackendoff (1969). Example (59) was first pointed out to me by Patrick Brogan.
15. The fact that the generalized EQUI-NP DELETION transformation is functioning clears up only part of the difficulty with the Parallel Deletion Phenomenon. As Postal (1970a) points out the subject NP of the parallel clauses must be coreferential.

5

CONTROLLER CROSS-OVER

The purpose of this chapter is to motivate the inclusion of a particular constraint in the grammar of English. Specifically, I wish to argue that there exists a constraint which marks as ill-formed any derivation in which a transformation has moved a node, n_i, in such a way as to cause it to describe a path over some set of nodes which includes a node, n_j, where n_i and n_j bear the same referential index, and n_i serves as the controller for a coreferential deletion transformation which reduces n_j to a null surface form. Obviously, this constraint handles Cross-Over cases involving controllers and the terms which they delete, hence the title of the chapter, Controller Cross-Over. The task of motivating the constraint is facilitated considerably by the existence of the set of arguments for the general case of Cross-Over presented by Postal (1968). We may begin the examination of this phenomenon by considering a claim recently advanced by George Lakoff.

LAKOFF'S *PASSIVE/EQUI* CONSTRAINT

In a recent article by George Lakoff entitled "Global Rules, or The Inherent Limitations of Transformational Grammar", the following observation by Robin Lakoff is reported:

(1) No single lexical item may take a *for-to* complementizer and undergo both the PASSIVE transformation and EQUI-NP DELETION.

The examples which are presented as relevant for the constraint are:

(2) (a) Minnie desired to kick Sam in the shins. (Lakoff's 24)
(*b) To kick Sam in the shins was desired by Minnie.

(3) (a) Sam tried to escape from America. (Lakoff's 25)
(*b) To escape from America was tried by Sam.

(4) (a) Sarah expected to have a party the following day. (Lakoff's 26)
(*b) To have a party the following day was expected by Sarah.

Each of the (b) versions of (2) through (4) have a derivation which includes the application of both the PASSIVE and EQUI-NP DELETION transformations on a single cycle, thus governed by the same lexical item. As predicted by the constraint (1), they are clearly ungrammatical. That the (b and c) versions of the triplets (5) through (7) are well-formed makes them clear counter-examples to the constraint (1).

(5) (a) Maxine forced Tim to take a shower.
(b) Tim was forced by Maxine to take a shower.
(c) Tim was forced to take a shower by Maxine.

(6) (a) Susan persuaded Michael to leave.
(b) Michael was persuaded by Susan to leave.
(c) Michael was persuaded to leave by Susan.

(7) (a) Nancy ordered Leonard to sit down.
(b) Leonard was ordered by Nancy to sit down.
(c) Leonard was ordered to sit down by Nancy.

Each of the (b and c) versions of (5) through (7) have a derivation which includes the application of both the PASSIVE and EQUI-NP DELETION transformations on the same cycle, thus governed by the same lexical item; yet the resultant surface structures are fully grammatical. The difference between the lexical items *force, persuade*, and *order* and the lexical items which occur in Lakoff's examples – *desire, try*, and *expect* – when considered in relation to the EQUI-NP DELETION transformation is clear. In the set of ungrammatical strings, the controller for the application of EQUI-NP DELETION is the underlying subject node[1] while in the grammatical strings, the controller node is a node in one of the oblique positions. Let us assume that this difference is the relevant distinguishing characteristic. If so, then we would predict that if there were a lexical item which allowed both underlying subject nodes and underlying oblique nodes to serve as controller for the application of the coreferential deletion transformation, the same lexical item would in one case result in a grammatical surface structure given the subsequent application of the PASSIVE transformation, but not in the other. The lexical item *beg* has been cited as such an item (Jackendoff, 1969).[2]

(8) (a) Rick begged to go.
(b) Pam begged Rick to go.

In the (a) version, the underlying subject node dominating the term *Rick* has served as controller for EQUI-NP DELETION; in the (b) version, the underlying oblique node represented by the lexical item *Rick* in surface structure has served as controller. As suggested above, if the distinguishing characteristic were the subject-oblique node controller difference, we would predict the PASSIVE transform of the (a) version, analogous to the strings (2b) through (4b), would be ill-formed, but that the PASSIVE transform of the (b) version would be grammatical. The prediction is accurate as (9) shows.

(9) (*a) To go was begged by Rick.
(b) Rick was begged by Pam to go.
(c) Rick was begged to go by Pam.

In view of this additional data, a re-formulation of the original constraint is needed.

(10) Mark as ill-formed any derivation in which the transformations PASSIVE and EQUI-NP DELETION have applied on the same cycle and the controller for the application of EQUI-NP DELETION was the underlying subject of the highest verb, V_i, on that cycle, if V_i selects a *for – to* complementizer.

The re-formulated constraint (10) appears to be accurate; it marks the (b) versions of the pairs (2) through (4) and (9a) as ill-formed while allowing the (b and c) versions of (5) through (7) and (9).

A PRINCIPLED EXPLANATION OF THE *PASSIVE/EQUI* INTERACTION

I would like to consider the status of statements such as (10) within the grammar. Specifically, I would like to draw attention to the distinction between representing and explaining a particular phenomenon.[3] I regard (10) as an account of the facts, a simple coding of some natural language phenomenon in the vocabulary of some theoretical framework, a representation. On the other hand, in order to explain the phenomenon registered in (10), we may begin by examining various properties which it has. Ideally, we hope to find some principle already motivated by independent considerations in the grammar which will produce results equivalent to (10).

Notice, first of all, that the derivations which resulted in a well-formed output and which included the application of both the PASSIVE and the EQUI-NP DELETION transformations had two surface structure variants; namely, the (b and c) verions of (5) through (7) and (9). The fact that both the surface structures are possible raises the question of where the PASSIVE transformation moves the underlying subject NP. Considering the above sequences, one sees that the transformation may be written in such a way as to move the underlying subject NP either to the position immediately succeeding the verb (the (c) versions) or to the position at the end of its clause (the (b) versions). There is some evidence that the latter suggestion is correct. There are simple sequences in which only the latter structure is permitted.

(11) (a) Jerry gave Spiro a flower.
(b) Spiro was given a flower by Jerry.
(*c) Spiro was given by Jerry a flower.

(12) (a) Nelson sold David a bank.
(b) David was sold a bank by Nelson.
(*c) David was sold by Nelson a bank.

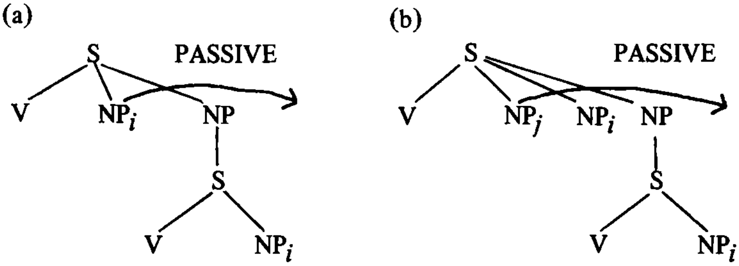
This pattern suggests the formulation (13) which I will assume for the remainder of the discussion.[4]

(13)

PASSIVE	X	$[_S$	V	NP	Y'	$]_S$	Z
Structural index :	1		2	3	4		5
Structural change :	1		2	$\emptyset$	4+3		5

Let us now consider the effect of the PASSIVE as it applies to the schema (14) and (15). The (a) versions of these two schema represent the application of the PASSIVE to structures in which the underlying subject NP has served as controller for EQUI-NP; the (b) versions, structures in which an underlying non-subject has served as controller.[5]

(14) (a) (b)



The schema (15) which shows only the linear relations affected by the PASSIVE is even more instructive.

(15) (a) V NP_i $[_S$ V NP_i $]_S$

(b) V NP_j NP_i $[_S$ V NP_i $]_S$

The problem is to explain why the (b) variants of the above schema are possible, but not the (a) variants. I believe that the solution to this problem involves the notion of a cross-over violation between two coreferential nodes shown to be coreferential by their participation in the EQUI-NP DELETION transformation. Specifically, the application of the PASSIVE to the (a) versions causes the underlying subject to move to the right, crossing the position of the embedded subject NP which is deleted by EQUI-NP DELETION, that is, a coreferent. In the (b) versions, since the non-subject or oblique NP serves as controller for the application of EQUI-NP DELETION, no crossing violation occurs. The underlying subject NP, being non-coreferential with the embedded subject NP, may move to the right, crossing that position without any violation. The controller NP in the (b) versions is never moved by the PASSIVE; therefore, it never crosses the coreferential node in the embedded subject position.

The Promise *Case*

The lexical item *promise* offers an instance of confirming evidence for this explanation. This lexical item is unusual[6] in that, while it may occur with zero or one oblique nominal as (16) shows, the controller position is always that of underlying subject.

(16) (a) Sam promised to leave. (Sam leave)
(b) Sam promised Harry to leave. (Sam leave).

That is, in both of the strings in (16) the underlying subject of the verb *promise* is understood to be the missing argument of the predicate *leave*. Given this fact and the explanation being proposed here, the verb *promise* turns out to be quite regular in its behavior. Specifically, since the underlying subject node will always be the controller, we may predict that both the PASSIVE and EQUI-NP DELETION transformation under no circumstances may apply on the cycle where *promise* is the highest verb.

(17) (a) Sam promised to leave.
(*b) To leave was promised by Sam.

(18) (a) Sam promised Harry to leave.
(*b) Harry was promised by Sam to leave.
(*c) Harry was promised to leave by Sam.

Thus, since the subject node is always the controller for the application of EQUI-NP, the application of PASSIVE always causes the controller node to cross the coreferential node in the embedded subject position.

The Missing Passive Case

Notice that (19) is ambiguous: the term *himself* may be understood as a coreferent of either the NP *Max* or *Sam*.

(19) Max told Sam that it would be difficult to control himself under those circumstances.

This ambiguity is accounted for by the fact that (19) is derived from (20) by the application of the generalized EQUI-NP DELETION transformation to (20), and the fact that the term *him* in (20) may be understood as a coreferent of either *Max* or *Sam*.

(20) Max told Sam that it would be difficult for him to control himself under those circumstances.

The fact that either the underlying subject node of the verb *tell* or an underlying oblique node of that verb may serve as the controller for EQUI-NP DELETION predicts the grammaticality of the two sequences of (21).

(21) (a) Martha_i told John that it would be difficult to control herself_i under those circumstances.
(b) Martha told John_j that it would be difficult to control himself_j under those circumstances.

The Cross-Over analysis predicts that only one grammatical passive sequence may result from the application of the PASSIVE transformation to the two strings in (21).

(22) (*a) John was told by Martha_i that it would be difficult to control herself_i under those circumstances.
(b) John_j was told by Martha that it would be difficult to control himself_j under those circumstances.

(22a) is out, as the application of the PASSIVE which moves the underlying subject NP to the end of its clause has caused that NP to cross the node which dominates the deleted subject coreferent. No such violation occurs in the case of (22b) as the controller was not the underlying subject which crosses the deleted NP position of the most deeply embedded clause.

The explanation being proposed here immediately reminds one of the general constraint proposed by Postal in his study entitled *Cross-Over Phenomena*. The statement in (23) is Postal's final formulation of the Cross-Over Principle.

(23) Cross-Over VI
Assumptions and Definitions as in Chapter 14
Despite the fact that *P* (any arbitrary phrase marker) is a member of *S* (the set of phrase markers properly *analyzable* with respect to some transformation *T*), *T* may not apply to *P* if the application path of *T* with respect to *P* is such that this path contains an NP_j coreferential with NP_k and both NP_j and NP_k are Pronominal Virgins and either:

(a) *T* is a Variable Movement Rule
(b) *T* is a Constant Movement Rule and NP_j and NP_k are both Clause Mates and Peers.

Obviously, the formulation of Cross-Over IV includes a rather large set of terms whose definitions are required before the applicability or non-applicability of the constraint with respect to the PASSIVE/EQUI interaction can be determined. It appears, as G. Lakoff (personal communication) has pointed out, that no appeal can be made to Cross-Over IV to exclude the cases under consideration in the PASSIVE/EQUI interaction. This is because the PASSIVE is a constant movement transformation; and clearly the controller node and the node which dominates the embedded subject term which is eliminated by EQUI-NP DELETION are not clause mates (that is, mutually commanding terms), let alone Peers (a stronger condition). Thus, a separate constraint is required to deal with cross-over violations involving controllers and nodes associated with them in some application of the transformation EQUI-NP DELETION. I will distinguish this from Cross-Over IV by referring to it as Controller Cross-Over.

(24) Controller Cross-Over[7]
Mark as ill-formed any derivation in which a transformation T has applied to some structure which includes a mentioned node, n_i, causing n_i to move describing a path over some set of constituents which includes a node, n_j, if in that derivation n_i has served as controller with respect to n_j for some application of a coreferential deletion transformation.

In order for Controller Cross-Over to replace the descriptively adequate statement (hereafter the PASSIVE/EQUI Constraint) it is necessary to show a series of cases where Controller Cross-Over and the PASSIVE/EQUI make different predictions. Notice that (24) predicts violations in a much wider range of cases than (10), as in (24) no mention of any specific transformations or complementizers is made; rather a much more general characterization is proposed. We may then begin to motivate the Controller Cross-Over Constraint by showing that there exists coreferential deletion transformations other than EQUI-NP DELETION which exhibit the same patterns of grammaticality.

OTHER COREFERENTIAL DELETION TRANSFORMATIONS

I have been able to identify several other coreferential deletion transformations which exhibit the cross-over phenomenon. These are:

BY Subject Deletion (Postal,1966;1968) (Fodor,1970)
Pronoun Apparel Elision (Postal, to appear)
Since–When–While Deletion[8]
In Order to Deletion

The following strings are examples of the processes listed above.

(25) (a) Mary irritated John by her ignoring him.
(b) Mary irritated John by ignoring him.

(26) (a) Sam took Pete's hat off him.
(b) Sam took Pete's hat off.

(27) (a) John hasn't seen Marsha since $\left\{\begin{array}{l}\text{he}\\\text{she}\end{array}\right\}$ left home.
(b) John hasn't seen Marsha since leaving home.

(28) (a) Louise saw Don $\left\{\begin{array}{l}\text{while}\\\text{when}\end{array}\right\}$ $\left\{\begin{array}{l}\text{he}\\\text{she}\end{array}\right\}$ was leaving home.
(b) Lousie saw Don $\left\{\begin{array}{l}\text{while}\\\text{when}\end{array}\right\}$ leaving home.

(29) (a) Liz called Tom in order that she could get his attention.
(b) Liz called Tom in order to get his attention.

Case I

These operations listed above provide the cases necessary to distinguish between the two formulations. Specifically, consider the effect of the PASSIVE when applied to the sequences of (25).

(30) (?a) $John_i$ was irritated by $Mary_j$ by her_j ignoring him_i.
(*b) John was irritated by Mary by ignoring him.

The relative grammaticality of the (a) version of (25) remains constant under the passive operation; the (b) version is literally uninterpretable. Notice that the two versions differ in just the characteristic that the constraint is sensitive to. In the (a) version the relation of coreference has been marked by the process of pronominalization; the Controller Cross-Over Constraint is not applicable as no coreferential deletion transformation has applied in the derivation. In the (b) version, the BY Subject Deletion transformation has applied, and the PASSIVE has caused the controller node to cross the position of the node for which it serves as controller. The PASSIVE/EQUI Constraint is not available as the coreferential deletion transformation involved is not EQUI-NP DELETION, as is required by the constraint.

Case II

In the case of the transformation Pronoun Apparel Elision, we again find support for the Controller Cross-Over Constraint. Using the PASSIVE as a test, we predict that since the underlying subject will cross the position of the deleted NP, the reading where the underlying subject NP is understood to be the individual who was originally wearing the hat will not be possible; the result, then, will be unambiguous.

(31) (a) Sam took Pete's hat off.
(b) Pete's hat was taken off by Sam.

The passive version of (31) can be understood only as a paraphrase of the reading of (31a) which reports Sam's removal of a hat which was on Pete's head. This failure of the PASSIVE transformation to preserve the ambiguity of the active string is directly attributable to the Controller Cross-Over Constraint. Further, the fact that the (b) version of (32) is ambiguous shows the necessity of reconstructing the notion of the 'mentioned' NP (Ross,1967; Postal,1968) in stating the Controller Cross-Over.

(32) (a) Sam took Pete's hat off.

(b) Sam took off Pete's hat.

