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THE ROLE OF SELECTIONAL RESTRICTIONS IN THE THEORY OF TRANSFORMATIONAL GRAMMAR

by

Joanne Madeline Egan

A Dissertation

Presented to the Graduate Committee

of Lehigh University

in candidacy for the Degree of

Doctor of Philosophy

in

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ABSTRACT

The object of this paper is to analyse the role of selectional restrictions in transformational grammar theory. The historical development of selectional restrictions as they have appeared in linguistic theories will be discussed and critically evaluated, and in line with this discussion and evaluation the theories of Noam Chomsky and Jerrold Katz are first analysed to present the traditional viewpoint. Following this, criticism of the Chomsky-Katz model from the point of view of a new "counter-movement" which includes the positions of Uriel Weinreich, James McCawley, George Lakoff and Charles Fillmore will be considered.

All of the above theories are defective, in the opinion of the author, because of the lack of attention given to the central role of selectional restrictions in any proposed model of transformational grammar. Therefore, an intensive analysis of the more critical linguistic issues is provided, including whether the derivation of synonymous sentences is from a single or multiple deep structure, the relationship of anomaly and contradiction,

how often lexical insertion occurs in sentence generation, the use of selectional restrictions for semantic and for syntactic purposes, and the occurrence of selectional restrictions in a single or double frame. It is contended that a methodological commitment to the centrality of selectional restrictions provides a solution to several of these issues.

The above analysis provides the framework for several proposals. First, the Chomsky-Katz model must be modified to include selectional features of a semantic nature in the generative component. Second, the claim of the counter-movement that acceptability of sentences depends partly upon semantic considerations is well founded, but the counter-movement proponents' attacks on the Chomsky-Katz model are weak and their own model proposal is not one that can be adopted wholesale. Third, a certain set of semantic and dual (semantic/-syntactic) selectional restrictions must be included in any generative portion of a model so as to assure the production of only grammatical and meaningful sentences. Fourth, any formulation of a model for transformational grammar should proceed from a basic methodological commitment that the role of selectional restrictions occupies a central position in the theory.

As a consequence of the developments in this paper, the author suggests the general nature of a theoretical model which would appropriately accommodate selectional restrictions. The sentence derivation in such a model involves both syntactic and semantic features which generate sentences that are both syntactically impeccable and linguistically meaningful. Such a model can be divided into two stages. The first is a single, generative process in which the essential or pre-transformational structure is produced, composed of syntactic, semantic and dual features. The second stage is a separate development of two independent processes--syntactic transformations and semantic processes. One is led to the proposal of this general model not because of data considerations but because any model would have to be of this general nature if selectional restrictions receive sufficient attention in any model.

CHAPTER ONE

INTRODUCTION--DEFINING THE PROBLEM

The particular notion of transformational grammar with which this paper is concerned was introduced to contemporary linguistics when Noam Chomsky wrote Syntactic Structures in 1957. Chomsky develops a model for this theory of grammar in several writings since 1957.[1] This model shows how a grammar generates the sentences of a language and gives them structural descriptions. This formulation explains the competence which enables a speaker of a language to produce and to understand an infinite number of sentences. The theory also provides an account of how structures of superficially dissimilar sentences are in fact closely related. The syntactic part of the grammar produces an infinite set of abstract formal objects, called underlying phrase-markers, each of which incorporates all the information relevant to a single interpretation of a particular sentence. The semantic part of the model derives the semantic interpretation of a sentence from the underlying phrase-marker, or deep structure, as it is sometimes called. Grammatical transformations are syntactic operations which map the deep structure onto a surface structure, which is the structure of the sentence communicated from speaker to

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[1] See Bibliography.

hearer. The phonological part of the model relates the surface structure to a phonetic representation. It should be noted that the Chomskian model describes speaker-hearer competence. Presumably if the communication of the written word were part of the model, there would be an orthographic component which would relate the surface structure to written symbols.

Due partly to Chomsky's interest in syntactic questions, and partly to his clear development of the arguments concerning the syntactic part of transformational grammar, the syntactic aspects of this theory have advanced greatly in the past decade to a high level of sophistication. The strength of this expression has been largely responsible for a generally syntactic orientation toward problem formulation and solving in all areas of transformational grammar.

The semantic questions in grammar received little systematic analysis until Jerry Fodor and Jerrold Katz began their semantic investigations within the framework of Chomsky's theory.[2] In a manner entirely in agreement with the Chomskian model, their work discusses semantics according to the role that Chomsky's model specifies for

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[2]Jerrold J. Katz and Jerry A. Fodor, "The Structure of a Semantic Theory," Language, Vol. 39, pp. 170-210.

it, namely, as an interpretation of the meaning elements present in the deep structure. The Fodor and Katz findings provided the impetus for Katz to work in greater depth in this area, both with Paul Postal[3] and alone.[4] One can detect a common underlying disposition in all of this investigation--because the formulation of the semantic model has occurred within the Chomskian framework, there is a continuing syntactic orientation to all the published material from these investigators.

In the literature concerning the theory of transformational grammar, selectional restrictions are frequently mentioned but are given a relatively minor role in the formulation of the theory. It is the contention of this paper that this subordination strongly contributes to the deficiencies of all the theories. A successful resolution of the several problems faced by these theories will depend upon an appropriate re-evaluation of the role of selectional restrictions in linguistic theory.

What are selectional restrictions, and how have they developed in the literature? Selectional restrictions emerge as a result of the rules of grammar which Chomsky proposed in Syntactic Structures. These context-free rewrite

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[3]Note especially An Integrated Theory of Linguistic Descriptions (Cambridge, 1964).

[4]See Bibliography.

rules replace a symbol by a string of symbols without any contextual constraints on the replacement. An example of such a rule is

(1) S → NP + VP,

indicating that the symbol 'S' is to be rewritten as the concatenation of the symbols 'NP' and 'VP'. The final rules are ones which replace a lexical category by a formative (morpheme or abstract grammatical symbol). An example of such a rule is:

(2) N → cat

where 'N' is the lexical category 'noun' and 'cat' is a terminal symbol or morpheme. The strings produced by these rules are terminal strings. They are thus sequences of lexical formatives.

However, it was soon discovered that such lexical category specifications do not contain enough information to generate all and only grammatical sentences. That is, it was soon evident that a subdivision of lexical categories would be required. In a subdivision process the lexical category symbol in a derivation is replaced by the symbol for the lexical subcategory, and then a member of that particular subclass can replace a subcategory symbol and produce an element of a terminal string. Thus, for example, the class "noun" is subdivided into smaller groups

of nouns, each group having specific properties, particular nouns being members of groups according to these properties.

However, with the use of context-free rules, even such subcategorization is not sufficient, for no constraint upon the choice of one given subclass rather than another is possible. Thus the need was felt for a rule framework in which the necessary constraints upon rule selection can be formulated. Context-sensitive rules thus become appropriate, for they can be phrased in terms of lexical subcategories; they can replace a general symbol with more specific ones; and most importantly, they specify the environment within which symbol replacement is permissible. The environment is specified in terms of adjacent lexical subcategories, and so is present in the derivation for immediate use.

To a point, specification of this subcategorization can be accomplished in a hierarchical manner. For example, there surely is a hierarchy involved with the class denominations physical object, animate, human. Also, disjoint classes can be defined; for example, male, female, concrete, abstract. However, there are conceptual areas of subcategorization which are not exclusively hierarchical or disjoint. Rather a partial hierarchy

and a partial overlapping of classes becomes evident, for when the attempt is made to force the schema of subcategorization to have disjoint classes of categories, a cross-classification seems to emerge. That is, the lexical items involved in different subclasses have certain aspects in common.

An analogy to this subcategorization phenomenon is the distinctive feature analysis in phonology, where each sound is characterized by a set of distinctive features, and phonological regularity can be defined in terms of sets of sounds sharing certain distinctive features. Similarly in this situation, as one identifies and specifies a set of aspects for each word, one finds that the set of words which can go into a given position in a terminal string can be characterized as the set of those words sharing a specified set of features. Such an introduction of features allows a contextual specification of what elements of a lexical class can fit into a framework in terms of the agreement of the "features" which the elements of the class have and those which the context of the terminal string requires. However, as Professor Rubenstein has pointed out, there is an important difference in this analogy: the sets of phonological distinctive features are not many, probably not more than thirty,

whereas the sets of subcategorized features are unspecifiably large.

While at the higher level the context is defined by neighboring lexical subcategories themselves, at a lower level the context is defined in terms of features of the surrounding context. It is this kind of specification which is called a selectional restriction. Note that although the above account tends to focus on syntactic appropriateness, it is not intrinsically that, for if one wants to account for the semantic meaningfulness of an expression, he can proceed in a similar manner. It is for this reason that the term 'selectional restriction' has been taken over in semantic analysis. Strictly speaking, the nature of the selection is not the same, for in the syntactic case it is a lexical item which is selected, and in the semantic case it is a lexical or constituent meaning.