The point of the (b) example is that the controller (on one reading) has reversed positions with the deleted term (the object of *off*); but the structural index of the transformation which caused the permutation did not mention the controller *Pete*, but rather the larger NP node, *Pete's hat,*[9] of which the controller is only a sub-constituent. If the controller were mentioned, then we would predict that the string resulting from the movement of the controller alone would be possible. The result is, however, hopeless.

(33) *Sam took {a / the} hat off Pete's.

The PASSIVE/EQUI Constraint cannot be invoked in these cases as the constraint is limited to derivations which include the application of the EQUI-NP DELETION transformation.

Case III

The result of the application of the *Since–When–While* Deletion transformation leaves the string ambiguous as the (b) versions of (27) and (28) show (repeated here for convenience).

(34) (a) John hasn't seen Marsha since leaving home.
(b) Louise saw Don {when / while} leaving home.

If the Controller Cross-Over is accurate and the formulation of the PASSIVE presented here is correct, then we predict that the PASSIVE will again fail to preserve the ambiguity of the above sequences. This prediction is borne out as (35) demonstrates.

(35) (a) Don was seen by Louise {when / while} leaving home.
(b) Marsha hasn't been seen by John since leaving home.

By fixing the reference of the deleted subject with the use of a term which requires a clause mate at some point in the derivation (in this case a reflexive form) as in (36), we predict that the PASSIVE will yield an ungrammatical string just in case the clause mate term is coreferential with the nominal node moved by the PASSIVE (37b). If the coreferent of the clause mate term is an oblique nominal node, then the result will be well-formed.

(36) (a) John saw Mary$_i$ $\left\{\begin{matrix}\text{when}\\ \text{while}\end{matrix}\right\}$ shaving herself$_i$.
(b) John$_i$ saw Mary $\left\{\begin{matrix}\text{when}\\ \text{while}\end{matrix}\right\}$ shaving himself$_i$.

(37) (a) Mary$_i$ was seen by John $\left\{\begin{matrix}\text{when}\\ \text{while}\end{matrix}\right\}$ shaving herself$_i$.
(*b) Mary was seen by John$_i$ $\left\{\begin{matrix}\text{when}\\ \text{while}\end{matrix}\right\}$ shaving himself$_i$.

The same pattern holds in the *since* cases, shown in (38) and (39).[10]

(38) (a) John hasn't seen Mary$_i$ since shaving herself$_i$.
(b) John$_i$ hasn't seen Mary since shaving himself$_i$.

(39) (a) Mary$_i$ hasn't been seen by John since shaving herself$_i$.
(*b) Mary hasn't been seen by John$_i$ since shaving himself$_i$.

Once again, the data lies outside the domain of the PASSIVE/EQUI Constraint. The case of the Controller Cross-Over where the transformation *Since–When–While* Deletion is involved also provides motivation for the mentioned node qualification in the formulation of the Controller Cross-Over Constraint being motivated here. Lakoff (1970) argues for the transformation ADVERB PREPOSING which distinguishes the derivations of the two versions of (40).

(40) (a) John$_i$ hasn't seen Marsha$_j$ since $\left\{\begin{matrix}\text{he}_i\\ \text{she}_j\end{matrix}\right\}$ left home.
(b) Since $\left\{\begin{matrix}\text{he}_i\\ \text{she}_j\end{matrix}\right\}$ left home, John$_i$ hasn't seen Marsha$_j$.

The effect of the ADVERB PREPOSING transformation is to permute the adverbial clause with the main clause, moving the former to the left. While the conditions for this transformation are more complex, this amount of information suffices for our purposes. The same results obtain in the case of derivations in which *Since–When–While* Deletion has occurred.

(41) (a) John hasn't seen Marsha since leaving home.
(b) Since leaving home, John hasn't seen Marsha.

Notice that in the case of (41b) the rule of ADVERB PREPOSING has applied, moving the clause which includes the deleted position over the controller; yet the result is well-formed. We see, then, that the crossing of a controller and the deleted position is not sufficient to cause a deviancy, but rather the movement transformation involved must mention and move the controller node itself across the deleted position. The interaction of the *Since–When–While* Deletion transformation, the PASSIVE, and ADVERB PREPOSING, provides an interesting case in itself.

(42) (a) Marsha hasn't been seen by John$_i$ since shaving himself$_i$.
(*b) Since shaving himself$_i$, Marsha hasn't been seen by John$_i$.

If the Controller Cross-Over is to account for the ill-formedness of (42b), then the order must be PASSIVE>ADVERB PREPOSING. This is consistent with the arguments in the literature.

Case IV

The coreferential deletion transformation, *In Order To* Deletion, provides additional evidence of the generality of the Controller Cross-Over Constraint. This transformation applies to intermediate structures of the types suggested by (43a) removing the subject of the *In Order To* clause and thus yielding (43b).

(43) (a) Donna touched Ned in order that she might get his attention.
(b) Donna touched Ned in order to get his attention.

Since the derivation of the surface structure (43b) includes an application of the coreferential deletion transformation under discussion in which the underlying subject served as controller, the constraint predicts that in the surface structure resulting from a derivation identical to this one, except for the additional application of the movement transformation, the PASSIVE will be ill-formed.

(44) *Ned was touched by Donna in order to get his attention.

The prediction is again accurate. In my dialect, the PASSIVE version of the string (43a) is well-formed.

(45) Ned was touched by Donna in order that she might get his attention.

This contrast in grammaticality demonstrates the necessity to distinguish cases of Cross-Over between a controller and the node which it served as controller for, and cases of Cross-Over between two coreferential nodes not related by the controller relation, that is, not involved in a coreferential deletion transformation. Obviously, the PASSIVE/EQUI Constraint is not available as the transformation EQUI has not applied in the derivation of (44).

Cases I-IV show that the Cross-Over phenomenon for controllers is perfectly general across the set of coreferential deletion transformations. Since the PASSIVE /EQUI Constraint specifically mentions the interaction of the PASSIVE with the single coreferential deletion transformation, EQUI-NP DELETION, it fails to capture the generalization that the entire set of such transformations behaves the same with respect to their inclusion in a derivation which contains an application of the PASSIVE. Further, an examination of Cases I, III, and IV reveals that the coreferential nodes being crossed in the application of the PASSIVE are neither clause mates nor peers. Thus, as pointed out in the original cases of the PASSIVE/EQUI interaction, Postal's formulation of the general Cross-Over Constraint does not include these cases as the movement rule involved, the PASSIVE, is a constant movement transformation. The form of the Controller Cross-Over being motivated here, (24), suggests that crossing violations should occur when any arbitrary permutation rule applies to move a mentioned node which has served as controller across the position of the deleted term. That is, not only may we generalize from the EQUI-NP DELETION transformation to the set of all coreferential deletion transformations, but similarly, we should be able to generalize from the single permutation rule, the PASSIVE, to the full set of permutation rules.

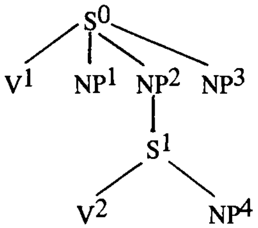
OTHER PERMUTATION RULES

The set of permutation rules which is potentially involved in testing the constraint is quite large, and includes the following:

INDIRECT OBJECT MOVEMENT
About MOVEMENT
PSYCH MOVEMENT
Wh-Q MOVEMENT
Wh-REL MOVEMENT

The first and last transformations on the list may be dropped, as neither appears to shed any light on the phenomenon. In the case of the transformation INDIRECT OBJECT MOVEMENT, in order to test the constraint, it would be necessary to find a structure of the following shape.

(46)



where the sequence NP^2–NP^3 is subject to the transformation INDIRECT OBJECT MOVEMENT and NP^3 has served as the controller for the application of a coreferential deletion transformation in which the node NP^4 is eliminated; thus NP^3 and NP^4 are stipulated coreferents.

I have not succeeded in constructing such a case. The two separate surface verbs *advise* and *recommend* as in (47) display all the properties for the test except, of course, they are distinct lexical items.[11]

(47) (a) Max advised Voy to leave.
 (b) Max recommended leaving to Voy.

What is required is that there be one single verb whose oblique argument nodes are interchangable in the way the order in (47) depicts. The fact that there appears to be no single lexical item with these properties is itself interesting. The transformation *Tough* MOVEMENT (cf. Postal,1968, for discussion) can be eliminated from the list by the simple observation that the node which is moved by the transformation is raised into a higher clause, and the set of constituents which lies in its movement path could not include a node whose term has been deleted under coreference with the moving node, as the controller in coreferential deletion transformations must minimally command the term being deleted.[12] We may now consider the remaining cases.

Case V

The transformation *About* MOVEMENT is the transformation relation which distinguishes the derivations of the two sequences of (48).

(48) (a) David talked to Mildred about Tom.
 (b) David talked about Tom to Mildred.

Using an embedded reflexive to the reference, we can construct the relevant examples for testing the constraint.

(49) (a) $David_i$ talked to Mildred about perjuring $himself_i$.
(b) David talked to $Mildred_i$ about perjuring $herself_i$.

Given the formulation of Controller Cross-Over, we may predict that the string resulting from the application of *About* MOVEMENT to the (a) version will be acceptable since no crossing of coreferential nodes will occur; the result of the application of that transformation to the (b) version will be unacceptable, as the controller *Mildred* will move across the coreferential node for which it served as controller (the node which dominates the term which was the underlying subject of the predicate *perjure*).

(50) (a) $David_i$ talked about perjuring $himself_i$ to Mildred.
(b) David talked about perjuring $herself_i$ to $Mildred_i$.

Interesting enough, in one dialect there is a distinction between the ungrammatical (b) sequence of the above pair and (51).

(51) David talked about her_i perjuring $herself_i$ to $Mildred_i$.

In this dialect, the sequence (51) is judged to be well-formed. I find both versions of the verb *perjure* ill-formed, with or without the deletion of the subject argument, but the non-deleted form (51) is somewhat better. This correlates in my dialect with the fact that the non-*About* MOVEMENTed form is of the same acceptability as (51), that is, the sequence (52).

(52) David talked to $Mildred_i$ about her_i perjuring $herself_i$.

In other words, the deletion of the subject argument of the predicate *perjure* is required in my dialect for the resultant surface structure to be of full grammaticality. The fact that the crossed and non-crossed versions of the non-deleted forms are of equal grammaticality shows clearly that the set of conditions regarding Cross-Over violation (where the relation of coreference is established in the surface structure by deletion) is different from the set of conditions regarding Cross-Over violations (where the coreference relation is established by pronominalization).[13]

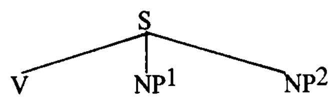
Case VI

Postal has argued for the existence of a transformation which applies in the derivations of the sequences of (53).

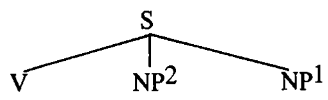
(53) (a) Sam is annoying to me.
(b) Sue is frightening to Sam.
(c) Sam is irritating to Sue.

The sequences of (53), under the transformation of PSYCH MOVEMENT as formulated by Postal, would be derived from more remote structures such as those suggested by (54a).

(54)

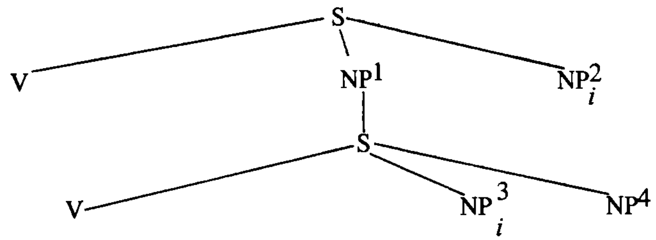


(b)



The structure in (54b) is related to the structure (54a) by the transformation PSYCH MOVEMENT. The claim is that the transformation interchanges the two NP nodes, thus affording the possibility of testing the constraint. Given structures of the form (55), the constraint predicts the ungrammaticality of the surface string resulting from the application of both EQUI-NP DELETION and PSYCH MOVEMENT.

(55)



(56) (?a) His$_i$ being required to defend himself$_i$ with a toothbrush was frightening to Sam$_i$.
(?*b) Being required to defend himself$_i$ with a toothbrush was frightening to Sam$_i$.

(57) (?a) Her$_i$ washing herself$_i$ is annoying to Marge$_i$.
(?*b) Washing herself$_i$ is annoying to Marge$_i$.

The unacceptability of the (a) versions can be attributed to the failure to apply the required deletion transformation. However, the fact that the derivation does not include a coreferential deletion transformation between the nodes crossed by PSYCH MOVEMENT makes the Controller Cross-Over inapplicable in these cases. The (b) versions have an ill-formedness attributable to the Controller Cross-Over; these are, in my dialect, distinctly worse than the (a) sequences, paralleling the fact noted in Case V. Compare the (b) strings of (56) and (57) with the superficially similar strings (58a and b).

(58) (a) Being required to defend himself$_i$ with a toothbrush frightened Sam$_i$.
(b) Washing herself$_i$ annoyed Marge$_i$.

These latter strings have derivations which do not include an application of PSYCH MOVEMENT. The above facts are consistent with Controller Cross-Over, but with none of the other constraints. G. Lakoff (personal communication) has pointed out what appear to be counter-examples to the Controller Cross-Over Constraint; namely, (59).

(59) (?a) Winning the election was surprising to me.
(?b) To win the election would be surprising to me.

Contrast these two with the pair (60).

(60) (*a) Winning the election was surprising to Max.
(*b) To win the election would be surprising to Max.

In judging the relative grammaticality of these strings, one can compare them to the perfectly well-formed sequenes of (61).

(61) (a) Winning the election surprised $\begin{Bmatrix} \text{me} \\ \text{Max} \end{Bmatrix}$.

(b) To win the election would surprise $\begin{Bmatrix} \text{me} \\ \text{Max} \end{Bmatrix}$.

I agree with Lakoff's intuition that the strings of (59) are much better than any of the other examples that we have seen thus far which are violations of the Controller Cross-Over Constraint.

Perhaps this is attributable to the fact that there is a controller other than the one crossed available in the case of (59) but not (60). In the case of the tree structure underlying the strings of (59), the highest predicate is the performative which includes as one of its arguments the node which dominates the argument *I*. This node is coreferential with both the deleted subject of the predicate *win* and the surface object of the preposition *to* in the Verb Phrase *surprising to*. In the case of the sequences of (60), there is no additional possible controller node coreferential with the two crossed nodes which may be appealed to. While these remarks are certainly no explanation, it seems to me that a principled explanation will mention such a difference. The examples (59) remain, then, somewhat problematic.

Cases VII and VIII

The permutation transformations WH-Q MOVEMENT and WH-REL MOVEMENT behave in perfect parallel with respect to Controller Cross-Over, and thus may be collapsed for purposes of discussion. The relevant cases are those presented in (62).

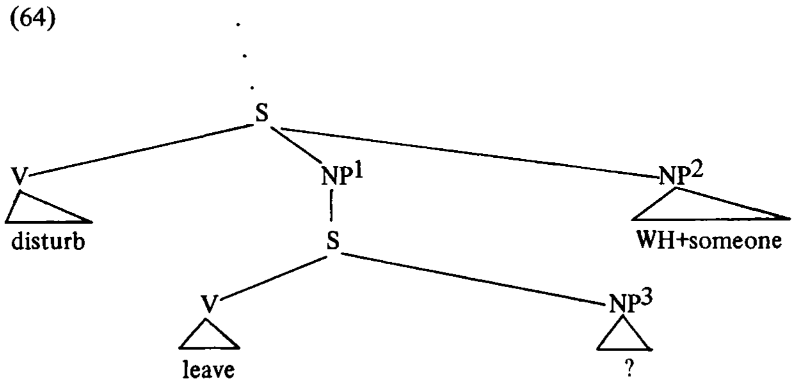
(62) (*a) Who did leaving disturb?
(*b) I know a man who leaving disturbed.

These rather hopeless strings contrast with the structurally parallel sequences of (63).

(63) (a) Who did Martha's leaving disturb?
(b) I know a man who Martha's leaving disturbed.

All of the above strings contain a sub-tree of the structure displayed by (64).