Selectional restrictions thus work on all levels of the sentence structure, on the individual morphemic level to specify what words can co-occur, as well as between subject and verb to require agreement of the features of each. There are both syntactic and semantic selectional restrictions within the theory of transformational grammar, considered together for some purposes,

considered separately for others.[5]

In any model for transformational grammar, the provisions dealing with word combination for meaningful communication are the special concern of selectional restrictions. They contain the information and provide the mechanism for designating acceptable sentences. Using the sentence structure and the feature specification of the individual words, the selectional restrictions have the central task of allowing acceptable sentences to be generated and blocking unacceptable ones. When a model for transformational grammar is viewed in this manner, one can see how important it is for the model that selectional restrictions be carefully and accurately formulated, and that the rules for their application be precisely stated.

In order to formulate rules for how selectional restrictions should function, one has to carefully specify what a grammar is expected to do; that is, what kind of adequacy a linguistic theory must have. Chomsky has developed a useful set of terms for consideration of this question, and they can be employed here. According to him, a linguistic theory should account for a certain

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[5]See Bibliography on Zellig S. Harris for examples of early analysis of selectional restrictions.

specified set of linguistic phenomena. Such a theory has descriptive adequacy if it accurately characterizes or describes the phenomena under study. However, this characterization may be unenlightening; for example, if the phenomena are finite in number, they may simply be characterized by a list. On the other hand, a linguistic theory has explanatory adequacy if it accounts for the linguistic phenomena by explanations or characterizations in terms of some theoretical constructs.

A particular linguistic theory can have explanatory adequacy for a certain set of phenomena, but only have descriptive adequacy for a larger set of linguistic phenomena. For example, the syntactic theory of Chomsky accounts for the absence of certain kinds of constructions, namely, those that violate syntactic rules, and does not account for the absence of others, namely those which are syntactically impeccable but semantically vacuous.

If one increases the range of linguistic phenomena to include semantic considerations, a new question arises. Are there two types of phenomena about which a linguistic theory must pass an adequacy test: syntactic phenomena and semantic phenomena, or can adequacy be specified in terms of the whole range of phenomena to be characterized? Because of the two-stage development of transformational

linguistic theory, that of Chomsky on syntax and Katz on semantics, two types of deviance have developed, and also two types of selectional restrictions. It may be the case that there appear to be two types of deviance because of the history of the development of transformational grammar theory, while in reality there is only one.

The question which requires an answer in this regard is, are there genuine linguistic reasons for distinguishing between the two? That is, is there only the adequacy test on acceptability of sentences generated by a model for a linguistic theory, or are two separate evaluations to be made, grammaticality and meaningfulness? If the latter option is taken, how are grammaticality and meaningfulness related? Is one a subset of the other, or is the intersection of their influence to be described differently?

It is the contention of this paper that the gap between descriptive and explanatory adequacy can be narrowed providing that selectional restrictions are specified in terms of both syntactic and semantic features. The production of sentences can be described as a single process which generates exactly the acceptable sentences, and uses both kinds of markers in this generation. In

this manner semantic anomaly is screened out in the generative process, and does not have to be treated separately.

Because some markers are necessary to account for grammaticality as well as meaningfulness, the process of sentence generation can be seen as occurring in two stages: first, a pre-transformational stage composed of both syntactic and semantic markers and restrictions, which can be considered not to discriminate between either orientation; second, a separate development of two processes--grammatical transformations on the one hand, which are syntactic, and extra-transformational processes which are semantic.

Consider now how selectional restrictions must function within any model for transformational grammar. When such a model ignores the central role of selectional restrictions, such a model is vastly weakened and the adequacy of its characterization is in jeopardy. Typically, models proposed for transformational grammar have been primarily occupied with the syntactic formulation of the model and the description of syntactic and semantic features of individual words of a language. With the emphasis upon structure and meaning expressed on the morpheme level,

the role of selectional restrictions tends to fade into the background.

The several models for transformational grammar all give a place to selectional restrictions, but they treat them somewhat differently. In the latest complete version of the Chomskian model,[6] Chomsky develops the syntactic aspects of selectional restrictions. These restrictions come into play when the base component of the model generates the deep structure. Chomsky provides an analysis of where within the derivation of the deep structure the restrictions occur, what their nature is, and the range of their effect. An outline of this formulation and an analysis of its consequences appear in Chapter Two of this paper.

Jerrold Katz has also analysed the role of selectional restrictions.[7] He describes restrictions in terms of separate syntactic and semantic features which function in the base and semantic components of the Chomskian transformational grammar model, respectively. He particularly elaborates upon semantic selectional

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[6] i.e., the version of Aspects of the Theory of Syntax, hereinafter abbreviated as Aspects (Cambridge, 1965).

[7] The latest statement of Katz's position is in Semantic Theory (forthcoming).

restrictions and their role in the semantic component of the grammar. He develops a model for semantic interpretation of the deep structure which consists of a highly complex lexicon and projection rules. The lexicon contains all the information necessary for the combination of words into sentence constituents, including all data on semantic selectional restrictions. The projection rules accomplish the process of combining the readings of the entries in the lexicon according to the deep structure provided for the sentence by the syntactic component. A description of Katz's formulation comprises Chapter Three of this paper.

Writing from an orientation within the basic framework of the Chomskian grammar, Uriel Weinreich has criticized the formulations of the role of selectional restrictions as Katz has developed this role.[8] An underlying factor in this criticism is that Weinreich disagrees with Katz's description of the lexicon where he specifies the form of the lexical entries. In addition, Weinreich suggests a different role within the transformational model for selectional restrictions. He deviates from the Chomskian model to suggest that some semantic features

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[8]Weinreich's most direct discussion of the Katzian model occurs in "Explorations in Semantic Theory," in Current Trends in Linguistics, ed. Thomas A. Sebeok (The Hague, 1966), III, 395-477.

must be incorporated in the syntactic component; and these semantic features contain co-occurrence restrictions. An account and discussion of Weinreich's arguments is contained in Chapter Four of this paper.

Recently a counter-movement has occurred, disputing the Chomskian description of the transformational model. Proponents of this position deny that there is an independent syntactic level of deep structure in sentence generation. Rather than a separate function for the syntactic and semantic components of the grammar, they argue that a single set of rules generates the surface structure of a sentence from predominantly semantic considerations.[9] Such a change brings with it a shift in the conception of the role of selectional restrictions, for until the appearance of these suggestions, a distinction between semantic and syntactic selectional restrictions was predicated upon a separation of the semantic and syntactic component. How syntactic and semantic factors are integrated into the formulation determines the form of selectional restriction statement. The counter-movement's proposals are described in Chapter Five.

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[9]See Bibliography on George Lakoff and James McCawley.

These serious charges made by the counter-movement about the basic principles of the theory of transformational grammar force one to reassess other aspects of this theory. It is necessary that one examine with care the position that selectional restrictions hold in the theory of transformational grammar, for these restrictions play an integral part in the generation of natural language sentences. One result of the counter-movement's charges is the implication that selectional restrictions are far more important to the formulation of a model for transformational grammar than had previously been assumed.

In order to develop an analysis of the role of selectional restrictions within the body of writing whose topic is the theory of transformational grammar, it is necessary to survey and critically evaluate the writings of authors in this area. Because their general orientation puts selectional restrictions in a subordinate position, it is not possible in the case of any author to find in one location a concise and direct analysis of the role of selectional restrictions within their theory. Consequently this investigation must proceed with first outlining the development of the literature and issues involving selectional restrictions. Each of

the positions concerning the role of selectional restrictions mentioned above will be discussed and analysed in depth in the next four chapters. Then with this important background, the place of selectional restrictions in any model of transformational grammar theory and a definition of the unique role that selectional restrictions must play in any such model can be properly described and argued for. Throughout this paper the critical evaluation is oriented toward showing the importance of this role. This enables Chapter Seven to present a selectional restriction foundation on which a satisfactory model for transformational grammar can be built.

CHAPTER TWO

SYNTACTIC SELECTIONAL RESTRICTIONS WITHIN THE CONVENTIONAL FRAMEWORK-- NOAM CHOMSKY'S FORMULATION

Chomsky describes his latest formulation of the form of grammar in Aspects. In summary, it is: A grammar has a syntactic component, a semantic component and a phonological component. Whereas the syntactic component generates the sentence structure, the semantic and phonological components interpret the generated structure to account for the sentence's meaning and sound, respectively. The syntactic component has two parts--a base and a transformational component. The base has two subcomponents, a categorial subcomponent and a lexicon. The base generates deep structures which are given semantic interpretation by the semantic component. Each deep structure is also mapped by transformation rules into a surface structure. The surface structure is given a phonetic interpretation by the rules of the phonological component.[1]

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[1]Chomsky (1965), 141, 135 ff.

Of interest are the notions of the categorial component and the lexicon, the nature of deep structure, and where and in what way the semantic component enters the formulation.

As noted above, the base component consists of two subcomponents: the categorial component and the lexicon. Throughout Aspects Chomsky discusses three aspects of the base--a phrase-structure grammar, a set of subcategorization rules and a lexicon consisting of lexical entries. He places the subcategorization element in the categorial component initially;[2] later he switches it to the lexicon.[3] He concludes that the latter presentation is preferable on a formal basis, although the greater flexibility afforded by the second formulation may not be necessary for grammar. Each of these subcomponents will be considered in turn.

Categorial Component

The categorial component of the base contains rewrite rules. A rewrite rule is a rule of the form

(1) $A \rightarrow Z/X \_\_ Y$

where X and Y are strings of symbols (possibly null),

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[2]Ibid., 84-120.

[3]Ibid., 120-123.

A is a single category symbol, and Z is a non-null string of symbols. One interprets this rule as asserting that the symbol A is replaced by the string Z when it is in the environment consisting of X to the left and Y to the right. Application of the rule (1) to the string ...XAY... converts it to ...XZY... . If X and Y are null in a rule of the form of (1), it is a context-free rule which applies independently of context. If X and Y are non-null, the rule is context-sensitive.[4]

Consider as an aside how the categorial component works. The symbols in the categorial component represent syntactic categories. The rules represent the realization of a category as a sequence of other categories. Thus beginning with the category 'S' (sentence), one applies rules which successively replace a category with one or more categories. The successive application of the rewrite rules can be represented in a diagrammatic structure known in the literature as a phrase-marker.[5] These rules are responsible for generating derivations terminating in lexical category symbols, for example, N (noun), V (verb), etc.

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[4]Ibid., 66f., 120, 122-124, 141f.

[5]Consult (4) on p. 23 for an example of a phrase-marker.

Consider as an example sentence:

(2) Sincerity may frighten the boy.

The categorial component contains rewrite rules for sentence (2) which include:

(3) (a) S → NP⌢Predicate-Phrase

(b) Predicate-Phrase → Aux⌢VP (Place) (Time)

(c) $$VP \rightarrow \left\{ \begin{array}{l} \text{Copula}^\frown\text{Predicate} \\ V \left\{ \begin{array}{l} (NP)\ (\text{Prep-Phrase})\ (\text{Prep-Phrase})\ (\text{Manner}) \\ S' \\ \text{Predicate} \end{array} \right. \end{array} \right\}$$

(d) $$\text{Predicate} \rightarrow \left\{ \begin{array}{l} \text{Adjective} \\ (\underline{\text{like}})\ \text{Predicate-Nominal} \end{array} \right\}$$

(e) Prep-Phrase → Direction, Duration, Place, Frequency, etc.

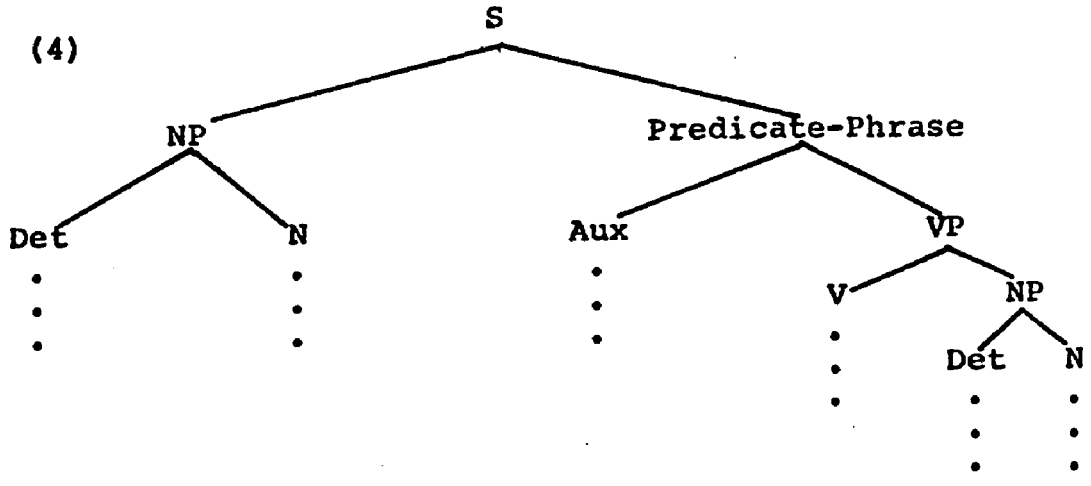
(f) NP → (Det) N (S')

(g) Det → (pre-Article⌢<u>of</u>) Article (post-Article)

(h) Aux → Tense (M) (Aspect)[6]

The categorial component portion of the phrase-marker for (2) is:[7]

(4)



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[6] <u>Ibid.</u>, 106f.

[7] <u>Ibid.</u>, 108.

Once the lexical category symbols of the string are generated, the subcategorization rules begin their role in the derivation of a sentence.

Subcategorization Rules

The subcategorization rules have several important characteristics. First, they involve development of a category into a set of syntactic features rather than into a sequence of features as is the case with rewrite rules. Second, the categories involved are those with lexical items as members. Third, such rules frequently involve cross-classification, and not hierarchial derivation. Fourth, they do not function simply as replacement rules, as do rewrite rules.

The terminal symbols of the categorial component, the lexical categories N, V, etc., are analysed by the subcategorization rules into complex symbols where each complex symbol is a set of specified syntactic features. Complex symbols are introduced by rules of the form

(5) $A \rightarrow [+A, +\alpha\_\_\beta] / \alpha\_\_\beta$, where $\alpha A \beta$ is a σ, where, furthermore, σ is the category symbol that appears on the left in the rule $\sigma \rightarrow \ldots A \ldots$ that introduces A.[8]

[8] Ibid., 99.

If the underlined condition of strict local subcategorization is adopted as a general condition on the form of grammar, then these rules can be given more simply in a form:

(6) $A \rightarrow [+A, + \alpha\_\_\beta]$.

Complex symbols are then expanded by rules of the form:

(7) $F \rightarrow G/\alpha\_\_\beta$, where F and G are syntactic features and α,β are syntactic features in context.

This rule is interpreted as specifying the addition of the syntactic feature G to the complex symbol containing the feature F.

The only characteristic of these rules that must be explicitly stated in the grammar is their position in the sequence of rules.

For our example sentence (2), the subcategorization rules are rules of the following sort:[9]

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[9] Ibid., 82, 91, 107. In these rules 'CS' (complex symbol) is an abbreviation for an appropriate set of item features, such as in (5) and (6).

(8) (a) V → CS

(b) N → CS

(c) [+Det___] → [±Count]

(d) [+Count] → [±Animate]

(e) [-Det___] → [±Animate]

(f) [+Animate] → [±Human]

(g) [-Count] → [±Abstract]