(64)



The strings of (62) differ from those of (63) in that the NP^2 node in the former set is coreferential with the NP^3 node for which it serves as controller. On the other hand, the indices on the NP^2 and NP^3 nodes in the underlying structure of the strings of (63) do not match; hence, the NP^2 node is never involved in a coreferential deletion transformation as a controller. The subsequent application of the permutation rules of WH-Q MOVEMENT – the (a) versions of the strings (62) and (63) – and WH-REL MOVEMENT – the

(b) versions of (62) and (63) – fronts the NP^2 node, causing it to cross a set of constituents which includes the NP^3 node. When the NP^2 serves as controller for the removal of the term dominated by the NP^3 node, the resultant string, as predicted by the Controller Cross-Over Constraint, is ill-formed, as in (62).[14] In the case where no coreferential deletion transformation has linked the nodes NP^2 and NP^3, as in (63), no violation occurs, and the resultant strings are perfectly well-formed. This pattern obviously supports the constraint being proposed here.

SOME ADDITIONAL DATA

Case IX

Although reflexives are one of the most carefully studied grammatical phenomena in English, a completely general account of reflexive forms has yet to be proposed. One of the areas of difficulty is that of Picture NP Reflexivization. In the previous chapter, I argued that the generalized EQUI-NP DELETION was involved in the derivation of sentences such as (65).

(65) (a) John_i showed Max_j the picture of $\left\{\begin{matrix}\text{himself}_i \\ \text{himself}_j\end{matrix}\right\}$.

(b) Marie_i gave Mathilde_j the photograph of $\left\{\begin{matrix}\text{herself}_i \\ \text{herself}_j\end{matrix}\right\}$.

Specifically, it was argued that the NP arguments (*John* and *Max*, and *Marie* and *Mathilde*) served as controllers for the deletion of the subject term of the abstract predicates underlying the surface nominals *picture* and *photograph*. If this account is correct, then the Controller Cross-Over Constraint predicts in such cases that the PASSIVE will fail to preserve the ambiguity of the active form. That is, the PASSIVE moves the subject NP node to the end of clause, and the reading on which that argument node serves as controller is rendered impossible. The predicted results obtain, as a consideration of (66) shows.

(66) (a) Max_i was shown the picture of $\left\{\begin{matrix}\text{himself}_i \\ \text{*himself}_j\end{matrix}\right\}$ by John_j.

(b) Mathilde$_i$ was given the photograph of $\left\{\begin{matrix} \text{herself}_i \\ \text{*herself}_j \end{matrix}\right\}$ by Marie$_j$.

Case X

Both the original observation by R. Lakoff and the first reformulation, the PASSIVE/EQUI Constraint (10), have limited the set of sentences handled to those where the lexical item involved has selected a *for – to* complementizer. Obviously, the Controller Cross-Over formulation is not so limited, being a much more general statement dealing with the set of possible configurations which may hold between coreferential nodes in a tree structure. Thus, the latter analysis automatically accounts for the deviancy of (67b) but allows (68b). The previous statements are inapplicable, being restricted as they are to *for – to* complementizers.[15]

(67) (a) Charlie$_i$ resented being forced to testify against himself$_i$.
(*b) Being forced to testify against himself$_i$ was resented by Charlie.

(68) (a) Charlie resented Mary$_i$'s being forced to testify against herself$_i$.
(b) Mary$_i$'s being forced to testify against herself$_i$ was resented by Charlie.

Case XI

G. Lakoff (1970) has pointed out that simple structures with the surface matrix verb *want* are unusual in that they support conflicting tense specifications.

(69) (a) Maxine want*ed* the car *tomorrow*.
(b) Kate want*ed* the rally *next Thursday*.

Lakoff argues that such facts, supported by the semantics of the strings, indicate an underlying structure such as the one suggested by the sequences of (70).

(70) (a) Maxine wanted to have the car tomorrow.
(b) Kate wanted to have the rally next Thursday.

The hypothesis, then, is that the derivation of the strings of (69) involves a more remote structure of the kind displayed more directly by the strings of

(70). More interesting for our present purposes is the fact that if this hypothesis were correct, then the derivation of (69) involves the application of the coreferential deletion transformation EQUI-NP DELETION between the underlying subject of the predicate *want* and the subject of the predicate embedded immediately below *want*. This hypothesis plus the Controller Cross-Over Constraint then explain the otherwise ad hoc fact that the effect of the PASSIVE on the arguments of the predicate *want* invariably yields an ungrammatical string.

(71) (*a) The car was wanted by Maxine tomorrow.
(*b) The rally was wanted by Kate next Thursday.

Case XII

The general area of nominalization provides the next example for the motivation of the Controller Cross-Over Constraint. Consider, for example, the interpretation of the sentences of (72).

(72) (a) Henry remembers arguing with Tom.
(b) Henry remembers the argument with Tom.
(c) Henry_i remembers that he_i argued with Tom.
(d) Henry_i remembers his arguing with Tom.
(e) Henry_i remembers his argument with Tom.

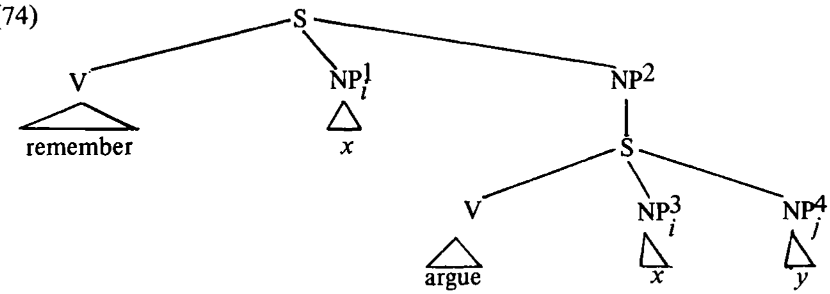
The application of the PASSIVE to the derivations underlying the strings of (72) gives the following set.

(73) (*a) Arguing with Tom was remembered by Henry.
(*b) The argument with Tom was remembered by Henry.
(c) That he_i argued with Tom was remembered by Henry_i.
(d) His_i arguing with Tom was remembered by Henry_i.
(e) His_i argument with Tom was remembered by Henry_i.

The transformational hypothesis regarding the derivation of the surface strings of (72) is that they proceed from a more remote structure like that of (74).

It is crucial that the proper structural configuration for the application of the transformation EQUI-NP DELETION obtains between the nodes NP^1 and NP^3. An examination of the surface realizations of (72) shows that the option of deleting the term under the NP^3 node has been exercised only in the case of the (a) and (b) strings. Correlated with this fact is the observation

(74)



where x = Henry, and y = Tom

that it is just the PASSIVE transforms of these two strings which are ill-formed, namely, (73 a and b). The Controller Cross-Over Constraint predicts this deviancy just in case the derivation of the surface structures (73 a and b) includes the application of a coreferential deletion transformation which eliminates the subject argument of the underlying predicate *argue*, the node NP^3 in the tree structure (74).

Case XIII

Roderick Jacobs has pointed out a particularly unusual case of deletion involving the deletion of an embedded object under coreference with a dominating controller.

(75)

(a) Sam_i resented Mary's { kissing / hugging / punching / poking / kicking / . . . } him_i.

(b) Sam resented Mary's { kissing / hugging / punching / poking / kicking / . . . }

It is clear that on one reading of the (b) versions above the deleted object argument of the embedded predicate *kiss, hug,...* is coreferential with the subject argument of the predicate *resent*. Now, consider the contrast in grammaticality between the (a) and (b) versions of (76).

(76)
(a) Mary's {kissing / hugging / punching / poking / kicking / . . .} him_i was resented by Sam_i.

(*b) Mary's {kissing / hugging / punching / poking / kicking / . . .} was resented by Sam.

That is, on the reading where the missing object term is to refer to the same individual as the object of the surface preposition *by*, the strings are clearly ill-formed. Again, the Controller Cross-Over Constraint predicts this ill-formedness.

Case XIV

In a paper presented at the 1970 Winter Meeting of the LSA, Postal argued for the existence of a transformational relation called Phrase Extinction for the following pairs.

(77) (a) The United States exploits nations allied to the United States.
(b) The United States exploits allied nations.

(78) (a) The woman in the front seat kissed the person next to the woman in the front seat.
(b) The woman in the front seat kissed the next person.

(79) (a) Max helped the man who was closest to Max.

(b) Max helped the closest man.

If Postal is correct both about the transformational relation hypothesized, and about the structure and contents of the more remote structures (the (a) versions of the above pairs), then it is clear that the derivations of the (b) versions involve the deletion of a nominal under identity with the nominal occupying the surface subject position in the above surface structures. If this is the case, the Controller Cross-Over Constraint predicts that the application of a movement transformation which causes a reversal of the controller and the position of the phrase which is deleted will result in an ill-formed string. Applying the PASSIVE to the above structures results in the following structures.

(80) (≠ a) Allied nations are exploited by the United States.
(≠ b) The next person was kissed by the woman in the front seat.
(≠ c) The closest man was helped by Max.

I have used the symbol ≠ to indicate the fact that the resultant surface structure cannot be understood to mean the same as the non-passivized versions. Specifically, the string (80a), if interpretable at all, does not allow the interpretation which is available in the case of (77); that is, the *allied nations* mentioned in (80a) cannot be understood to be nations allied to the United States; rather the allied nations are nations allied to some other appropriate nominal which is not mentioned in the surface structure of (80a). Results parallel to this obtain in the case of (78) and (79) with respect to the relational terms *next* and *closest*. This failure to maintain the same set of referential possibilities in the case of two derivations from the same underlying structure is accounted for by the Controller Cross-Over Constraint.

Case XV

The grammar of inalienable possession (cf. Fillmore,1968, for a fuller discussion) offers a final confirming case of the constraint being motivated. In the discussion of this portion of English grammar, it is pointed out that strings like (81) are understood to involve inalienably possessed items.

(81) (a) Martha lost a leg.
(b) Bonsall cracked a vertebra.

The notion involved is the fact that the leg referred to in (81a) and the vertebra mentioned in (81b) are usually understood to be inalienably possessed by the individuals named in the strings, *Martha* and *Bonsall*, respectively.

Semantically, it is plausible to derive the sentences of (81) from the more remote structures of the form which is suggested by the strings of (82).

(82) (a) Martha lost a leg {of Martha's / which Martha had}

(b) Bonsall cracked a vertebra {of Bonsall's / which Bonsall had}

If this is correct, then obviously the derivation of the surface structures of (82) involves the deletion of coreferential terms under identity with the surface subjects of the above clauses. Once again, the prediction by the Controller Cross-Over Constraint is that the PASSIVE versions will be ill-formed. Thus, corresponding to the surface structures of (82), we have:

(83) (*a) A leg was lost by Martha.
(*b) A vertebra was cracked by Bonsall.

The resultant sequences are ill-formed on the interpretation that the leg and the vertebra being referred to are inalienably possessed. The only well-formed interpretation for (83a), for example, is that the leg lost by Martha was one which was not normally attached to her; in the case of (83b), the vertebra referred to is not in the set of vertebrae which comprises Bonsall's backbone (if any).

SUMMARY

I have presented a number of phenomena which support the Controller Cross-Over Constraint (24). The particular phenomena reported here were selected on the basis of their consistency with the formulation of the Controller Cross-Over Constraint, and concomitant inconsistency with either the formulations offered by Lakoff (1) (revised to 10) or Postal (23), or both. I know of no counter-examples to the constraint. It should be pointed out that while the statement of the constraint (24) unequivocally has the form of a Global Derivational Constraint as defined by Lakoff (1969), this appearance is totally misleading. It will be shown in the concluding chapter (Chapter 7) that a principled statement of this phenomenon is beyond the power of a Global Derivational Constraint; rather a constraint which requires reference to other derivations is required to make an accurate statement of the Controller Cross-Over Constraint.

NOTES

1. I mean the phrase *underlying subject node* in the sense of the functional definitions presented by Chomsky (1965): the node identified by the notation [NP;S] when applied to the Deep Structure, again in the *Aspects* sense. The term *underlying subject of a predicate* has yet, to my knowledge, to be reconstructed in the Generative Semantics framework.
2. I doubt that this is the case; rather it seems that the semantics of the two predicates *beg* are so divergent that they cannot be so directly related. Paul Chapin maintains that (8b) is ambiguous in his dialect with either nominal serving as controller. The prediction for this dialect would be that the PASSIVE form is unambiguous, with the underlying oblique NP (*Rick*) being understood as the controller. This prediction is accurate for the dialect in question.
3. The distinction is clearly presented in Chomsky (1965).
4. The set of verbs which do not allow the passivized subject node immediately after the verb is, roughly, the set of double object verbs which undergo INDIRECT OBJECT MOVEMENT. Simply by assuming the formulation of the PASSIVE (13), I have done nothing to explain how the two surface orders, the (b and c) versions of (5) through (7), are to be derived, but only how the sequences (11c) and (12c) are to be excluded. Ross (1967) and Postal (1968b) have discussed structures quite similar to these. Ross, for example, cites examples such as:

(*i*) (a) He attributed the fire to a short circuit.
(*b) He attributed to a short circuit a fire.

but

(*ii*) (a) He attributed the fire which was still raging to a short circuit.
(b) He attributed to a short circuit the fire which was still raging.

In general, the difference between (*i*b) and (*ii*b) has been attributed to the fact that the NP *the fire* in the first case is a simple NP, but in the second case is a *heavy* NP (that is, complex in the sense that it has an attached relative clause). The strings are usually thought to be related by the transformational process called HEAVY NP DRIFT (Postal, 1968:120) which arranges the elements of the VP from left to right by heaviness (cf. Bever, 1970, for a competing explanation). The double surface form possibility exhibited by the sequences of (5) through (7) might then be accounted for by this permutation transformation. However, note that the analogue of (*ii*b), (*iii*b) is still not grammatical.

(*iii*) (a) David was sold a bank which was solvent by Nelson.
(*b) David was sold a bank which was solvent.

If HEAVY NP DRIFT is to account for the variants of (5) through (7), but exclude (*iii*b), it must be sensitive to the difference between NP with relative clauses (*a bank which was solvent*) and sentential fragments (*to leave*).
5. Actually, I suspect that the specification that the PASSIVE, a right movement rule, moves the node to the end of clause is redundant. Rather, as Ross has pointed out, there is a universal constraint that the set of all right movement rules is subject to, namely, that they are clause bounded. If so, then it is possible to further argue that all right movement rules, in addition to being clause bounded, invariably move the element involved to the end of clause. I will not attempt to make the argument here.
6. The lexical item *promise* is one of the few which violate Rosenbaum's principle of minimal distance (cf. Rosenbaum, 1965, for a discussion). Contrast its behavior with that of *beg* in (8), for example.
7. By mentioned node, I mean any node that corresponds to one of the terms of the structural index of the transformation when the string containing that node is properly

analyzed with respect to the transformation. Cf. Postal, 1968b, and Ross,1967, for discussion. Motivation for this qualification is provided by Case II, for example.

8. I keep the *BY* Subject Deletion distinct from the *Since–When–While* Deletion as in the former there is a requirement that the subject of the *by* phrase and the subject of the highest main clause predicate be coreferential; this is not true of the latter. Thus (*ii*) is possible, but not (*i*).

(*i*) *John irritated Mary by Harry's ignoring her.

(*ii*) John hasn't seen Mary since Max left home.

This was pointed out in Postal (1966), under the title of Horrors of Identity.

9. This account assumes, of course, that the complex NP *Pete's hat* is moved to the left. If, on the other hand, one were to claim that the preposition is moved (*off* $\emptyset$), no appeal to the mentioned condition would be necessary, and the data would be consistent with the constraint as formulated.

10. The sentence (36a) is judged by many speakers to be ill-formed. This same set of speakers accept the sentence (37a) as well-formed. The latter is, of course, the passive transform of the former. There are two explanations for this pattern. First, one might interpret this as showing that the deletion transformation in question (*Since–When–While* Deletion) is sensitive to the condition that the controller must occupy surface subject position for its application. Further, under this interpretation, the deletion transformation must be ordered subsequent to the PASSIVE. A second possible explanation would be that the string (36a) is actually well-formed for the set of speakers under discussion, but that the performance factors are so strong as to mask the grammatical well-formedness. On this version, the application of the PASSIVE in violation of the Controller Cross-Over Constraint, removes the possibility that the deep subject can be interpreted as the controller, thus leaving the underlying oblique nominal as the only candidate.

11. I am unsure of my judgement on coreferentiality between the subject of *leaving* and the object of the preposition *to* in the sequence (47b). I believe only the unspecified *one* interpretation is possible.

12. Actually, there is a possibility that a crossing violation could occur. It would be a case where the predicate with which the NP node moved by *Tough* MOVEMENT is associated has a sentential argument in subject position, and the moved NP and the subject of the sentential subject are related by right-to-left or backwards EQUI-NP DELETION. Apparently, the set of predicates which allow EQUI into sentential subject nodes and the set of predicates which govern *Tough* MOVEMENT are disjoint. Another movement transformation, RAISING or IT REPLACEMENT, is not listed in the text, as it also does not provide any examples which bear on the constraint.

13. This is the major way in which Controller Cross-Over differs from Postal's Cross-Over VI. That is, the crossing of controllers and the nodes which they serve as controller for is subject to a more stringent general constraint than pronouns and their antecedents. The former case, Controller Cross-Over, is more general in that there is no necessity to reconstruct the notions of clause mate and peer, nor is it necessary to distinguish between Constant and Variable Movement transformations.

14. Similar to the facts noted in cases V and VI, the Cross-Over cases involving the WH-MOVEMENT transformations are more acceptable just in case the deletion has not occurred. Paralleling the strings (62 a and b), we have:

(*i*) (?a) Who$_i$ did his$_i$ leaving disturb?
(?b) I know the man$_i$ who$_i$ his$_i$ leaving disturbed.

These above sequences, while not well-formed in my dialect, are somewhat better than those of (62).

15. A particularly nice case where a *POSS – ING* complementizer is involved is (*i*).

(*i*) (*a) { Flying / Horseback riding / Handball / . . . } was tried by Max.

(b) { Flying / Horseback riding / Handball / . . . } was discussed by Max.

In the (a) versions, since the *ing* form is embedded under the predicate *try* which requires that the subject of the predicate embedded immediately below the coreferential with its subject (cf. Perlmutter, 1968), there is no question but that the Controller Cross-Over Constraint is relevant. In the (b) versions, no such constraint is involved with the predicate *discuss*, and correspondingly, my understanding of these strings is that the subjects of the *ing* forms are the general unspecified argument *one*. Specifically, Max's flying, horseback riding, handball,... cannot be the thing which Max is reported to be talking about.

6

IDENTITY OF SENSE DELETION

In this chapter I will discuss the third type of deletion mentioned in the introduction, Identity of Sense (IS). *IS* is the type of deletion involved in the relation between the (a) and (b) strings of (1).

(1) (a) Jack blew up a train and Max blew up a train, too.
(b) Jack blew up a train and Max did, too.

The missing VP in the second conjunct of (1b) is understood to be the phrase *blew up a train*; it is interpreted exactly parallel, term for term, to the overt VP of the first conjunct. There are several obvious reasons to distinguish this type of deletion from that type of deletion usually referred to as coreferential deletion. Notice, first, that the phrase *blew up a train* is not nominal in form, but rather seems to be a description of some activity. It is not obvious what interpretation the referential indexing of such a linguistic object would have. Secondly, both the controller phrase – the VP of the first conjunct – and the missing VP of the second conjunct are interpreted in such a way as to include a term which in the former has the overt surface form of a nominal, specifically, the NP *a train*. While it is conceivable that the train referred to by the overt nominal of the first conjunct of (1b) is the same entity as the one understood to be included in the missing VP in the second conjunct, the most common interpretation of the string is that where the two trains being described are distinct entities. In the sequences of (2) the situation is unambiguous; for example, there is only the interpretation where the minds being referred to are distinct.

(2) (a) Jack lost his mind and Max lost his mind, too.
(b) Jack lost his mind and Max did, too.

The point is that even if one were to entertain extending the notion of reference to the constituent VP, giving it a principled interpretation, the fact that the *trains* in the case of (1b) and the *minds* in (2b) refer to different entities shows that the VP involved may not have the same referential index, since one of the terms in the first VP bears a different referential index than its counter-part in the second. These observations are sufficient to distinguish this process from the process of coreferential deletion. The fact that the missing VP of the second conjunct of (3b) is interpreted parallel to the overt VP of the first conjunct shows that the notion of controller of parallel identity structure must be reconstructed for IS; this feature distinguishes it from the so-called free deletion case.

(3) (a) Voy wanted to split and Gordon wanted to split, too.
(b) Voy wanted to split and Gordon did, too.

Some Properties of the IS Transformations Purposed

The following IS transformations have been proposed in the literature to date.

(4)	VP Deletion	(Ross,1967,1969), (Lakoff,1968), (Grinder and Postal,1970)
	Sluicing	(Ross,1969)
	Gapping	(Ross,1966), (Jackendoff,1970)
	Comparative	(Ross,1967)
	Equative Deletion	(Ross,1966)
	Answer Deletion	(Pope,1971)
	Partial Deletion	(Burt,1969)[1]
	S Deletion	(Lakoff,1966), (Postal and Grinder,1971)

The following pairs of strings exemplify the transformations listed:

(5) (a) Brent drank a bottle of coke and Mary drank a bottle of coke, too.
<VP Deletion>
(b) Brent drank a bottle of coke and Mary did, too.

(6) (a) I know that someone here plays tennis, but I don't know who here plays tennis.
<Sluicing>
(b) I know that someone here plays tennis, but I don't know who.

(7) (a) Max ordered spinach and Tom ordered beans.
<Gapping>
(b) Max ordered spinach and Tom, beans.

(8) (a) Jennifer yells louder than Erica yells.

<Comparative>

(b) Jennifer yells louder than Erica.

(9) (a) Jane talked to someone who I'd like to meet: she talked to the man who invented laughter.

<Equative Deletion>

(b) Jane talked to someone who I'd like to meet: the man who invented laughter.

(10) (a) Do you like swimming? Yes, I like swimming and diving.

<Answer Deletion>

(b) Do you like swimming? Yes, and diving.

(11) (a) After she met Bob, Sue met Sam.

<Partial Deletion>

(b) After Bob, Sue met Sam.

(12) (a) Mary believes that the moon is made out of mescaline, and I believe that the moon is made out of mescaline, too.

<S Deletion>

(b) Mary believes that the moon is made out of mescaline, and I believe it, too.

PROPERTY I – ESSENTIAL VARIABLES[2]

The above set of transformations may be partitioned into two sets – one of which includes all the above transformational relations which have an essential variable in their structural index at a position between the controller or parallel identity structure and the term(s) to be deleted. In terms of surface structure possibilities, the occurrence of an essential variable at the position mentioned is reflected by the well-formedness of strings where an entire clause intervenes between the zero anaphor and the term(s) that serve as the parallel identity structure from which the zero anaphor receives its interpretation in that surface structure. The following pairs demonstrate that the transformations VP Deletion, Sluicing and S Deletion must contain an essential variable.

(13) (a) Brent drank a bottle of coke and *I think* that Mary drank a bottle of coke, too.

<VP Deletion>

(b) Brent drank a bottle of coke and *I think* that Mary did, too.

(14) (a) Brent drank a bottle of coke and *Sue knows that I think* that Mary drank a bottle of coke, too.
(b) Brent drank a bottle of coke and *Sue knows that I think* that Mary did, too.

(15) (a) I know that someone here plays tennis, but *I don't know* who here plays tennis.
<Sluicing>
(b) I know that someone here plays tennis, but *I don't know* who.

(16) (a) I know that someone here plays tennis, but *Sue says that I don't know* who here plays tennis.
(b) I know that someone here plays tennis, but *Sue says that I don't know* who.

(17) (a) Mary believes that the moon is made of mescaline, and *I believe* that the moon is made of mescaline, too.
<S Deletion>
(b) Mary believes that the moon is made of mescaline, and *I believe* it, too.

(18) (a) Mary believes that the moon is made of mescaline and *Sue thinks that I believe* that the moon is made of mescaline, too.
(b) Mary believes that the moon is made of mescaline and *Sue thinks that I believe* it, too.

The italicized elements in the above strings identify the contents of the clause which intervenes between the parallel structure and the deleted term. Notice that in all the above cases the deletion is affected without introducing any deviancy. This situation contrasts with that of the following pairs where the (a) version (no deletion involved) is perfectly grammatical, but the (b) version which results from the application of the deletion transformation, indicated over an essential variable, is ill-formed.

(19) (a) Max ordered spinach and *I think* that Tom ordered beans.[3]
<Gapping>
(*b) Max ordered spinach and *I think* (that) Tom, beans.

(20) (a) Jennifer yells louder than *the newspaper claims* that Erica yells.
<Comparative>
(*b) Jennifer yells louder than *the newspaper claims* (that) Erica.

(21) (a) Jane talked to someone who I'd like to meet: *Michael said* that

she talked to the man who invented laughter.
<Equative Deletion>
(*b) Jane talked to someone who I'd like to meet: *Michael said* (to) the man who invented laughter.

(22) (a) After *she said* that she met Bob, Sue met Sam.
<Partial Deletion>
(*b) After *she said* (that) Bob, Sue met Sam.

(23) (a) Do you like swimming? Yes, *I think* that I like swimming and diving.
(*b) Do you like swimming? Yes, *I think*, (that) and diving.

The deviancy of the (b) versions of the above pairs shows that this set of transformations differs in terms of the material which may intervene between the identity structure and the deleting term. I will refer to the set of IS Deletion transformations which include an essential variable as Group I and to the remainder of the IS Deletion transformations listed above as Group II.

PROPERTY II – SELF-INCLUSION

In his paper at the 6th Chicago Linguistic Society meeting, Bouton presented a number of sentences of the form displayed by (24).

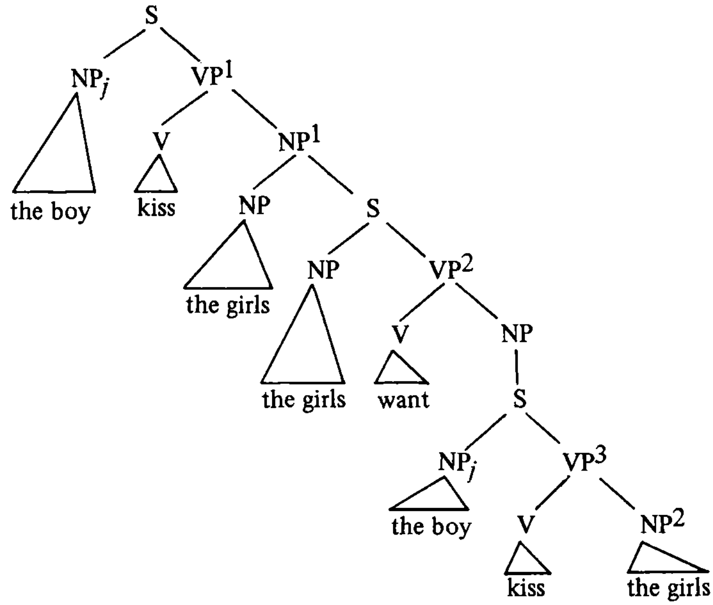
(24) (a) The boy kissed the girls who wanted him to kiss them.
(b) The boy kissed the girls who wanted him to.

(25) (a) The government official responded to the corporations who paid him to respond to them.
(b) The government official responded to the corporations who paid him to.

(26) (a) The federal grand jury indicted all the people who hoped that they would indict them.
(b) The federal grand jury indicted all the people who hoped that they would.

The startling structured characteristic of these strings is revealed if one considers the structure of the missing VP in the (b) version, and especially, its structural relationship to the parallel element which serves as its identity term for the application of the transformation VP Deletion. Consider the tree structure underlying the string (24) prior to the application of the transformation VP Deletion.

(27)



Notice, in particular, that the NP^2 which is contained in the VP to be deleted by VP Deletion is inadequately represented in the tree structure. A full representation of NP^2 is not possible without using some recursive device,[4] as the meaning of the NP^2 is clearly that of the structure dominated by NP^1 which includes NP^2 itself. In a parallel manner, the identity element for VP^3 is the VP identified as VP^1. An inspection of the tree structure shows that VP^1 contains VP^3, the element for which it serves as a parallel structure. Schematically:

(28) $\ldots[_{VP^1}$ kissed the girls who wanted him to $[_{VP^3}\ \emptyset\ ]_{VP^3}\ ]_{VP^1}\ldots$

where $[_{VP^3}\ \emptyset\ ]_{VP^3} = [_{VP^i}\ldots\ldots\ldots[_{VP^3}\ \emptyset\ ]_{VP^3}\ ]_{VP^1}$

The schema (28) clarifies why I refer to the property under discussion as *self-inclusion*; the antecedent of the null anaphor VP^3 includes the null anaphor VP^3 itself. The transformation involved in the sentences which we have been considering is one of the Group I transformations. Let us turn to another member of Group I, S Deletion. Specifically, consider the sentences in the pair (29).

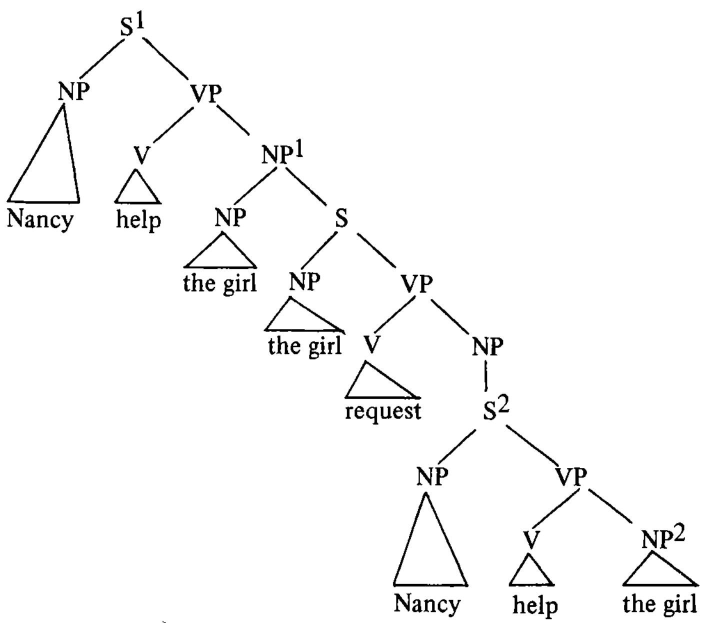
(29) (a) Nancy helped the girl who requested that she help her.
(b) Nancy helped the girl who requested it.

(30) (a) The administration listened to the people who demanded that it listen to them.
(b) The administration listened to the people who demanded it.

(31) (a) The doctor prescribed medicine for the patiens who suggested that he prescribe medicine for them.
(b) The doctor prescribed medicine for the patients who suggested it.

The structure of the tree which underlies (29) prior to the application of S Deletion is that suggested by (32).

(32)



Notice, once again, the term NP^2 which is contained in S^2 (The S to be deleted) has an incomplete representation. Its complete representation would specify that it was understood to be identical with NP^1 which includes NP^2. So too, if one attempts to specify the antecedent of the S which is deleted by S Deletion, namely, S^2, one arrives at the following schema.

(33) .....$[_{S^1}$ Nancy help the girl who request $[_{S^2}$ it $]_{S^2}$ $]_{S^1}$.....

where $[_{S^2}$ it $]_{S^2}$ = $[_{S^i}$ ....$[_{S^2}$ it $]_{S^2}$ $]_{S^1}$

Once again, we see that strings over which the transformations of Group I are defined, in this case S Deletion, allow the occurrence of the property of self-inclusion.

The situation becomes interesting as we notice that the third member of the set of Group I IS transformations is also defined for structures which allow the self-inclusion relationship to hold between antecedent structures and null anaphors.

(34) (a) People who say that I should kiss girls who claim that I don't know how to kiss them are crazy.
(b) People who say that I should kiss girls who claim that I don't know how to are crazy.

(35) (a) I know many individuals who maintain that people would attack anyone who is convinced that they don't know how to attack them.
(b) I know many individuals who maintain that people would attack anyone who is convinced that they don't know how to.

(36) (a) Tim claims that mothers who talk to FBI agents don't understand why not to talk to FBI agents.
(b) Tim claims that mothers who talk to FBI agents don't understand why not to.

The structure of the three underlying (34) prior to the deletion is that in (37).