(h) [+V] → CS/α⌢Aux ___ (Det⌢β) } ,where α is an N

(i) Adjective → CS/α ••• ___ } and β is an N

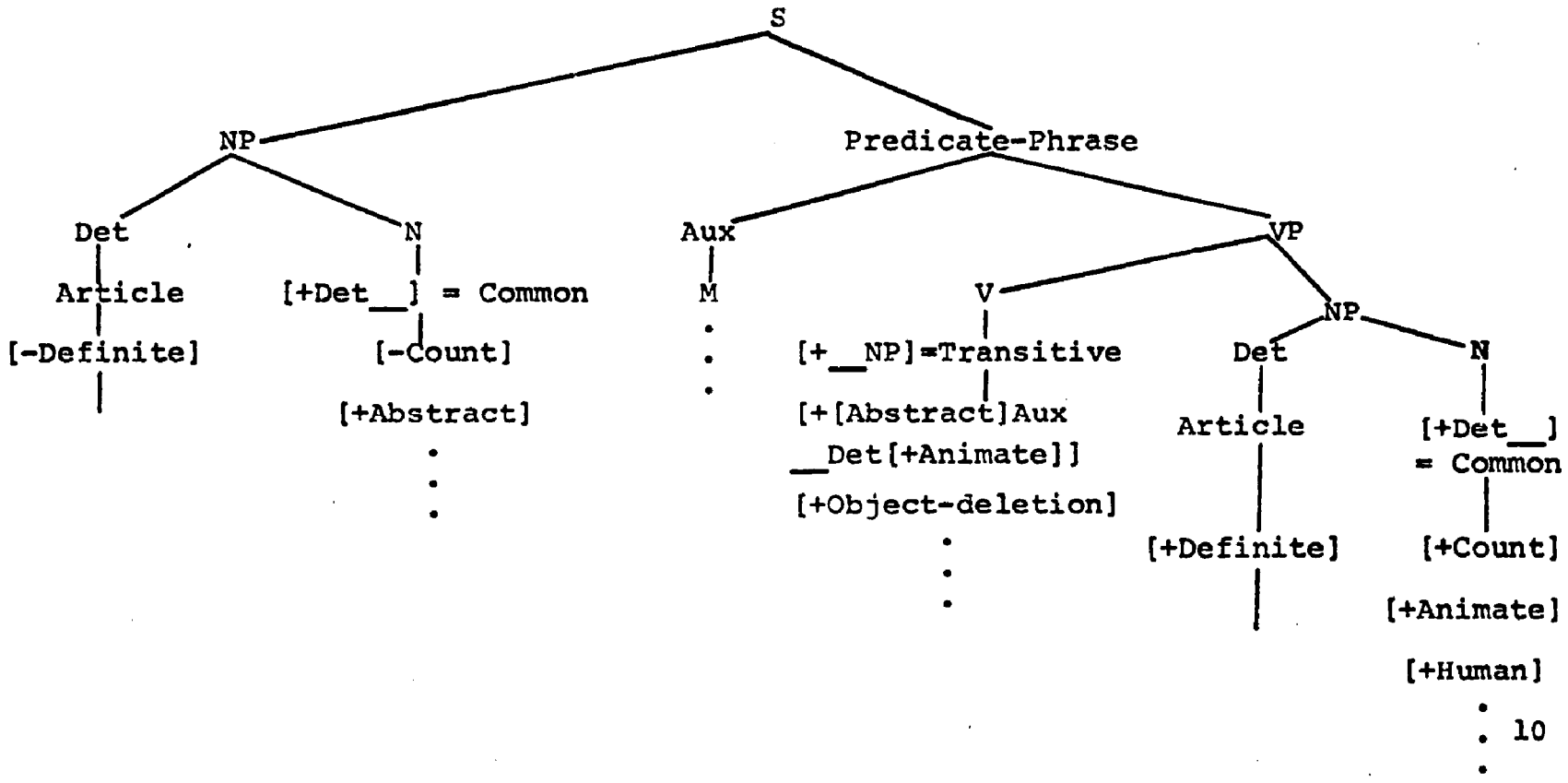
(j) Article → [±Definite]

The partial phrase-marker (4) is enriched by the above subcategorization rules to look like (9).

Note that there are two sorts of rules; they both analyse a category into a complex symbol in terms of the context in which this category appears. Rules which analyse a symbol where the context is in terms of category symbols, Chomsky names strict subcategorization rules. Rules which analyse a symbol in terms of syntactic features of the context in which it appears, Chomsky calls selectional rules.[11] One can distinguish these two types of context-sensitive rules by the kind of rule frame in which they are stated, lexical category or syntactic feature. Because lexical categories occur earlier in the

[11] Ibid., 90-94.

(9)



[10] Ibid., 108f.

derivational history of a sentence than do syntactic features in Chomsky's formulation, strict subcategorization rules are of a higher level than are selectional rules.

Chomsky introduces context-sensitive complex symbol rules to explain a possible functioning of the category V in grammar. The general rule for strict subcategorization of verbs is:

(10) V → CS/__ { NP
#
Adjective
Predicate-Nominal
like^Predicate-Nominal
Prepositional-Phrase
that^S'
NP (of^Det^N)S'
etc. } [12]

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[12] Ibid., 94.

or more generally, the rule schema

(11) V → CS/__ α, where α is a string (possibly null) such that Vα is a VP.[13]

The verb is subcategorized into a complex symbol, where the framework of the subcategorization is given in terms of the sister nodes of the node in question, i.e., among the nodes immediately dominated by VP. So, for the example sentence (2), to express the strict subcategorization feature [+Transitive], one must indicate the occurrence of the frame '__NP' which states the environment of permissible occurrence of the verb in terms of category symbols.[14]

Now consider selectional restriction rules. An example of such a rule is:

(12) $[+V] \rightarrow CS/ \left\{ \begin{array}{l} [+\text{Abstract}]\ \text{Aux}\_\_ \\ [-\text{Abstract}]\ \text{Aux}\_\_ \\ \_\_\text{Det}[+\text{Animate}] \\ \_\_\text{Det}[-\text{Animate}] \end{array} \right\}$ [15]

or a more general rule schema could be

(13) $[+V] \rightarrow CS/ \left\{ \begin{array}{l} \alpha\ \text{Aux}\_\_ \\ \_\_\text{Det}\ \alpha \end{array} \right\}$, where α is an N, α being a variable ranging over specified features.

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[13] Ibid., 96.

[14] Ibid., 93; also Noam Chomsky, Topics in the Theory of Generative Grammar (The Hague, 1966), 73 (hereinafter abbreviated as Topics).

[15] Chomsky (1965), 5.

The rules abbreviated by the schema of (12) and (13) assert that each feature of the preceding and following 'Noun' categories is assigned to the 'Verb' category and determines an appropriate selectional subclassification of it. For example, to express the feature that a verb requires a concrete subject, one would include as part of its complex symbol the feature [[-Abstract] Aux__].[16]

By rules of the sort listed above, the subcategorization is determined by a set of contexts that are syntactically definable. That is, subcategorization is expressed in terms of the syntactic framework of the base component. Notice that in (8) above (c), (d), (e), (f), (g) and (j) are context-free and (a), (b), (h) and (i) are context-sensitive. The context-free rules express inherent features, e.g., Count, Animate, Human, whereas the context-sensitive rules introduce contextual features, e.g., a particular verb, say 'command' has the feature [[+Animate] Aux__Det [+Animate]].[17] Moreover, rules (a), (b) and (j) are strict subcategorization rules and (c) - (i) are selectional rules. There is an ordering to these two types of rules in that once a selectional rule has

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[16]Cf., (12) above.

[17]Ibid., 120.

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different from the way in which they are normally understood. For example, in the noun phrase 'the insane creature,' 'insane' seems to pass the feature [+Human] onto 'creature,' but the Chomskian model denies this. Second, in cases of noun-verb agreement, features of nouns pose selectional restrictions for verbs. But there are constructions in which it is verb features that pose restrictions for nouns and actually pass such features onto the nouns. For example, the verb 'speaks' requires a human subject and may pass this feature onto the subject if it is unspecified. (Weinreich also develops an argument for transference of verb features to nouns, as will be seen in Chapter Four.) Third, note that Chomsky never uses higher constituents in his rules, but instead couches all formulation of subcategorization rules only in terms of lexical categories. Furthermore, the lexical categories involved are always adjacent ones. As a result, his model cannot account for features arising from adjectives which pose restrictions upon verbs.[20]

Note another important point with respect to the subcategorization rules. Rule (h) of (8) is stated

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[20]More will be said about these particular phenomena in Chapter Seven.

in terms of double selectional restrictions. That is, in the choice of subject and object for a given verb, agreement of complex symbol features is required between the verb and both the subject and the object before a given restriction is satisfied, and not subject or object independently. Chomsky raises the question as to whether such dual restrictions are necessary or even desirable.

For example, for the verb 'sing,' the dual requirement would be:

(14)

$$[+V] \rightarrow CS/ \left\{ \begin{matrix} [+Animate]Aux\_\_Det[+Abstract] \\ [+Animate]Aux\_\_Det[-Abstract] \end{matrix} \right\}$$

Since the choice of subject and object requirements are independent, however, these double restrictions could be replaced by the single restriction :

(15)

$$[+V] \rightarrow CS/ \left\{ \begin{matrix} [+Animate]Aux\_\_ \\ \_\_Det[+Abstract] \\ \_\_Det[-Abstract] \end{matrix} \right\}$$

Notice in (14) the same subject requirement is repeated, and in the (15) formulation it need be stated only once.

Chomsky remarks that he is not convinced that this sort of redundancy is acceptable in the final

analysis.[21] The formulation of double selectional restrictions does prevent ungrammatical sentence formations from occurring, but the important question of the form of feature specifications for lexical items with a range of distinct yet related features remains unsettled. However, in Chapter Six we argue that double restrictions are indeed necessary and do not always involve such redundancies.

The Lexicon

The lexicon is another area in Chomsky's formulation of grammar. It is:

> ...simply an unordered list of all lexical formatives. More precisely, the lexicon is a set of lexical entries, each lexical entry being a pair (D,C), where D is a phonological distinctive feature matrix "spelling" a certain lexical formative and C is a collection of specified syntactic features (a complex symbol).[22]

The lexicon lists all properties of a formative which are idiosyncratic in nature. The form these lists take is a set of features.[23] The lexicon specifies all

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[21] Ibid., 118f.

[22] Ibid., 84.