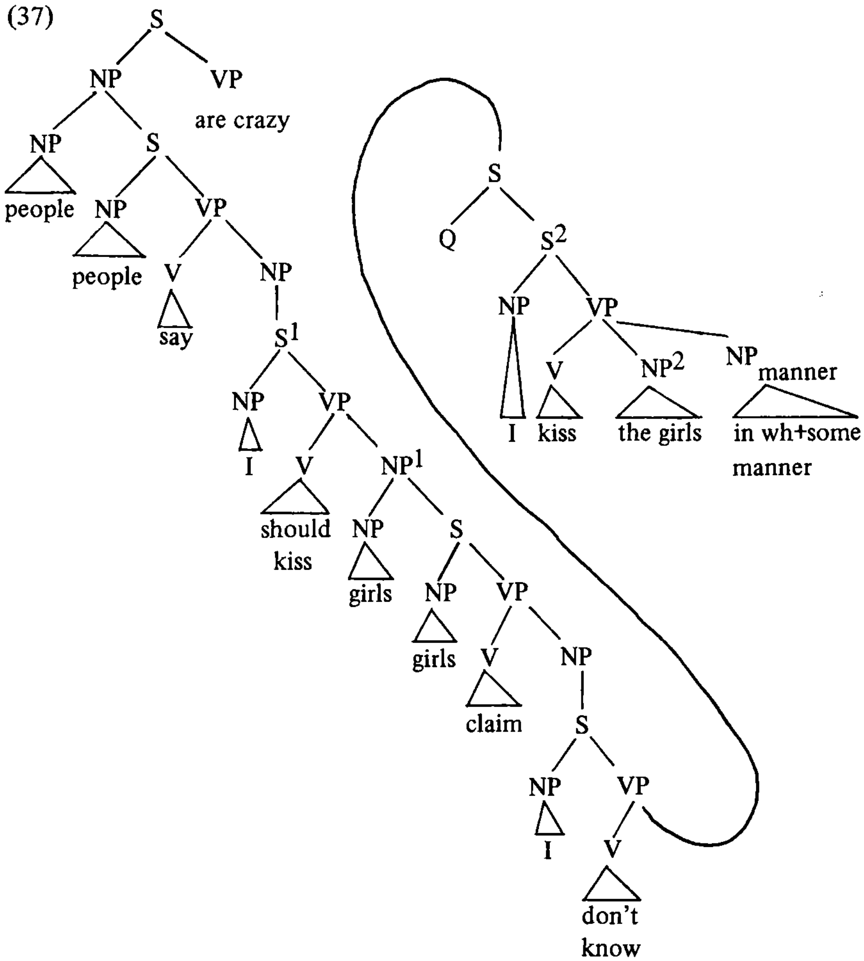
Notice that the antecedent of NP^2 is the structure dominated by NP^1. NP^1, of course, includes NP^2 as one of its constituents. Thus, once again, the representation for the dominated NP, NP^2, is necessarily incomplete. The following schema represents the relationships which hold between the antecendent/controller structure S^1 and the structure S^2 which is deleted by the Sluicing transformation.

(38) .....[I should kiss the girls who claim that I don't know how to $[_{S^2}\ \emptyset\ ]_{S^2}\ ]_{S^1}$...

where $[_{S^2}\ \emptyset\ ]_{S^2} = [_{S^i} \ldots\ldots\ldots\ldots]_{S^2}\ \emptyset\ ]_{S^2}\ ]_{S^1}$

The above discussion shows that all the transformations of Group I are defined on structures which allow the possibility of self-inclusion. We may, abstracting from the specific cases treated above, present a more rigorous

(37)



description of structures which have the property of self-inclusion.

(39) Self-inclusion for IS Transformations

A structure, s_i, may be said to possess the property of self-inclusion if and only if there exists a partition (proper analysis) of s_i, with respect to the structural index of some IS Deletion transformation, t_i, which identifies the constituents, c_i and c_j, such that:

(a) c_i is the controller/antecedent, and c_j is the term(s) to be deleted.

(b) c_i contains c_j (or equivalently, c_j is a sub-constituent of c_i).

The analysis of the above case, with respect to the definition of structures which have the property of self-inclusion, shows that, in fact, each of the structures do meet the requirements of (39).

We may now turn to the transformations of Group II in order to determine whether they too are defined for structures which possess the property of self-inclusion. The answer to this question appears to be negative. Consider the list of transformations in Group II.

(40) Group II IS Transformations
Gapping, Comparative Deletion, Equative Deletion, Answer Deletion, Partial Deletion

If we examine the structural indices of the set of transformations in (40), we find an interesting feature; namely, it appears that with the possible exception of Partial Deletion, all of the Group II transformations require that the term being deleted and the controller/antecedent be separated by a conjunction of some sort. This is, perhaps, most obvious in the case of Gapping. The typical case of Gapping involves a series of two or more conjoined clauses with identical verb forms, all but the initial verb form being deleted by the application of the rule of Gapping. Ross states: "Although rules like Gapping ..., can apply to delete the verb of an indefinitely large number of consecutive conjoined sentences,..." (1967:355).

If it is correct as Ross claims that the rule of Gapping must be formulated over a set of conjoined sentences, then it is obvious that the rule of Gapping could never apply to structures which possess the property of self-inclusion. Rather, structures which are properly analyzable with respect to Gapping would necessarily fail to meet the requirement imposed by (39c). In other words, since the controller/antecedent is separated from the term to be deleted by a conjunction, it follows that the term to be deleted could never be contained within the element which serves as its identity element.

It seems that the conjunctive term which appears between the controller/antecedent and the verb form to be deleted is an essential term in the formulation of the rule of Gapping. This can be clearly seen by considering the results of the application of the rule of Gapping to structures which meet all the requirements for the Gapping phenomenon except that of including the conjunctive term in the proper position. There are three possibilities if the terms involved in the Gapping are not separated by a conjunction: VP Complementation (41), NP Complementation (42), and Relative Clauses (43).

(41) (a) John hoped that Mary hoped that Max would leave.
(*b) John hoped that Mary that Max would leave.

(42) (a) Peter ignored the fact that Gordon ignored the fact that Shelley

was angry.

(*b) Peter ignored the fact that Gordon the fact that Shelley was angry.

(43) (a) Moira saw the man who saw Katy.

(*b) Moira saw the man who Katy.

The (b) versions of the above pairs are hopelessly ill-formed because the conjunctive term is essential for the proper formulation of the Gapping transformation. Since we have been able to show that such a term is required, we can eliminate the rule of Gapping from the discussion by appeal to the logical incompatibility of the condition (39c) and the conjunction in the structural index of the transformation Gapping. We may thus conclude that Gapping is not defined for structures possessing the property of self-inclusion.

Next consider the structural index for Equative Deletion as presented by Ross (1966:10).

(44) *Equative Deletion* (optional)

X –	NP –	Y –	: –	X –	NP –	Y
1	2	3	4	5	6	7
1	2	3	4	∅	6	∅

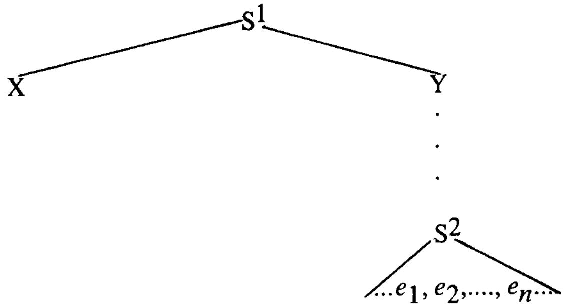
Again, we notice that the center term in the structural index is conjunctive,[5] namely, the colon. Once more, Ross' intuition about the conjunctive relation of the terms involved in the transformational process of Equative Deletion seems accurate; I have been unable to construct examples where the controller/antecedent includes the term to be deleted.

The simple observation that the process of Answer Deletion involves speech production from two separate individuals, and that the controller/antecedent terms are contained in a different production than the terms to be deleted, is sufficient to disqualify that transformation as possibly being defined on self-included structures – specifically, failure to meet the requirement (39c).

In all the cases of strings for which the transformation Comparative Deletion is defined which I have been able to construct, it is always the case that the controller/antecedent and the term(s) to be deleted are on opposite sides of the surface reflex of the comparative marker. Hence, these strings necessarily fail the (c) condition for structures possessing the self-inclusion property.

The last transformation in Group II is the Partial Deletion transformation. In order for this transformation to meet the condition (39c), the structural schema presented in (45) would have to be found.

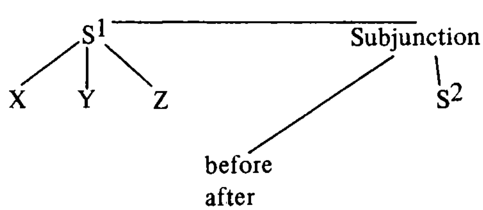
(45)



where some portion of the string e_1, e_2,..., e_n is deleted under identity with a structure between Y and S^2.

Notice that in terms of Partial Deletion, with respect to the structure (45), it would be necessary that the clause introduced by such connective terms as *after, before*, etc. be a sub-constituent of the controller/antecedent in the surface matrix clause (S^1 in the schema). In terms of the traditional grammatical terminology, connective terms such as *after, before*,... were usually referred to as subordinating conjunctions. I would interpret this terminology as suggesting structural configurations of the type displayed in (46).

(46)

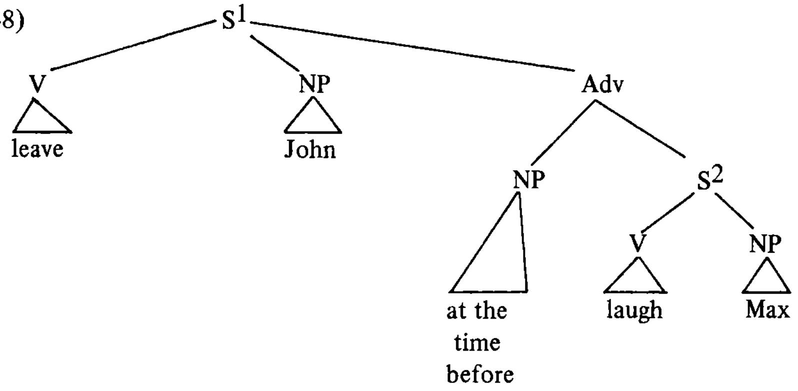


where S^1 is the surface matrix clause and S^2 is the clause introduced by a subordinating conjunction.

More recently, within the transformational framework of analysis Geis (1970) has argued for an underlying structure for such subordinated clauses which is the structural parallel of the relative clause construction. A sentence such as (47) would thus have an underlying structure such as that represented by (48).

(47) John left before Max laughed.

(48)



In either view, whether the clause S^2 is a sister node of the constituents of the matrix clause S^1 or not, it appears that only in the case that S^2 contained a constituent which was deleted by Partial Deletion and which was identical to the *entire* structure dominated by S^1 (including S^2) could the case of self-inclusion arise. I have been unsuccessful in constructing such an example; the schemas (45) and (46) are offered in order to assist in attempts to construct such examples.

It appears that all of the members of Group I but none of the members of Group II are defined on structures possessing the property of self-inclusion. This finding is fully convincing in the case of the Group I operations as positive examples have been offered to that effect. In the cases of the Group II operations, the results are slightly weaker, as the failure to find examples of structures – properly analyzable with respect to any of the Group II transformations – could be attributed to lack of imagination on my part as well as the hypothesized non-existence of such structures. We may, however, state the negative findings somewhat more strongly in the form of a conditional: if it is possible to establish for each of the transformations of Group II that their structural indices require the presence of a term which is conjunctive between the controller/antecedent term and the term to be deleted, then we may conclude unequivocally that none of the operations of Group II are defined on structures possessing the self-inclusion property. This is clearly the case for all the Group II transformations except possibly Partial Deletion.

It appears, then, that the partition of the set of IS Deletion transformations with respect to either property I or property II yields the same sub-sets.

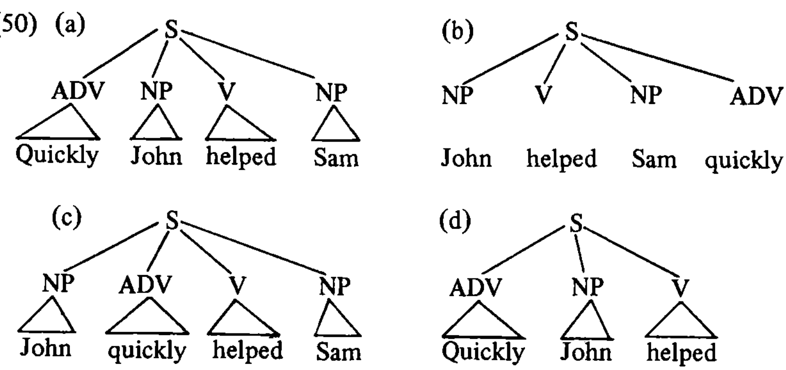
INTERPRETATION OF THE RESULTS

What I have suggested above is simply that there is an identity relation between the set of IS Deletion transformations which must have an essential variable in their structural index at a position between the controller/antecedent and the term which is to be deleted and the set of IS Deletion transformations which are defined on structures which possess the structural property of self-inclusion. This observation, while accurate, remains just that, an observation –a simple statement of a strict correlation of structural properties within the grammar of English. An explanation of this identity relations would be of more interest. The following remarks are to be viewed as an attempt at such an explanation.

We may begin with a general discussion of the nature of the formal mechanism called the transformation as presently understood in transformational grammar. Transformations are understood to be composed minimally of two parts, a structural index (structural description) and a structural change. Whether a particular string of terminal elements undergoes a particular transformation is determined by whether that string of terminal elements is partitioned by the formula which appears in the structural index of the transformation in question. If the string of terminal elements is so partitioned, then it is said to be properly analyzable with respect to the transformation and will undergo the transformation. The formula which appears as the structural index of a transformation may be composed of any combination of the following sets of terms: elements of the terminal vocabulary of constants (specific terminal symbols such as *for, ing* ...), members of the non-terminal vocabulary or category symbols (N, NP, VP, S, ...), and variables (either abbrevatory or essential) over the two previous sets and the null element. As an example, the formula (49) partitions the tree structures (50a and b), but not (50c and d).

(49) X NP V NP Y

(50)



The structural index formula identifies, then, the set of strings in the language which are properly analyzable with respect to, and thus subject to, some transformational relation. Crucially, then, the set of terminal symbols must be partitioned by a single linear formula, the structural index.

One can distinguish two types of elements in the structural index of transformations: the affected and the non-affected terms. Some term in the formula of the structural index which appears in the i^{th} position, t_i, will be called non-affected just in case t_i also appears in the i^{th} position in the structural change; the affected terms will be all the symbols which occur in the structural index which do not belong to the set of non-affected terms. There are several ways in which affected terms can be affected. If, for example, the transformation involved is a movement transformation, and t_i is an affected term, t_i will appear in the structural change in some k^{th} position where $i \neq k$. In the case of deletion transformations, if t_i is an affected term, then the i^{th} position in the structural change will be filled not by the term, t_i, but rather by the null element.

As must by this time be clear from the preceding discussions, the typical deletion transformation involves an identity element or a controller/antecedent. One of the essential conditions used in deciding whether a string of elements is properly analyzable with respect to such a deletion transformation is the determination of whether the condition of formal identity obtains identifiable terms in the formula of the structural index, the controller/antecedent and the affected term. To illustrate, consider the formula (51) for a hypothetical deletion transformation where term 2 serves as the controller/antecedent and term 4 as the affected term.

(51)	X_1,	X_2,	X_3,	X_4,	X_5	
	1	2	3	4	5	Structural index
	1	2	3	$\emptyset$	5	Structural change
					condition: 2 = 4	

Clearly, in the case of deletion transformations, the affected term must be distinguished as it is replaced in the structural change by the null element. The presence of the identity condition in the statement of the transformational relation of deletion further forces us to recognize that the controller/antecedent term (2, in the above example) must also be distinguished, as it is referred to in stating the necessary identity relation between itself and the effected term.

Summing up this brief review of the central mechanism of the linguistic theory adopted in this study, the transformation, we note that in the specific case of some deletion transformation, T_i, a string of terminals, t_1, t_2,..., t_n, will be said to be properly analyzable with respect to T_i if and only if there exists a partition of t_1, t_2,..., t_n by a single linear formula (called the structural index of T_i) such that the two terms, t_i and t_j, are distinct – where t_i is the controller/antecedent and t_j, the affected term. Given this observation, it immediately follows that the operations of S Deletion, VP Deletion and

Sluicing cannot be transformations.

The reason for this result should be clear. In the first section of this chapter we identified a number of surface structures whose derivations involved the application of one of the operations of Group I; that is, the operations of S Deletion, VP Deletion, and Sluicing. For a subset of these cases, we saw that the strings involved the structural property of self-inclusion. An explicit statement of self-included structures (39) revealed that the affected term, t_j, was formally identical to the controller/antecedent, t_i. A further examination of the structure of t_i showed that t_i wholly included t_j, that is, that t_j was a proper sub-constituent of t_i. This is equivalent to stating that there can be no single linear formula which will partition the strings involved such that the affected term, t_j, is distinct from the controller/antecedent term, t_i. Since no formula meeting these requirements can be constructed for these strings, the transformations are not defined. This is equivalent to stating that the operations of S Deletion, VP Deletion, and Sluicing are not transformational in nature; but rather they are beyond the power of transformations. This result is unacceptable. The surface structures of English which are involved in these examples are unequivocally grammatical surface structures of English, and must therefore be explicitly accounted for. Either the notion of transformation must be extended for these cases or a new mechanism proposed. I will argue in favor of the extension.