[23] The examples Chomsky uses have only phonological and syntactic features, for he considers that a formulation for these is readily available. He remarks that although from the Katz and Fodor work inclusion of semantic features is necessary, for ease of exposition he regards the entry only as a pair.(cf. fn. 15, 214.)

aspects of phonetic structure that are not incorporated into a general rule. It stipulates properties necessary for transformation rules to function, and properties relevant for semantic interpretation, including dictionary definition components. It also contains information about the proper placement of lexical entries in sentences.[24]

To continue the use of our example sentence (2), the lexicon for this sentence might be:

(16) (a) (sincerity, [+N, +Det__, -Count, +Abstract, ...])

(b) (boy, [+N, +Det__, +Count, +Animate, +Human, ...])

(c) (frighten, [+V, +__NP, + [+Abstract] Aux __Det [+Animate], +Object-deletion, ...])

(d) (may, [+M, ...])[25]

With the addition of the lexical entries the completed phrase-marker could then be:

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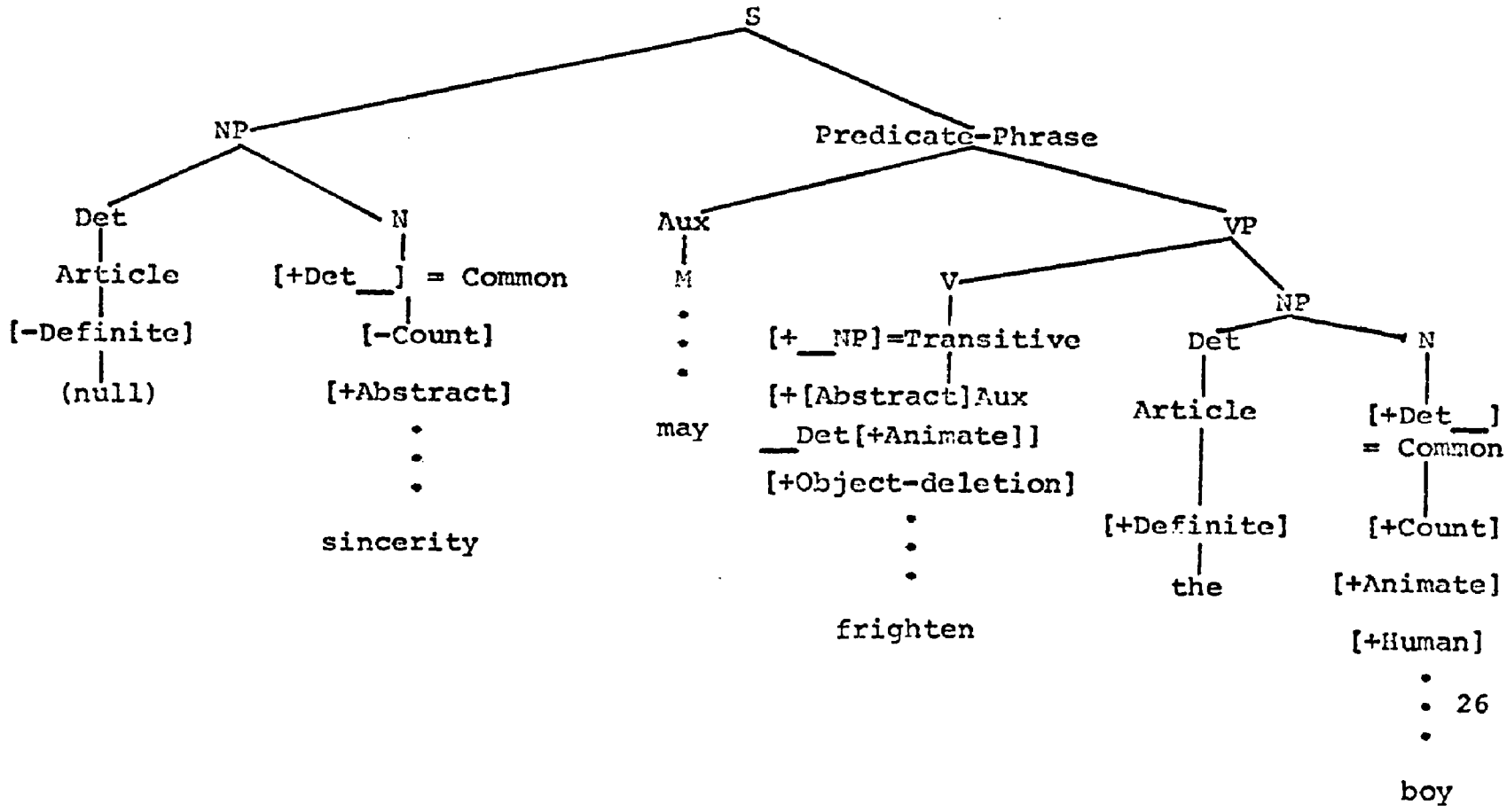
[24] Ibid., 87f.

[25] Ibid., 107. Chomsky notes, p. 110, that these lexical items are not fully specified as to their syntactic features, and no semantic features are given at all.

(17)



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[26] Ibid., 108f.

In discussing the features of the lexical entry in Topics in the Theory of Generative Grammar (hereinafter abbreviated as Topics), Chomsky follows the same conceptual line he begins in Aspects; however, he does add a few examples of the several features. They may be "...phonological (e.g. [+Voiced$_n$], where n is an integer indicating position), semantic (e.g. [±Artifact]), or syntactic (e.g. [±Proper])."[27]

Supposedly the dictionary definition for each lexical item consists of the set of semantic markers, semantic restrictions and distinguishers that Katz and Fodor define as the dictionary component in the process of semantic interpretation. Chomsky admits that some of the features of the lexical entries are semantic and they are

> ...presumably drawn from a universal "alphabet," but little is known about this today, and nothing has been said about it here. We call a feature "semantic" if it is not mentioned in any syntactic rule, thus begging the question of whether semantics is involved in syntax.[28]

By the introduction of the lexicon into the syntactic component, Chomsky has in effect pulled along

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[27]Chomsky (1966), 70.

[28]Chomsky (1965), 142.

into it the elements of the terminal string which are the basic units of semantic interpretation. Thus all the selectional restriction information is present in the base component of the grammar.

Chomsky stresses that separating the lexicon from the rewrite rule aspect of grammar is advantageous. In general the lexicon becomes the repository for all idiosyncratic features. Features that are irrelevant to the functioning of the rules of the base, such as the transitive verbs which do and do not permit object deletion, can now be specified for the relevant lexical formatives in the lexicon, and so greatly simplify the rewrite rule part of the grammar.

Matching Lexical Entries to Complex Symbols

The terminal string of the generalized phrase-marker is formed from the pre-terminal string by insertion of a lexical formative according to the lexical rule:

(18) If Q is a complex symbol of a preterminal string and (D,C) is a lexical entry, where C is not distinct from Q, then Q can be replaced by D.[29]

This rule is a rewrite rule which introduces portions of the lexicon into the preterminal string whose derivation to this point has been in the categorial component.

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[29] Ibid., 84.

Chomsky also considers as an alternative to having the subcategorization rules in the categorial component that these rules be assigned to the lexicon.

By either convention for lexical entry, particular lexical items are inserted into the preterminal strings of phrase-markers only if there is a coincidence between a required characteristic of the terminal node of the string and a corresponding feature set as part of the definition of the lexical item. Thus by a matching rule the selection process occurs when the lexical items are plugged into the syntactic component.

Chomsky has not precisely described the entire structure of the lexicon, but he has discussed some of the factors which need to be determined. One such factor concerns the conventions for the form of lexical entries. A single lexical item could be formulated so it contains more than one categorial symbol; for example, the word 'run', which can be either a noun or a verb, could be specified as one lexical item. Or else the convention could be adopted that a word specified as belonging to two lexical categories must have separate lexical entries. In the former case the item would contain a disjunctive set of features, and the features retained in the lexical string would be just those needed to guarantee lexical insertion.

The advantage to this formulation, as Chomsky remarks, is that transformationally related strings would contain largely the same formatives; for example, "...proof that S..." and "...prove that S..." would be related on the lexical item level and the former would not have to be derived from the latter by a nominalization transformation.[30] In the latter case of lexical item conventions, only that individual lexical entry would be inserted whose categories and complex symbols match the required features in the phrase-marker. Chomsky's comment about either development is that it raises unanswered questions about the structure of the lexicon.

Since the structure of the lexicon depends upon semantic features as well as syntactic ones, and some selectional restrictions have both syntactic and semantic aspects, before one comments on the structure of the lexicon, one must analyse in detail the development of the semantic component of the Chomskian model. Therefore, further considerations with respect to the lexicon will be deferred until later chapters.

Semantic Component

Chomsky reiterates that he agrees essentially with the semantic component formulation as Katz and Postal

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[30]Chomsky (1965) 219f, fn. 29.

describe it (1964).[31] In the new terminology of Aspects, the deep structure generated by the syntactic component is precisely the generalized phrase-marker which is the basis for semantic interpretation. If one agrees that the role of the semantic component is purely interpretive, then all the information necessary for this component's proper functioning must be presented in the base component, for interpretation depends only upon the lexical items and the grammatical relations expressed in their derivation.[32]

> ...we are led to the following conception of how the semantic component functions. This interpretive component of the full generative grammar applies to a deep structure and assigns to it a semantic representation, formulated in terms of the still quite obscure notions of universal semantics. The deep structure is a labeled bracketing of minimal "meaning-bearing" elements. The interpretive rules apply cyclically, determining the semantic interpretation of a phrase X of the deep structure from the semantic interpretations of the immediate constituents of X and the grammatical relation represented in this configuration of X and its parts.[33]

In Chomsky's opinion the basic alternative to general dependence upon the syntactic component would be to rely

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[31] Ibid., fn. 10, 198.

[32] Ibid., 75, 117, 132-136. Also, Chomsky (1966), 71.

[33] Noam Chomsky, "The Formal Nature of Language," Biological Foundations of Language (New York, 1967), 418.

upon "unanalyzed semantic intuition" which he immediately rejects.[34]

Placement of Subcategorization Rules in Syntax or in Semantics--The Particular Case of Deviant Sentences

The violation of subcategorization features in a derivation causes a sentence to be deviant in some fashion. Whether the subcategorization rules are placed in the syntactic or the semantic component, the nature of deviance can be clearly outlined. If the syntactic component accounts for deviance, it should be designed so as not to generate such deviant sentences directly, but to assign them phrase-markers only by virtue of their similarity to well-formed sentences; thus phrase-markers are assigned by rules which define well-formed sentences and which allow deviant ones only by relaxing some syntactic condition(s). If, on the other hand, the semantic component accounts for deviance, then the syntactic component generates both well-formed sentences and those which are deviant with respect to some subcategorial feature. The lexical items are specified with all their subcategorial features in such a way that the rules of

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[34]Chomsky (1965), 75.

the semantic component can distinguish between acceptable and deviant sentences.[35]

Chomsky develops an argument to indicate how the distinction between strict subcategorization features and selectional features correlates closely with a distinction between classes of deviant sentences and also with the degree of their deviance from grammaticality.[36] In all cases the violation of a subcategorization rule leads to a deviant sentence; however, Chomsky shows that the grammar he develops can distinguish between two major types of deviant sentences. He gives examples of three sets of sentences, one set of which is well-formed. Of the deviant sets, the most deviant examples occur as violations of strict subcategorization rules in which there is a violation of a contextual feature which is specifiable in terms of a grammatical category co-occurrence requirement. These sentences are clearly very deviant and barely interpretable, if at all. Such sentences are like

(19) (a)*John became Jack to leave

(b)*Susan ate sad.

The other set of deviant sentences are deviant because they violate selectional feature requirements.

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[35]Ibid., 78f.

[36]Ibid., 148ff.

In this case the violation is on the level of a conflict of features between those of the complex symbol of the sentence string and the members of the feature list attached to the lexical item inserted at the particular node. Examples of such selectional restriction violation includes

(20) (a)*Tennis plays Mike

(b)*She may swim the idea.

On occasion these strings have a metaphorical interpretation, and a judgment of their deviance cannot be clearly made.[37]

From sets of examples which reflect the rules of subcategorization, and from an exposition of the intuitive notion of degrees of grammaticalness, Chomsky concludes that the rules of the grammar impose a partial ordering of deviance in terms of the features that compose the complex symbols. Thus for the lexical item of 'frighten' (16) the symbol and the ordering of its features is [+V, +__NP, +[+Abstract] Aux __Det [+Animate]]. From this ordering one can state the degree of deviation. "The deviation is greater the higher in the dominance hierarchy is the feature corresponding to the rule that is relaxed."[38] Chomsky adds that further ordering seems

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[37]Ibid., 148f.

[38]Ibid., 152.

to occur among rules involving high and low level selectional features.

However, Chomsky immediately introduces a complication to this clear-cut ordering of deviance types. In addition to strict subcategorization rules and selectional restrictions, there are other considerations which involve syntactic features. They are not selectional restrictions since violation of them produces deviance on a much higher level than violation of selectional rules.[39] Also, although Chomsky does not mention this, they seem typically to involve the later transformational operations performed on sentences.

The first example type involves violation of rules which refer only to the intrinsic features of nouns. In particular, this example involves violation of rules which have the feature [±Human]. This violation concerns a relative clause in which the aspect of [±Human] which requires selection of the particular form of the relative pronoun according to the feature [+Human] is violated.[40] Consider:

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[39] Ibid., 150, and fn. 3, 227.

[40] Ibid.

(21) (a) The book which you read was a best seller.

(b)* The book who you read was a best seller.

Although Chomsky provides no further analysis of this example, it is still possible to comment further concerning this problem. The underlying structure for the pair of sentences (21) is:

(22) The book/wh you read the book/was a best seller.

A transformation operates on the relative position here designated as 'wh' together with the repeated noun. It turns this relative pro-form and a noun having the feature [-Human] into 'which', or the pro-form and a noun having the feature [+Human] into 'who(m)'. This transformational operation explains why (21a) is correct and (21b) is not.

In Chapter Seven such situations are shown to pose a serious objection to the Chomsky-Katz model. Briefly, they involve cases where the noun is not specified with respect to the feature [±Human], and so no determining feature is attached to the noun for the relative clause transformation to operate upon.

The second example type involves adjective-noun restrictions when the adjective is a transformational derivation of the verb. The examples here concern violation of some apparently syntactic feature which prevents the adjective from properly combining with the noun. Chomsky claims that the feature in question is the verb feature [[+Abstract]...__[+Animate]]. Adjectives derived from verbs that are positively specified for this feature can appear in the position of "pure Adjectives" in the frame

(23) A very _____ person appeared.

Verb forms such as 'frightening' with the above feature can be substituted in this frame, but verb forms such as 'walking' cannot.[41]

Suppose we examine this second example type in more detail. Examples of sentences whose verbs do and do not have the feature in question include:

(24) (a) Love frightens a skeptical person

(b) The lawyer walks his dog frequently.

Consider the feature specification of some of the lexical items in these examples. With the help of Webster one

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[41] Ibid., 150f.

can generate the following descriptions:

(25) (a) frighten (+V, +__NP, [[+Abstract]..._..._ [+Animate]], ...)

(b) walk (1) (+V, +__NP, [[-Abstract]..._..._ [+Animate]], to cause to walk, e.g., 'John walked the horses.')

(2) (+V, +__PP, [[-Abstract]..._], to advance by steps

One can immediately determine that 'walk' could not be substituted in the frame (23), because it does not contain the required feature that Chomsky gives for this frame. Surely

(26)* A very walking person appeared

is unacceptable. However,

(27) A very frightening person appeared

is acceptable, and notice that it is appropriately specified as to the feature in question. However, one can also find many instances in which the verb 'frighten' has a subject whose feature is not [+Abstract]. To cite a few:

(28) (a) Grandfather frightens his listeners with old war stories.

(b) The newspaper headlines frightened the city residents.

One then sees that 'frighten' has an additional feature

to the one specified in (25), namely [[-Abstract..._..._ [+Animate]]. In fact, examples (24) and (28) show that 'frighten' generates acceptable sentences with either feature specification.

Further, one can say even more about the permissible features involved in the frame (23). Even though 'frighten' is acceptable with its two particular specifications involving [+Abstract] and [-Abstract] in the subject position, the feature [..._..._[+Animate]] is not a proper substitute, because 'walk' would satisfy this requirement, yet it is not acceptable in the frame (as shown by (26)). In addition, a verb, such as 'implies' which requires the feature [[+Abstract..._] will not fit into (23) either, because the frame requires an object specification of [+Animate] for 'person.' Thus any verb which will fit the frame for (23) must have both feature forms, as does 'frighten,' and not just the one suggested by Chomsky.

From this analysis one must conclude that it is not sufficient to explain the syntactic violation in the case of the adjective-noun set as a violation of the particular syntactic feature in question. Perhaps what is needed is to specify a selectional restriction for

'very' upon the adjectives with which it co-occurs. One further point: this entire discussion of the feature [±Abstract] entails a distinction between single and double selectional restrictions, which will be further investigated in Chapter Six.

However, the general point of this elaboration is that selectional features are consistently more complicated than Chomsky implies by his examples, and if they were utilized in a more extensive manner than he designates, could provide some possible solutions to issues such as the above two example types portray. At the least, more investigation is required into these phenomena, and Chomsky's comment is well put that

> ...it is clear that the intuitive notion of grammatical well-formedness is by no means a simple one and that an adequate explication of it will involve theoretical constructs of a highly abstract nature.[42]

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[42] Ibid., 151.