BOUTON'S PROPOSAL

The linguist Bouton, who first noted the existence of what I have been referring to as self-included structures for the operations of VP Deletion and S Deletion (S Pronominalization in his terms), made the following comments (1970):

> It remains to formulate a rule that refers to a constituent contained within its antecendent. For this we modify the present convention of using a set of brackets to indicate one construction contained within another in the structural description of a rule. ...If we were to write the VP Deletion rule using such brackets and were to modify the convention to permit us to refer to the set of brackets as an actual constituent in the structural description of the rule, we could easily generate the sentences like those in (10 – 12) [the self-included structures–JTG].

Bouton's proposal, then, is to write the VP Deletion and S Deletion operations for the self-included structures and to refer to the brackets in the structural index which contain the VP to be deleted as a separate term. He presents a formulation for the operation of VP Deletion as follows:

W	$[_{VP}$	X	VP	Y	$]_{VP}$	Z
1	2	3	4	5		6
1	2	3	∅	5		6
						where 2 = 4

Notice the interesting way in which this formulation violates the statement which was made above to the effect that the deletion transformation, in its single linear formula for the partition of the input string, must distinguish the controller/antecedent term from the affected term. The technique of referring to brackets as a separate term in the structural index of a transformation allows one to refer to that term in the identity condition, and is in that sense consistent with my claim that the controller/antecedent term and the affected term must be kept distinct. The point is that the two terms are clearly not *linearly* distinct. We will see that this has immediate negative consequences which support the claim about linear distinctness which I wish to maintain. Bouton is not unaware that there are difficulties with his formulation. He states:

> A serious problem remains, however, in that we are now forced to postulate two different rules for both the process of VP-Deletion and sentence pronominalization (here referred to as S Deletion-JTG). One pair of rules will apply the two processes when the item pronominalized or deleted is contained within its antecedent. The other pair will be employed when it is not. In the former type of instance, we will have to use the convention suggested in (30); in the latter, we will use the usual linear format (32).

(32)	X	VP	Y	VP	Z
	1	2	3	4	5
	1	2	3	∅	5
			(where 2 = 4, JTG)		

Bouton goes on to comment:

> Having to apply two completely different rules to completely account for the instances of VP-Deletion or sentence pronominalization implies that there is something different about each of the two processes when it applies to structural descriptions like those represented in (30) as opposed to (32). But there seems to be no significant difference. No constraint restricts one structural description of the rules which does not restrict the other as well. There is no apparent reason to order one of the two VP-rules (for instance) ahead of the other. If there were some dialect of English that totally rejected all instances of sentences like those in (10–12), that would provide some justification for having to postulate the two distinct structural descriptions....

As Bouton notes, there is, to his knowledge, no dialect of English which accepts (rejects) the self-included structures, but which rejects (accepts) the nonself-included structures for the operations of VP Deletion and S Deletion.[6] Bouton's comments extend immediately to the self-included structured defined for the operation of Sluicing. Thus, we see from Bouton's remarks that he clearly recognizes the empirical inadequacy of the formulation which he presents. I agree with Bouton's criticism of his own formulation and suggest both that it be rejected for the reasons which he presents and that the convention regarding *linear distinctness* for the controller/antecedent and the affected term in deletion operation naturally prevents this type of solution.

A NEW PROPOSAL: DOUBLE PARTITIONS

It should be pointed out that the more recently proposed mechanism for the grammar, Derivational Constraints (Lakoff,1969), whether local or global in nature, does not appear to be of assistance in overcoming the difficulties involved with a unified treatment of self-included and nonself-included structures for the operations of VP Deletion, S Deletion, and Sluicing. If, as has been claimed by Lakoff (1969), Local Derivational Constraints are equivalent to transformations, then by the preceding discussion they fail to solve the problem. Global Derivational Constraints, on the other hand, are designed specifically to identify and mark as ill-formed derivations in which certain relations hold between non-contiguous tree structures. But the difficulty facing us with respect to Group I IS Deletion transformation and the self-included structures is confined to a single level of tree structure in different derivations.

Again, Global Derivational Constraints are of no assistance in resolving the difficulty. Specifically, the question is how to naturally extend the notion of transformation (or local derivational constraint in Lakoff's terms) in such a way as to establish explicit, adequate partition of a potentially infinite set of tree structures of two structural types, self-included and nonself-included, for the operations of Group I.

The answer, I suspect, lies in a different conception of transformation. In the presently accepted understanding of transformation, there is a single linear partition of the string of terminal elements. If the partition succeeds, the string is accepted. Under the extension of transformation which I am proposing, the function of the structural index would not be to determine whether within the tree structure being considered there exist *two subtrees* which meet certain requirements. The proposal, then, as Kuroda has pointed out (personal communication), is essentially a proposal to allow *doubly indexed transformations*. Specifically, the transformation (in the new sense) VP Deletion would have the following form:[7]

(52) VP Deletion

Strucutral Indices:	(1)	X	VP	Y	(2)	W	VP	Z
		1	2	3		4	5	6
Structural change		1	2	3		4	$\emptyset$	6
		where 2 = 5, X ≠ W						

Essentially, the formulation (52) says that if there exist two distinct partitions of the same tree structure such that there are two distinct VP which are formally identical, then the second of the two may be reduced to null. There are two features of the formulation which should be commented on. First, there is the restriction that X ≠ Y is necessary in order to prevent some term, t_i, from serving as its own identity element. This condition guarantees that the two partitions will be distinct since the variable X is constrained in such a way as to be required to cover a different stretch of material than the variable W. Secondly, since there are two distinct partitions of the same tree structure, there is no natural way of specifying precedence relations between the controller/antecedent and the affected term; that is, since the partitions are distinct, there is no way of determining whether the controller/antecedent term, term 2, occurs to the right or left of the affected term, term 5. It is, of course, possible to include a distinct condition on the transformation to the effect that term 2 must precede term 5 (assuming that that is the case as dictated by the surface facts about VP Deletion in English). On the other hand, there is the possibility that such a statement is wholly redundant; that is, that for some formally identifiable set of deletion transformations the Ross-Langacker constraints obtain. If so, then the formulation of VP Deletion in (52) is complete and accurate.

It should be clear that the double partition solution to the problem of explicitly stating a single process for the self-included and the nonself-included structures with respect to the Group I IS transformations succeeds. In the case of nonself-included structures as in (53), say, the two partitions are as shown in (54).

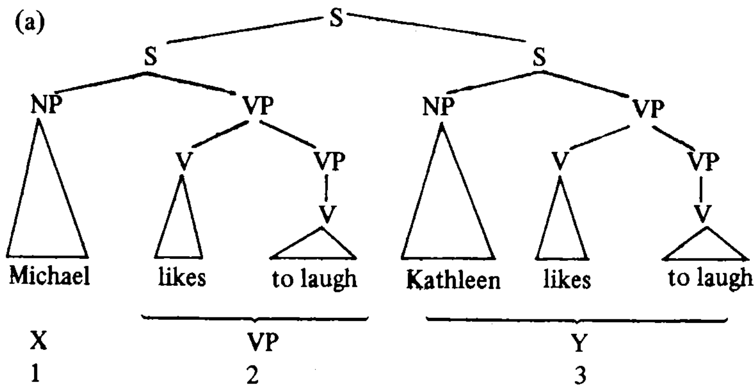
(53) (a) Michael likes to laugh and Kathleen likes to laugh, too.
(b) Michael likes to laugh and Kathleen does, too.

In the case of the self-included structures, for example, as in (55), the two partitions are as in (56).

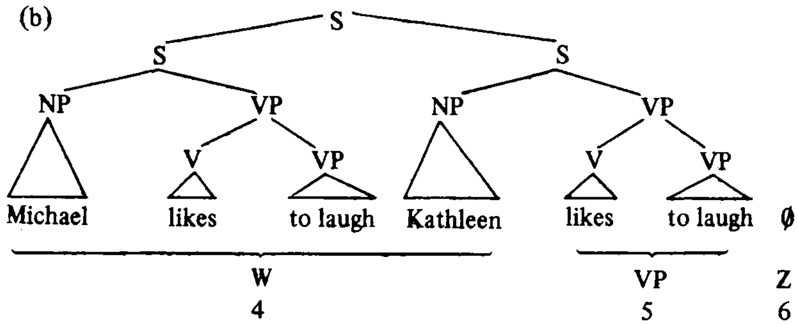
(55) (a) Ruth talks to people who want her to talk to them.
(b) Ruth talks to people who want her to.

As the above tree structures show, a single formulation making use of the innovation of doubly indexed transformations for the Group I IS transformation VP Deletion succeeds in capturing the identity of the process

(54) (a)



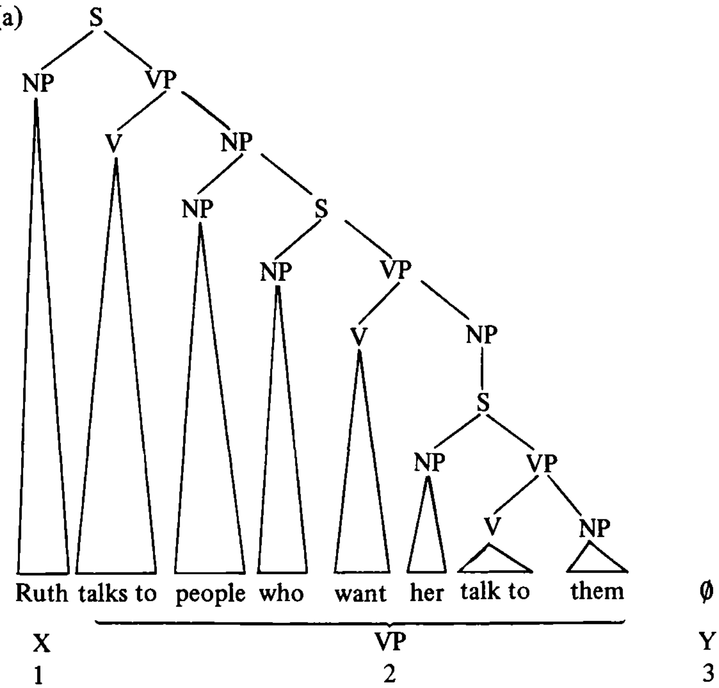
(b)



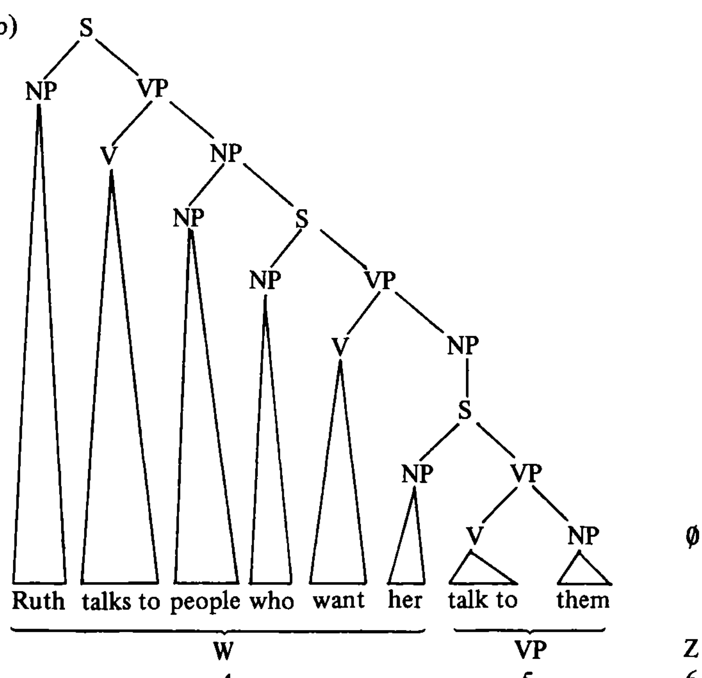
involved in the self-included as well as the nonself-included structures. The same solution yields an adequate result in the cases of S Deletion and Sluicing. This extension of the notion of transformation in Bouton's paper allows the processes to be collapsed and appears to be the minimal extension of the notion of transformation consistent with the empirical requirements.

In review, we identified a set of IS Deletion transformations and noted that there were two properties which distinguished certain members of this set of IS Deletion transformations from other members. More interestingly, we found that the partition of the set of IS Deletion transformations under both of these properties – that of requiring an essential variable between the controller/antecedent term and affected term, and the property of being defined on self-included structures – yielded the same subsets. The subset of the IS Deletion transformations consisting of S Deletion, VP Deletion, and Sluicing (Group I) was positive with respect to both of the properties mentioned. A closer examination of this correlation led us to the discovery that under the present conception of a transformation, the operations of Group I were literally unstatable. Bouton's proposed solution was then presented

(56) (a)


S
NP
VP
V
NP
NP
S
NP
VP
V
NP
S
NP
VP
V
NP
Ruth talks to people who want her talk to them ∅
X
VP
Y
1
2
3

(b)


S
NP
VP
V
NP
NP
S
NP
VP
V
NP
S
NP
VP
V
NP
∅
Ruth talks to people who want her talk to them
W
VP
Z
4
5
6

along with his own criticism of it. A proposal to extend the notion of transformation to identify sub-trees within a single input structure was presented. This solution overcame the criticisms by Bouton and allowed us to capture explicitly the identity of process for the Group I operations with respect to both the self-included and nonself-included structures. The notational device of double indices for the set of transformations defined both on self-included and nonself-included structures provided a way of stating the double sub-tree partition solution for the Group I transformations.

Finally, we may consider the original question which led us to the result obtained here: Why does the set of IS Deletion transformations, which must be formulated in such a way that there is an essential variable at a position between the controller/antecedent identity element and the affected term, coincide exactly with the set of IS Deletion transformations which are defined on self-included structures? The answer, I think, is not particularly profound. There are two possibilities. First, the material between the controller/antecedent identity element and the affected term can be specified by a linear series of elements from the terminal/non-terminal vocabulary. This is equivalent to requiring the presence of this string of elements at that position with respect to the controller/antecedent and the affected term as a necessary condition that the transformation be defined for the set of tree structures concerned. The second possibility is that the material between the two terms cannot be specified. There are two limiting cases: one, the case where the material lying between the two distinguished terms is infinite,[8] essentially unbounded (it includes the recursive symbol S, and thus cannot be naturally limited); two, the case where the essential variable includes only the null element. This later case is the same as stating that the two elements are, in fact, contiguous. Notice that under either of these interpretations, the transformation in question would not be defined for self-included structure. However, it is only in the latter case that the question about the possibility of self-included structure even arises. In the former case, the linear string of elements which lie between the two distinguished terms in IS Deletion transformations must necessarily be present. In the later case, when the variable goes to zero, the question can at least be considered. The finding here is that the presence of what has previously been taken to be an essential variable in IS Deletion transformation is misleading; it has served to obscure the fact that the transformations involved are not single partitions of an input tree structure, but rather double partitions which in fact determine whether the input structure contains two sub-trees with certain required formal characteristics (identity of form). It is obvious that in a system where the tree structure under consideration is accepted or rejected by determining whether certain elements are present under *two distinct partitions* of that structure, there is literally no possibility of specifying a string of elements which, as a necessary condition for acceptance of that tree, must be present at a position between the controller/antecedent identity term and the affected term.

NOTES

1. I cite the paper by Burt only through a secondary source; namely, Ross (1969:281), where the sentence (*i*) is reported. I have arbitrarily given the name Partial Deletion to this rule. Obviously, Burt is not to be held responsible for my discussions of the rule.

(*i*) After Bill, John talked to Mary about sloppiness.

2. The term essential variable originates, I believe, with Postal (1968). I have profited greatly both from the discussion by Postal in the reference cited and Ross' incredibly fertile study of the general properties associated with syntactic variables (Ross, 1967).
3. It is baffling (to me, at any rate) that the following version of what I take to be the same underlying structure is acceptable:

(*i*) Max ordered spinach and Tom, I think, beans.

I understand that Ross is studying strings of the form (*i*).
4. Such a device would, of course, yield essentially the same results as those obtained in the classic Bach–Peters–Kuno paradox, namely, that the structures underlying the self-included strings are not finite. This is clearly unacceptable. On the other hand, the innovation proposed and motivated by Gilles Fauconnier (1971) regarding indexing eliminates the difficulty.
5. This formulation by Ross must be corrected, at any rate, by restricting term 5 to an abbreviatory variable as the pair (18) in the text shows. The distinction between abbreviatory and essential variables had not been made explicit at the time that Ross wrote the paper.
6. Bouton's proposal has the amusing consequence in the case of S Deletion that elements may serve as their own identity element. In a string such as (*i*a), if Bouton's proposal regarding S Deletion were applied mechanically, the result would be (*i*b), by the first application, and (*i*c) by the second.

(*i*) (a) Johanna talked to the man who requested that she talk to him.
(b) Johanna talked to the man who requested it.
(*c) It.

That is, consider the formula for VP Deletion presented by Bouton for the self-included structures as reported in the text. By referring to the brackets which include the term to be deleted as the necessary identity element for the deletion, he obtains a structural index which appears to be adequate. Transferring the proposal to the case of S Deletion, the structural index would be:

X	$[_S$	Y	S	Z	$]_S$	W
1	2	3	4	5		6
1	2	3	∅	5		6

Any case in which the variables Y and Z, terms 3 and 5, are null will yield a surface structure of the form (*i*c) above. In other words, if terms 3 and 5 are null, terms 2 and 4 will be indistinguishable; the element will serve as its own identity element. Similar examples can be constructed for VP Deletion under Bouton's proposal.
7. Notice that while the Double Partition (therefore, double indexing) solution represents an innovation in the concept of transformation, it still meets the requirement proposed by Chomsky (1965:226): "...we are therefore able to formulate the structural analyses that define transformations strictly as Boolean conditions on Analyzability,

thus greatly restricting the power of the theory of transformational grammar." The innovation still restricts the operations in the format of transformations to the Boolean operations of union, intersection, and complementations. In this particular case, the proposal is for two distinct partitions of the same tree structure, in other words, the union of two distinct partitions.

8. I have been advised by the local Turing Machine operator that in order to conserve space, I should not present such an example.

7

CONCLUSION

This study has been an attempt to clarify the notion of deletion processes in the grammar of English. It is further to be hoped that, while the data considered in this dissertation have been restricted almost entirely to intuitions regarding surface structures of English, the parameters uncovered in the various attempts to make explicit the structure of the processes of deletion in English will generalize to other natural language systems or perhaps, more interestingly, to accurately indicate some of the relevant parameters of universal grammar with respect to deletion processes. It would be foolish, given the present state of grammatical studies, to insist on such a generalization. If the study here encourages and guides further research both in the analysis of the grammar of English and in the analysis of other natural language systems, then it has fulfilled its function.[1]

The major function of research efforts in natural language phenomena to my mind, is, to provide an explicit representation of the structure of a portion of the human mind and by so attempting, as stated above, to encourage and guide further research in the area. One way in which this is accomplished is to identify the crucial parameters of the processes involved and then to construct coherent models which integrate the results of these research efforts. The construction of a coherent model which integrates such findings is, of course, theory building. As was pointed out in the introductory remarks (Chapter 1), there are two categories of reasons for selecting a particular theoretical model as a guide for research; the first, that of largely aesthetic or intuitive appeal; the second, that empirical conclusions form the patterns of data which are or are not compatible with the structure of the models available. The reasons of the first category which lead me to prefer a position closer to the Generative Semantics model were presented in the first chapter. It is now appropriate to consider the force of the findings with respect to providing non-aesthetic reasons for choosing one model of grammatical theory over another.

There are four types of results in this study with respect to this issue. There are, first of all, the results which are as consistent with one model as with the other. The extension of the central mechanism of transformational grammar, the transformation, as motivated in Chapter 6 is of this category. That is, since both of the theories are forced to accept a syntactic rule (a transformational relation) of VP Deletion, by arguments independent of this study (cf. Ross,1969; Akmajian,1969; Grinder and Postal,1971; Bresnan, 1971; Postal,1971; Leben,1971),[2] and since both theories accept the usual formulation of transformations, it follows from the arguments presented in Chapter 6 that both theories must adjust their notion of transformation to include the extension proposed in that chapter. Thus the mechanism of the transformation will include the possibility of a double partition or double index for a single tree structure in order to determine whether that tree (actually, an infinite set of trees) is properly analyzable with respect to a subset of the transformations included in that model. Such a finding will be said to be neutral with respect to the choice between the two models. Whatever repercussions such a result ultimately has for the universal theory, it does not allow us to choose between the two forms of grammar presently available.

Another example of a result obtained in this study which is neutral with respect to a choice between the two models is the definition of Deletion Path which is necessary to state the Intervention Constraint. The effect of these two notions is to provide an explicit account of the set of structural conditions which must obtain at some point in the derivation of a sentence in order for some member(s) of a set of coreferential nodes in the underlying structure of that sentence to have a null surface representation in surface structure; yet the relation of coreference is still understood by native speakers of English to be present. While the finding is cast in terms of deletion phenomena (that is, a transformational account), it seems quite easy to translate this result into the Extended Standard Theory framework. In that interpretation, the set of structural conditions which the rule of semantic interpretation establishes, the relation of coreference between empty nodes and lexical items in post deep structure trees (derived phrase markers), is sensitive too. In other words, the set of structural conditions specified by Deletion Path can be interpreted either as the set of conditions on the transformational rule of EQUI-NP DELETION or on its counterpart in the competing framework, the semantic rule which establishes coreferential relationships in derived tree structures. Hence, while the definition of Deletion Path may prove to be essential in stating the constraints on the processes which mark coreferential relations between null anaphors/nodes and lexical items in surface structures, it determines nothing about the nature of the process in terms of the apparently conflicting claims advanced by proponents of the two approaches. This suggests, in fact, that the conflict may only be apparent. It seems to me that a re-analysis of the entire process of coreference along the lines presented by Fauconnier (1971) is to be welcomed. Therefore, the choice to set down the structural conditions which must obtain between a coreferential controller and a null anaphor/node in a derivation in transformational terms was an arbitrary one, dictated only by aesthetic preferences.

The second type of result can be illustrated by a discussion of the mechanism proposed in Chapter 2, that of optional lexicalization. The mechanism was proposed to allow one to avoid certain undesirable consequences of the alternatives which had been considered to date. Assume that the proposed mechanism must be accepted (this is a much stronger result than is actually warranted) as a mechanism of any adequate grammar of English. As was pointed out in the previous discussion in Chapter 2, the result is wholly consistent with the identification of deep structures and semantic representations in the model of Generative Semantics. On the other hand, consider this result with respect to a Katzian type interpretative semantics. In that system, the semantic representation of a deep structure is given by the result of the application of projection rules to the fully developed deep structure phrase marker, namely, the amalgamated path. By fully developed deep structure, I mean to point out that the projection rules are applied to the deep structure tree after all lexical insertion has occurred.[3] Thus the mechanism of optional lexicalization cannot be incorporated into this model without violating the convention that the projection rules are defined on terminal symbols with their accompanying sets of phonological, syntactic, and semantic markers. On the other hand, this finding certainly presents no profound problem for a Katzian type semantic system. One needs only to allow the lexical insertion rules in order to insert all but the phonological material in these cases and then to allow the projection rules to operate on the semantic material so inserted, since projection rules are never sensitive to the phonological material.[4] Thus, a trivial adjustment in the model allows it to incorporate the results of a new proposal without apparently causing any difficulties. There is, of course, more to be said on this subject. In the Katzian semantic model, the fact remains that only the semantics of actual lexical items may be appealed to in the mechanism of optional lexicalization. If this is correct, and my intuitions regarding the semantic material represented by the blank in sentences such as (1) are correct, then a more serious objection finds.

(1) Eldridge talked about more _____ than strawberries.

But the point of this discussion is not to develop this line of reasoning, but rather to point out that there are results in this study which are only superficially at variance with certain models of English grammar. They require, if indeed correct, only minor adjustments in the competing theories.

The third type of result is more interesting with respect to the choice between models. This is the situation where one theory (in this case, the Extended Standard Theory) has adopted a general attitude with respect to some set of grammatical phenomena, and the results obtained here show that a portion of that set of phenomena cannot be handled in the manner suggested by proponents of that theory. The result of the finding is that because of some organizational principle in the model, a statement of the results obtained here must appear in two distinct components of the grammar. The Extended Standard Theory has expressed the attitude toward the establishing of the identity relation between the italicized elements in (2) that such bonds will be established by interpretive rules of semantics defined on post-deep structures phrase markers (cf. Akmajian,1969; Leben,1971; Bresnan, 1971, for example).

(2) Socrates didn't mind *corrupting the youth*, but it would bother Spiro.

As Postal points out, Bresnan (1971) clearly states the position:

> Akmajian does treat a class of cases of I–S=A which are not discussed at all by Grinder and Postal, namely *do it, it happens, do that*, and the like. ... Akmajian's position, stated in his thesis, pp. 310–311, is that while elliptical constructions (involving what Grinder and Postal call null anaphors) are derived by deletion, anaphoric pronouns are to be semantically interpreted. For example, Akmajian argues against the transformation of S Deletion....

In the discussion of sentences such as (2), I have referred to the process which explicitly accounts for the identity relation as that of S Deletion, a transformational relation. This is, of course, consistent with the Generative Semantics framework. In the Extended Theory such identity relations are established by means of a rule of semantic interpretation. While the form of this rule is not clear to me, it seems obvious that it will result in unacceptable consequences for the Extended Standard Theory.

Why is this the result? Consider the following: the Extended Standard Theory accepts the relationship of VP Deletion as a transformational relation (as we see, for example, from the above quote). We saw in Chapter 6, that VP Deletion is defined for self-included structures. This led us to the result that the notions of transformation must be extended to allow double partitions if the relation of VP Deletion is to be stated. Thus the Extended Standard Theory must accept the extended notion of transformation which employs the double partition. We point out now that there are structures such as (3) in the set of well-formed surface structures in English.

(3) The United States will oppress any nation which allows it.

We recognize (3) as the result of a derivation in which the rule of S Deletion has applied to a self-included structure. For any proponent of the interpretative approach to the establishing of identity relations between the anaphor *it* in sentences such as (3), it will be necessary to make one of the following moves:

A. Claim that the process which establishes the identity relation between the surface anaphor *it* and its antecedent in (2) is essentially different from the process which establishes the identity relation between the surface anaphor *it* and its antecedent in (3).

B. Claim that the processes involved in establishing the relation of identity between the surface anaphors *it* and its antecedent in both (2) and (3) are the same process.

Why are both of these moves undesriable? The claim in A is clearly undesirable as the grammar under the Extended Standard Theory approach now contains two rules (irrespective of their type), where the Generative Semantics approach contains only one. Further, the criticisms presented by Bouton in his critique of his own solution to this problem, such as the lack of any indication that speakers of any dialect of English distinguish between the two types of structures, bear with their full force against proposal A, above. The claim in B is equivalent either to the claim that in fact the transformational solution for S Deletion is correct – that is, accepting the transformational solution and thereby giving up the claim about an interpretative mechanism for the process – or it is equivalent to the claim that the extension of the notion of transformational relation as a double partition *must be re-constructed in the system of interpretative semantic rules* to account for the data. There would be no serious criticism of this latter proposal B except for the fact that the extension of the notion of transformation as a double partition will be necessary independently in the Extended Standard Theory's grammar as the proponents of this theory accept VP Deletion as a syntactic phenomenon. Hence, the grammar under this approach will again contain two devices where the Generative Semantics approach will contain one. The mechanism of the double partition will be reconstructed in the semantic system of rules (however that is to be done) for data such as that in (2) and (3) and again in the syntactic-transformational component for the case of strings which involve the rule of VP Deletion. This is, I think, not an isolated or accidental result,[5] but rather follows from the insistence that one maintain distinct levels of analysis, specifically, that the syntax and semantics are separable in some principled way.

The fourth type of result is represented by the constraint whose motivation formed the basis of the fifth chapter of this study, the Controller Cross-Over Constraint. The constraint was given the form of a Global Derivational Constraint in the sense defined by George Lakoff (1969). This device is available in the Generative Semantics model, but not acceptable to the proponents of the Extended Standard Theory. The essential feature of the device which appears to be objectionable to the latter group is that it is a mechanism which marks entire derivations as ill-formed by referring to *non-contiguous trees in a derivation.* It remains only to be shown that there is literally no way within the inventory of mechanisms to be found in the Extended Standard Theory to state the constraint. Let us begin by restating the constraint:

(4) Controller Cross-Over
Mark as ill-formed any derivation in which a transformation T has applied to some structure which includes a mentioned node, n_i, causing n_i to move describing a path over some set of constituents which includes a node, n_j, if in that derivation n_i has served as controller with respect to n_j for some application of a coreferential deletion transformation.

If my interpretation concerning the unacceptability of Global Derivational Constraints to Extended Standard Theorists is correct – in other words, the unacceptable characteristic of Global Derivational Constraints is the fact that reference must be made to non-contiguous trees in a derivation in order to determine the well-formedness of that derivation – then a demonstration that the Controller Cross-Over Constraint or its equivalent cannot be stated at one level in the derivation bears directly on a choice between the present forms of the two theories. Using the line of argumentation developed by Postal (to appear), we may consider the following possibilities. If the Controller Cross-Over can be stated only on the level of derivation, then it must be statable at the level of one of the following:

A. Deep Structure
B. Surface Structure
C. Shallow Structure
D. The level of the derivation identified by some specific rule R_i.

A. Deep Structure

If the Controller Cross-Over or its equivalent were statable at the level of deep structure, then this would be equivalent to stating that by an inspection of the underlying structure one could determine the set of transformations which would apply to it. There are several ways to show that this is impossible. Perhaps the simplest is to show alternative surface realizations of the same underlying structure, one of which is ill-formed because of a violation of the Controller Cross-Over Constraint, the other well-formed.

(5) (a) Sam showed $Martha_i$ a picture of $herself_i$.
(*b) Sam showed a picture of $herself_i$ to $Martha_i$.

The transformation which explicitly captures the fact that the (a and b) versions of (5) are alternate surface realizations of the same underlying structure is INDIRECT OBJECT MOVEMENT, one of the older and better motivated transformations in the grammar of English. The fact that both surface forms of (6) are well-formed shows that the transformation is optional.

(6) (a) Sam showed a picture to Martha.
(b) Sam showed Martha a picture.

Since the transformation is optional, there is no way of determining from the deep structure whether some particular strings which are properly analyzable with respect to that transformation will undergo it. Yet in just the set of derivations where the structure does undergo the transformation and certain other conditions obtain (as specified by the Controller Cross-Over), the resultant surface realization will be ill-formed (5b).

It is well-known that whether some phrase marker, p_i, will be properly analyzable with respect to a particular transformation, T_i, can depend on whether, prior to the point in the derivation where p_i is available to T_i, p_i has undergone some distinct transformation. From an inspection of the Controller Cross-Over Constraint, it is easy to see that in order to determine whether the constraint is applicable, it is necessary to determine whether a coreferential deletion transformation has applied. Thus, in order to show that the constraint cannot be stated at the level of deep structure, we need only show that the application of some coreferential deletion transformation EQUI-NP DELETION, say, is contingent on the prior application of some distinct transformation. In this case the prior application of the PASSIVE transformation determines whether the structure will be properly analyzable with respect to the coreferential deletion transformation.

(7) (a) $Dick_i$ thought that it was silly that the explosion upset him_i.
(b) Dick thought that it was silly to be upset by the explosion.

The pair shows that whether the structure underlying (7) will be properly analyzable with respect to the generalized EQUI transformation depends on whether the transformation PASSIVE moves the coreferential NP in the most deeply embedded clause into the derived subject position in that clause. These cases show that the constraint cannot be stated at the level of deep structure.

B. Surface Structure

If the Controller Cross-Over or its equivalent were statable at the level of Surface Structure, this would be equivalent to stating that one could determine by an inspection of the surface structure whether in the derivational history of the sentence in question a controller node and the node for which it served as controller had reversed their linear order.[6] To show that one cannot state the constraint at this level, it suffices to point out that the usual interpretation of deletion is that the node structure, as well as the terminal elements which it dominates, are removed by an application of a deletion transformation. If this is correct, then there is obviously no possibility of stating the constraint at a point in the derivation where all the nodes affected by deletion transformation have been removed since, minimally, the constraint will mention the relative linear ordering of the controller and the node for which it serves as controller. Suppose that contrary to the usual interpretation of deletion, we assume that the nodes involved are still present in the surface structure but have no lexical representation.[7] It then becomes relevant to note that many of the surface structures resulting from derivation, which are ill-formed just because of a violation of the Controller Cross-Over, are of the form displayed by (8).