CHAPTER THREE

SEMANTIC SELECTIONAL RESTRICTIONS WITHIN THE CONVENTIONAL FRAMEWORK-- JERROLD KATZ'S ELABORATION

Jerrold Katz, along with his colleagues, Jerry Fodor and Paul Postal, introduced into linguistics a systematic discussion of semantic theory. He has always maintained the position[1] that the role of semantic theory is to explain linguistic meaning within the framework of the model for transformational grammar proposed by Noam Chomsky.

The model that Katz has developed for semantics describes how semantic interpretations are derived from underlying phrase-markers as a compositional function of the meaning of the sentence constituents and their syntactic organization. This semantic component model contains a dictionary of the individual formatives, i.e, words or morphemes, of a language as well as rules for combining the formatives into meaningful sentences.

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[1]The first important article is "The Structure of a Semantic Theory" reprinted in Fodor and Katz (1964).

Katz's latest discussion[2] completely adopts the new formulation of the syntactic component in Aspects, for he considers his formulation to be a continuation of semantic theory discussion, as Chomsky anticipated it. Katz attempts to develop a complete semantic theory to explain the nature of the semantic component. As a part of this theory he undertakes an extensive analysis of the structure of the lexicon and the notion and use of projection rules; he considers these subcomponents to hold the key to semantic theory discussion.

The syntactic basis of the conventional framework has been outlined in Chapter Two. A natural progression from this description is to the semantic theory of this model. Katz's formulation of the semantic component consists of two subcomponents, the lexicon and the projection rule(s). The lexicon, or dictionary, contains all the individual morphemes of the language, along with meanings and some syntactic information. The projection rule(s) amalgamates the several morphemes and their senses to derive a meaning (or more than one meaning) for a sentence. It operates according to the structure given by the phrase-marker of the sentence and the restrictions specified within the lexical items.

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[2]Semantic Theory, (forthcoming).

Semantic selectional restrictions occur in the semantic component as elements of the lexicon. They are present on the individual morpheme level, for they stipulate restrictions of that morpheme's amalgamation with other morphemes to form higher level constituents of a sentence. To understand how the semantic selectional restrictions operate and the range of their effect, one must analyse Katz's latest formulation of the lexicon and projection rule.

The Lexicon

A. The Form of the Lexical Entry

Katz claims that the proper formulation of the structure of the lexicon provides the answers for all fundamental questions of semantic theory. From its introduction in "The Structure of a Semantic Theory" until the present, the lexicon has been the storehouse for the linguistic meanings of the individual morphemes, or lexical items. The newest development concerning the lexicon has consisted of a technical analysis of the semantic parts of the lexical entry and their structure.

One must begin by considering some of Katz's technical terminology:

> We shall use the term sense in its customary usage to refer to one of the different meanings which a morpheme (or expression) may bear and reserve the term meaning for the collection of senses that a morpheme (or expression) has. Accordingly, the meaning of a morpheme, or as we shall say, a lexical item, is the set of senses it has in the dictionary and the meaning of a complex expression is the set of senses it has on the basis of the meanings of its parts and their mode of semantic composition. Thus, a dictionary entry will contain a semantic representation for each sense of its lexical item, and the semantic representation of the meaning of a lexical item will be taken to be the set of semantic representations of its senses.[3]

Katz introduces several technical terms to elaborate upon the sense of an item. With respect to 'reading':

> We use the term reading to refer to a semantic representation of a sense of a morpheme, word, phrase, clause, or sentence.[4]

Concerning 'semantic marker':

> We use the term semantic marker to refer to the semantic representation of one or another of the concepts that appear as parts of senses.[5]

Some markers must have a complex internal structure to reflect the complex concept they represent.[6]

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[3] Ibid., II, 35.

[4] Ibid., 36.

[5] Ibid.

[6] Ibid., 37. Several chapters of this book develop some aspects of the nature of such structure.

Another term which is an integral part of any dictionary discussion is selection restriction:

> A selection restriction states the condition under which the sense represented by the set of semantic markers can combine with others to form a sense of a syntactic complex constituent. The selection restriction in a reading specifies the semantic markers that other readings must have (or not have) in order that they may combine with it to form derived readings.[7]

A lexical reading for an item consists of a set of semantic markers and a single selectional restriction.[8]

After outlining the semantic parts of a dictionary entry, Katz discusses how such an entry is formed from these parts consistent with Chomsky's theory in Aspects. Recall that Chomsky describes the lexicon as a set of entries each of which is a pair (D,C), where D is the phonological information and C is a collection of specified features containing both category and complex symbols.[9] Katz adopts this formulation and extends it only to include the semantic part of lexical entries.

> A dictionary entry is a lexicon entry paired with a set of lexical readings, one for each sense of the lexical item...[10]

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[7] Ibid., 46.

[8] Ibid., 47.

[9] Consult supra, Chapter Two, pp. 34-38, for a more complete discussion.

[10] Katz (forthcoming), II, 47.

The form of the dictionary entry is such that the syntactic parts of the lexical item specification are unambiguous; that is, there is a separate entry in the lexicon for each different set of syntactic features for a lexical item. The semantic part of the dictionary consists in the assignment of a set of lexical readings to each lexical entry of the lexicon.[11] Consequently, it is possible for a lexical item to be semantically, but not syntactically, ambiguous.

There are several possible alternatives for the general form of the lexicon. It could be a separate dictionary referenced only when a sentence is semantically interpreted, or it could be incorporated with the lexicon of the syntactic component which Chomsky describes. Which is more desirable for the linguistic theory in question--to have two dictionaries, to have distinct operations with the same dictionary for the syntactic and semantic components, or to have all the syntactic and semantic lexical information inserted with the lexical item into the terminal string?

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[11]This point was specifically made in conversation; Katz (forthcoming), III, 15, speaks to this point, yet does not make the precise distinction; also III, 30.

It should be remembered that the lexical insertion process in the syntactic component depends upon a matching between the categories and complex symbols of the preterminal node of the underlying phrase-marker and the entry list of the given lexical item. Were the option of single insertion chosen, the semantic information carried along would receive no analysis on the syntactic level; they would simply be present for later expansion by the semantic component. On the other hand, were the option of double insertion of lexical items chosen, the syntactic information for a given lexical item would be incorporated in the appropriate place in the generation of the underlying phrase-marker, and the semantic information would be incorporated separately as an initial activity in the semantic component.

Katz says that the entire lexical item must be present in the underlying phrase-marker as a result of the syntactic component:

> Since the underlying phrase markers are the sole objects that undergo semantic interpretation, the underlying phrase markers for a sentence must contain all the parts of the sentence that have senses and all the parts whose senses contribute to the derived senses of other meaningful parts. If these phrase markers did not contain the lexical items

> of the sentence, not only would some of the meaningful parts of the sentence, namely, its lexical items, not be available for semantic interpretation, but because the lexical items are the elements out of which all the other constituents of a sentence are built, none of the constituents of the sentence could have their meaning explained as a compositional function of the meanings of their elementary components.[12]

The above quotation, simply stated, goes beyond Chomsky's argument that the terminal string of a phrase-marker contains lexical items. Chomsky discusses the syntactic elements present in the terminal string, but he never mentions whether any semantic elements are included. Katz has an opinion concerning how the lexical readings should be incorporated into the model:

> The simplest form of this convention would be the stipulation that the set of lexical readings paired with a lexical item in a dictionary entry is carried along with the lexical item when the lexical rule of the syntactic component inserts that item in a preterminal string.[13]

Katz feels that whether the insertion process occurs once or twice is not crucial for the theory, but the above convention is preferable because of simplicity.[14]

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[12]Katz (forthcoming), VIII, 39f.

[13]Ibid., II, 49.

[14]Point made in conversation with Jerrold Katz on April 16, 1969, at Rockefeller University. Also a variation of this point is made in III, 24.

B. Selectional Restrictions

Katz comments further in his forthcoming book on the role of selectional restrictions in the semantic component. He considers it the express function of semantic selectional restrictions to detect semantic anomaly and contradiction, and to account for their origins. He states that an anomalous reading is given to a constituent if amalgamation within that constituent is blocked by some violation of selectional restrictions. An example of an anomalous sentence is:

(1)* It is a strawberry flavored truth.

A contradictory reading is given to a constituent if the semantic markers of two elements of the constituent are antonyms. An example of a contradiction is:

(2)* His remark is important and trivial.[15]

Concerning semantic anomaly and contradiction, Katz makes an interesting observation: the former is a graded concept and the latter is an absolute one.[16] Thus it is possible to say that one sentence is more anomalous than another, while every contradiction is equally contradictory. Katz does not discuss the

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[15] Ibid., 64.