(8) *Martha was touched by Sean in order to get her attention.

The structural characteristic in the surface structure (8) which is imporant for this discussion is that under the interpretation of deletion which we are now assuming, the surface structure level of derivation still does not possess adequate information to state the constraint. Specifically, giving this version of deletion the most sympathetic interpretation, it is clear that the controller appears to the left of the entire clause which (presumably) contains the node that dominates the term which was deleted by the controller *Sean*. Thus, while the PASSIVE has caused a Controller Cross-Over violation earlier in the derivation, later re-ordering rules have re-established the original linear order of the controller and the affected term, making it impossible to decide in the surface structure whether a violation has occurred. Clearly, even under this unusual interpretation of deletion, the constraint cannot be stated.

C. Shallow Structure

Under the usual interpretation of deletion, it follows that the constraint cannot be stated on Shallow Structure as either:

A. the relevant coreferential deletion transformation has applied; in which case one of the two nodes which must be identified in order to state the constraint is no longer present.

B. the relevant coreferential deletion transformation has not applied; in which case neither of the two nodes which must be identified in order to state the constraint can be identified.

Under some alternative interpretation of deletion, say, where the position of the deleted node is marked by a special marker (cf. Note 7) or the node is still present although with a null terminal symbol, and assuming that the coreferential deletion transformation has already applied (see alternative B above for the result of assuming the opposite), then one still cannot state the constraint as there is no principled way of identifying the controller term.

Suppose, further, that we introduce the totally ad hoc but statable convention that in every case of an application of a coreferential deletion transformation, we introduce *two special markings*: [+ Commie] and [+ Bircher], the former being assigned to the controller node, the latter to the affected node. By this same convention we would mark all other nominals [– Commie] and [– Bircher] . Notice that even after going through this absurd marking convention, we do not have sufficient information to determine whether a Controller Cross-Over has occurred. We must, in addition to the above pieces of information, be able to determine whether the two nominals so marked have reversed their linear order at some point in the derivation. Thus, it is not adequate to simply mark as ill-formed all strings where the nominal marked [+ Bircher] appears to the left of the nominal marked [+ Commie]. This is true because, as we saw in Chapter 4, at least one of the coreferential deletion transformations operates from right-to-left as well as left-to-right. Thus any attempt to block strings at the level of shallow structure because they include a pair of nominals with the linear arrangement shown in (9) will also prevent the specification of the perfectly well-formed surface structure (10).

(9) ....NP........................NP....

[+ Bircher] [+ Commie]

(10) Enjoying himself$_i$ annoyed Mitchell$_i$.

D. *Some Level of Derivation Defined by the Rule R_i*

It is easy to show that this proposal will also fail. How are we to test this proposal? First we must choose R_i. Suppose that we select some coreferential deletion transformation EQUI-NP DELETION, say, as R_i. By doing so we guarantee that we will be able to identify the controller and the affected node adequately. But this information is insufficient as we cannot tell whether their linear order has reversed or will reverse in the derivation.

Suppose, on the other hand, we choose some permutation transformation INDIRECT OBJECT MOVEMENT, say, as R_i. In this case, we have sufficient information to determine for any two arbitrary elements in the string whether this particular permutation transformation will reverse their linear order. Unfortunately, we no longer know whether any of the elements involved in the permutation are related in the controller-affected node relationship by some coreferential deletion transformation. Hence, it should be clear that we cannot state the Controller Cross-Over Constraint at some level of the grammar defined by the Rule R_i.

Summary

It follows necessarily from the demonstration that if one cannot state the constraint at the level of Deep Structure, Surface Structure, Shallow Structure, or some level of the grammar defined by a particular rule R_i, then one cannot state the constraint at any single point in the derivation. It is clear that such a result is literally unstatable in any theory which limits itself to mechanisms which state the ill-formedness of strings or derivations as a function of some property or set of properties present at a single point in the derivation. The Controller Cross-Over Constraint is statable only on a series of tree structures; it is a true case of an interaction between *two sets* of transformations: the set of coreferential deletion transformations and the set of permutation transformations. The point of this discussion is to state explicitly that there are results within this study which literally cannot be stated in the Extended Standard Theory as characterized by Chomsky (1970: 78). Such results unequivocally choose between the competing theories presently available.

As was mentioned in the final remarks in the chapter where Controller Cross-Over was motivated, while the constraint is specified in the standard form of a Global Derivational Constraint, this appearance is wholly misleading.

THE CONTROLLER CROSS-OVER CANNOT BE STATED WITHIN A SINGLE DERIVATION

Let us begin by examining the constraint critically in order to determine exactly the set of elements of information required to identify derivations which are ill-formed because of Controller Cross-Over violations. Select some arbitrary derivation, D_i. Clearly we need to identify the tree structures in D_i which are input to the permutation transformations. To simplify the discussion, assume (this assumption entails no loss of generality in the result) only one permutation transformation applied in D_i; call this transformation T_i. Specifically, we need to examine the partition of the tree structure which is input to T_i in order to identify:

a. the element which mentioned in structural index as the moving element; call this NP_i
b. the set of elements which NP_i crosses when T_i applies; call it E.

Having determined T_i, NP_i, and E in D_i, we scan all other trees in D_i checking to see whether NP_i has functioned as the controller term for any coreferential deletion transformation. Assume that one such transformation has applied (again, no loss in generality is involved under this assumption); call this transformation T_j. The partition of the tree structure by the structural index of T_j, in addition to identifying NP_i as the controller, will identify the affected term; call it NP_j. We apparently now have sufficient information to determine whether the Controller Cross-Over Constraint is operative, that is, whether D_i is ill-formed with respect to the constraint. We have the following bits of information:

D_i	=	the derivation under consideration
T_i	=	the permutation transformation which has applied in D_i
NP_i	=	the mentioned moving element in the application of T_i in D_i
E	=	the set of elements crossed by NP_i in the application of T_i in D_i
T_j	=	the coreferential deletion transformation which has applied in D_i
NP_j	=	the affected term (the one deleted) in the application of T_j in D_i for which NP_i served as controller

Given this information, the Controller Cross-Over reduces to the question: Is NP an element of E? If NP_j is an element of E, then D_i is ill-formed with respect to the constraint. If not, then it is not. Hence, we have apparently succeeded in determining the ill-formedness of D_i with respect to the Controller Cross-Over Constraint by referring to objects defined within D_i.

The above procedure is well-formed in all cases where grammars are organized in such a way that all applications of the set of permutation transformations precede all applications of the set of coreferential deletion transformations. If there exists a single permutation transformation which is ordered after any of the coreferential deletion transformations, the above procedure will fail. It is important to understand why this is true. There are two cases.

Case I

Suppose that T_i precedes T_j in its application in D_i. By *precede in its application*, I mean that T_i applies to a more remote structure (in the sense of Postal,1970) in D_i than does T_j. If this is the case then both NP_i and NP_j will be present somewhere in the tree structure at the point of application of T_i. Thus, the question: Is NP_j an element of E? is well-formed, and we have succeeded in determining the ill-formedness of D_i with respect to the constraint.

Case II

Suppose that T_j precedes T_i in its application in D_i. If this is the case, then at the point in D_i where T_i applies, NP_i will be present somewhere in the tree structure, but NP_j will have already been removed (deleted) by T_j. Thus, the question: Is NP_j an element of E? is not well-formed. The question itself is trivially answerable, obviously, since NP_j is not in the tree structure at all at the point where the set E is defined, it is clearly not in E. But, as we will see in (13) and (14) below, this yields the wrong result.

It follows from the discussion above that either all applications of permutation transformations precede all applications of coreferential deletion transformations or the Controller Cross-Over Constraint cannot be stated within a single derivation. If the first alternative of this disjunction were true, it would constitute a powerful organizational principle for the grammars of natural languages. However, it can be shown to be false on the basis of data already presented in Chapters 4 and 5 of this study.

In order to show that for at least one pair of transformations T_i and T_j, T_j must precede T_i. In Chapter 4 in the development of the concept of Deletion Path necessary to specify coreference relations between controllers and null anaphors, we noted triplets like the following:

(11) (a) $John_i$ said that Wh+someone wanted $John_i$ to protect $John_i$.
(b) Who did $John_i$ say wanted him_i to protect $himself_i$.

(c) Who did John$_i$ say wanted to protect himself$_i$.

(12) (a) I recognized the man$_j$ John$_i$ said Wh+man$_j$ wanted John$_i$ protect John$_i$.
(b) I recognized the man$_j$ who$_j$ John$_i$ said wanted him$_i$ to protect himself$_i$.
(*c) I recognized the man$_j$ who$_j$ John$_i$ said wanted to protect himself$_i$.

The c versions of the above triples are ill-formed under the interpretation specified by the coreferential indices marked. The point of the above examples is to show the ordering of the coreferential deletion transformation generalized EQUI-NP DELETION with respect to the permutation transformations Wh-Q MOVEMENT (11) and Wh-REL MOVEMENT (12). If the order were:

Wh-Q MOVEMENT
> EQUI-NP DELETION
Wh-REL MOVEMENT

then there would be no intervening NP node between the controllers and the coreferential underlying embedded subject terms of the predicate *protect* in (11) and (12). Therefore, the Deletion Path would be clear; the results of the deletion of the embedded subject term would be grammatical with respect to the coreference relations specified. But the resultant strings are ill-formed; thus the order must be:

Wh-Q MOVEMENT
EQUI-NP DELETION >
Wh-REL MOVEMENT

The transformations involved in the above argument obviously meet the requirements necessary for the paradigm we are attempting to construct. Let T_i be either Wh-Q MOVEMENT or Wh-REL MOVEMENT, and T_j, EQUI-NP DELETION. It remains only to be shown that in some derivation the Controller Cross-Over Constraint must apply to characterize the ill-formedness of the derivation on the basis of a crossing violation between this particular T_i and T_j. But we have already seen such examples in Chapter 5 where the original Controller Cross-Over Constraint was motivated: examples (62a and b), repeated here as (13) and (14).

(13) *Who did leaving disturb?

(14) *I know a man who leaving disturbed.

Thus, we may unequivocally resolve the disjunction stated earlier in favor of the result that the Controller Cross-Over cannot be stated within a single derivation. What, then, is the form for the constraint to be?

CONTROLLER CROSS-OVER: A TRANSDERIVATIONAL FORMULATION[8]

Intuitively speaking, the information that we are missing in a single derivation in the cases where T_j precedes T_i is a determination of the location of NP_j with respect to E, the set of elements crossed by NP_i in the application of T_i. Since NP_j is removed by the earlier application of T_j, what we really need to determine is whether NP_j would be in E if it had not been removed by T_j. This can be made precise in the following way:

D_i = the derivation under consideration
T_i = the permutation transformation which has applied in D_i
NP_i = the mentioned moving element in the application of T_i in D_i
T_j = the coreferential deletion transformation which has applied in D_i
NP_j = the affected term (the one deleted) in the application of T_j in D_i for which NP_i served as controller
D_j = a derivation from the same underlying structure as D, identical in every respect with D_i except that T_j does not apply in D_j
E = the set of elements crossed by NP_i in the application of T_i in D_j

Given the above information, the Controller Cross-Over Constraint reduces to the well-formed question: Is NP_j an element of E in D_j? If the answer is yes, then D_i is ill-formed by the Controller Cross-Over Constraint. If no, D_i is well-formed with respect to the Controller Cross-Over Constraint. This result may be formulated as follows:

(15) The Controller Cross-Over Constraint
Mark as ill-formed any derivation, D_i, in which a coreferential deletion transformation, T_j, has applied with NP_i serving as controller and NP_j serving as the affected term if in a distinct derivation, D_j, identical to D_i in every respect except that T_j fails to apply, a permutation transformation, T_i, has applied causing the mentioned node, NP_i, to cross over a set of elements, E, where E includes NP_j.

The formulation (15) is a transderivational constraint as developed by David Perlmutter (presented at the La Jolla Syntax and Semantics Conference in the spring of 1970), and independently by Paul Postal and myself (mentioned in Grinder and Postal,1971). The constraint determines the ill-formedness of a derivation in terms of information available only in some defined distinct derivation. It should be pointed out that the derivation, D_j, mentioned in stating the constraint may or may not be a real derivation in the language. D_j is constructed (that is, wholly specified) with respect to the derivation under consideration, D_i. One can, in fact, predict that D_j will be ill-formed just where T_j is obligatory in D_i. That fact that D_j is a constructed object rather than a natural (in some intuitive sense of natural) derivation distinguishes this constraint from the set of candidates for transderivational constraints which I am familiar with. Such a constraint, while clearly a powerful device, appears to be the minimal principled statement of the Controller Cross-Over phenomenon. As we have already mentioned, phenomena which require statements of the form of Global Derivational Constraints cannot be stated with the Extended Standard Theory as characterized by Chomsky. Clearly, transderivational constraints are more powerful and, presumably, unacceptable in this model. While Chomsky's statement concerning such constraints is unequivocal, I confess that I do not see where in the structure of the Extended Standard Theory such statements are disallowed. In so far as the structure of that model can be shown to exclude the possibility of stating the Controller Cross-Over Constraint, to that extent the model is falsified by the phenomenon.

I have attempted in this concluding chapter to indicate what interpretation I attach to some of the results reached in this study. On the other hand, it should be clear to the reader that this study has only scratched the surface of the phenomenon of deletion processes in natural languages. I have been unable to treat a number of pressing problems in this area. For example, topics such as the notion of *identical* for the purposes of deletion in IS Deletion transformations, or whether there is some constraint to the effect that only constituents may be deleted, have not been discussed. Hopefully, the results of this study will assist in formulating answers to these as well as additional questions about the natural language phenomenon of deletion. In addition to assisting individuals in the further study of these questions about deletion phenomena, I hope that this study has raised a number of new questions regarding the form of the grammars of natural languages, including that of the motivation for the inclusion of a new class of constraints, the transderivational constraint.

NOTES

1. Besides it was fun.
2. This is stated both by Akmajian and by Bresnan, two of the proponents of the Extended Standard Theory. I understand that similar statements were made by Chomsky in class lectures in the fall semester of 1970–1971 at MIT. The force of the arguments in Ross,1969, and Grinder and Postal,1971, are such that if one denies that the relation commonly referred to as VP Deletion is transformational in character, one effectively denies that there are any transformational rules.
3. This is one of the defining characteristics of the Katzian deep structure. It appears to be one of the areas of difference between interpretative and generative semantics which is more than terminological. Cf. Lakoff (1969), Postal (1970), and Grinder (to appear) for examples where it is not possible for one to maintain the position that lexical insertion occurs at a single level of the grammar.
4. I am quite certain that Katz could find a more interesting way of handling this problem. His position, as I understand it, would say, however, that lexical entries determine the possible meaning bundles in a language. Cf. example (1) in the text for a comment on this feature of Katz's system.
5. Lakoff (1969) presents an interesting discussion of this point as well as Ross (1969) and Postal (1970).
6. This is necessary but not sufficient to determine the applicability of the constraint. One must know, in addition to the fact that the positions of the terms have reversed in the derivation, whether the permutation transformation which caused the reversal mentioned the controller in its partition of the phrase marker (Cf. Chapter 5 for discussion).
7. This would seem to be equivalent to introducing a Doom type marker of the type once proposed by Postal, but later rejected by him as an obviously ad hoc coding of a global derivational constraint. Cf. Postal (to appear, Appendix A) for discussion of coding of global derivational constraints.
8. There appears to be one way of stating the Controller Cross-Over Constraint within a single derivation. This would be to introduce at the point of application of T_j an ad hoc marker of the *Doom* (cf. note 7 above) variety into the tree structure at the position of the affected term. The subsequent application of T_i would then yield the correct results since the information as to whether NP_j is or is not in the set E at the point of application of T_j is decidable with reference to the marker *Doom*. In evaluating this solution, it is appropriate to consider the comments of the individual who first proposed *Doom*, namely, Postal (to appear,28): "For the point is *not* that the feature-marking approach fails to provide a description in accord with facts in this case, but, rather, that if arbitrary features are available, *any* possible Global Derivational Constraint can be reformulated in terms of a single level of structure. ...The point should be clear. Marking structures with arbitrary features is not a way of avoiding Global Derivational Constraints. It is simply a way of *coding* these constraints in a pointless and obscuring notational framework, that of *features*."

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