[16] Ibid., 65.

relationship between contradiction and anomaly further; in particular he is silent concerning whether contradiction is a special case of anomaly or a class of its own.

We cannot precisely delineate the place of contradiction and anomaly now, but will in Chapter Seven. Nevertheless, some comments are in order. If one considers the definitions as given above, the question seems to depend on whether or not the antonymy of two elements of a constituent is sufficient to block amalgamation. If so, then a contradiction must be an extreme form of an anomaly. But this is strange because a contradiction seems to be more meaningful than an anomaly--a contradiction combines incompatible conceptual components to express a proposition which is false. An anomalous sentence, however, combines concepts which are mutually inapplicable and so fails to express a proposition.

Selectional restrictions specify what constituents can co-occur in a sentence. The selectional demands that a constituent puts on its sister constituents serve as criteria for conceptual relatedness. In the case of contradiction a term and its antonym are conceptually

related, i.e., they apply to the same kind of things. Therefore, amalgamation is not blocked. Thus there is surely a distinction to be made between contradiction and anomaly.

Katz pursues the topic of semantic anomaly further with a consideration of anomalous constituents:

> A necessary but not sufficient condition for a sentence to be semantically anomalous is that it contain a conceptual incongruity of the sort represented by the failure of a reading to satisfy a selection restriction.[17]

It is possible for anomaly to occur among any of the sub-constituents of the sentence or in the sentence as a whole. On the one hand he gives the example that the sentence:

(3)* Prepositions feel oily

is anomalous, not because of component constituent readings, but because of the whole sentence reading.

Consider the phrase-marker for this sentence. It has a form something like:

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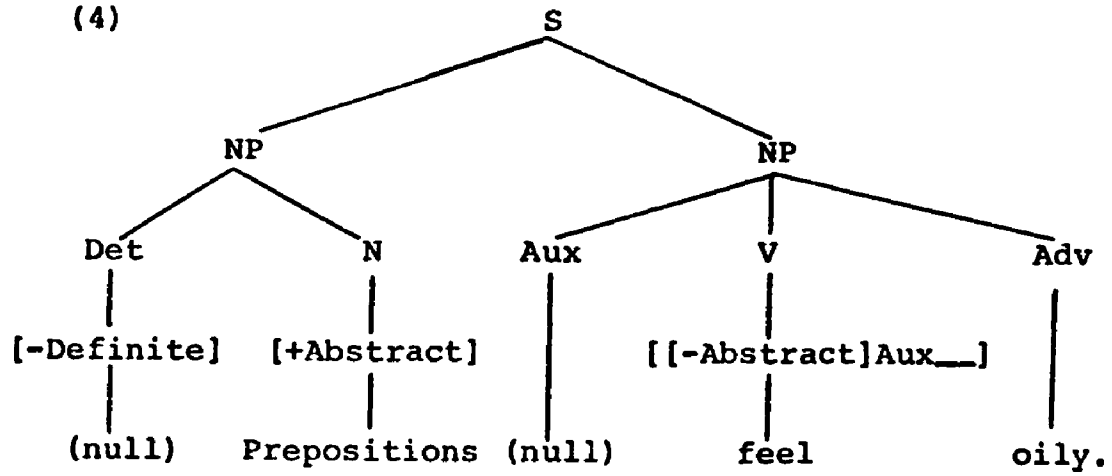
[17] Ibid., 65-66.

(4)



It is anomalous because a violation of selectional restrictions occurs at the sentence constituent level, namely when the NP and VP amalgamate to generate the semantic interpretation for the whole sentence.

On the other hand, component constituents can be anomalous and the whole sentence have a satisfactory reading as in cases like:

(5) We would think it queer indeed if someone were to say that he smells itchy.

Upon examination of a sentence such as (5), one can see that the clause 'he smells itchy' is anomalous on the level of the whole constituent, because 'smells' and 'itchy' contain features which are inappropriate in combination. However, within a higher level clause of the phrase-marker for this sentence, there exists a selectional specification which allows the anomalous

constituent to be acceptable, namely that the verb 'say' can take an anomalous constituent as a direct object.

Notice that in analysing the examples (3) and (5) the arguments are given in terms of the selectional requirements of the constituents; such a description appears to be appropriate here.

Katz develops an argument concerning constituents in some detail, but in an entirely different manner from the above analysis. For the types of sentences in which a constituent part is anomalous while the whole sentence is meaningful, Katz suggests they are of the form of meta-linguistic statements whose meaning is that an anomalous sentence was uttered or written (actually or hypothetically) but not that an object-level proposition was stated.[18] Since the proposition expressed by such a sentence can only be of a meta-linguistic sort, Katz thinks that no such sentences could be linguistically meaningful on the object level.

In his general description of the lexicon, Katz avoids any discussion of selection restrictions in terms of syntactic categories or complex symbols. He works out in detail only the aspects of the lexicon which are part of the semantic component. In fact,

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[18] Ibid., 66f.

there is no discussion at all about syntactic selectional restrictions until Katz criticizes some of the proposals of James McCawley. These arguments will be analysed in Chapters Five and Six. However, it is interesting that Katz adopts in every detail Chomsky's exposition of the syntactic component, with never a comment or even minor evaluation.

There is an important consequence of Katz's methodology. It fosters the total separation of syntactic and semantic selectional restrictions in the Chomsky-Katz model. That the restrictions are mutually exclusive causes problem areas in the Chomsky-Katz model which will be discussed in Chapters Six and Seven.

Projection Rules and the Categorized Variable

A. The Projection Rule and Its History

In the characterization of the semantic component of the Chomskian model, Katz has consistently discussed two subcomponents, the lexicon and the projection rules. The lexicon supplies the lexical items for the sentence string. The projection rules combine the readings for the lexical items according to the structure given in the phrase-marker of the sentence string and derive null, one or multiple readings for the sentence as a whole.

In an early article concerning the semantic component, Katz describes amalgamation of words to form sentences as a function of various projection rules, each specifically designed to account for a particular derivation. For example, there is a rule for combining adjectives and nouns, and one for combining subjects and verbs, etc.[19]

As Katz and his colleagues developed this semantic model further, the notion of projection rule became a more general one. The next formulation of the theory[20] characterizes the projection rule notion as consisting of two types of rules, singular and generalized ones. The singular rules amalgamate all constituents of a single, simple phrase-marker into the reading(s) for the entire string. The generalized rule accounts for embedding constituents into complex phrase-markers.

The latest formulation of the semantic component[21] discusses the notion of projection rule in the most general form in its history. Katz revises the notion of projection rules so that there is only one

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[19]Fodor and Katz (1964).

[20]Katz and Postal (1964).

[21]Katz (forthcoming).

type of such rule, and it has the form of a general substitution rule. Such elimination is possible because Katz includes the necessary information in the lexical entry to determine "the particular form of semantic combination required in connection with different grammatical relations" and to determine "the point at which one reading will embed in another to form a derived reading."[22] Katz incorporates dummy symbols called categorized variables into the lexical entry to mark the place in the lexical reading where projection rules operate. Katz states the projection rule informally as follows:

> This rule operates by substituting the reading of a constituent for a categorized variable in the reading of another constituent just in case the constituents bear a grammatical relation to one another and the governing selection restriction is met; it assigns the result of the substitution as a derived reading to the constituent whose subconstituents provided the substituent and reading in which it was substituted.[23]

To gain a complete picture of the interworking of the projection rule and categorized variable, a detailed description of the categorized variable is necessary.

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[22] Ibid., III, 88.

[23] Ibid., 88f. The formal rule can be found on p. 89 of the Katz chapter. The above informal representation is sufficient for our purposes.

B. The Categorized Variable

Katz has stated throughout his publications that semantic markers of sentences have an internal structure which reflects the conceptual structure of the concepts they represent. Only with his latest study of semantic theory has Katz discussed in detail the nature of this structure. In order to understand how Katz develops this structural description, consider his example of the reading for the most familiar sense of 'chase':

(6) ((Activity) ((Physical) ((Motion) ((Speed$^{(Fast)}$) (Following Y))) ((Purpose) ((To catch Y)))) of X)[24]

> The semantic marker '(Activity)' distinguishes "chase" from state verbs, such as "sleep," "wait," "suffer," "believe," etc. and from process verbs, such as "grow," "freeze," "dry," etc. It classifies it together with other activity verbs, such as "eat," "speak," "walk," "remember," etc., assuming they have '(Activity)' in their lexical readings. The semantic marker '(Physical)', together with the bracketing, indicates that the activity is qualified as to its nature: '((Activity) ((Physical)...( )))' says that chasing is a physical activity. This distinguishes "chase" from verbs like "think," "remember," "imagine," etc., which would be appropriately qualified in their lexical readings to indicate that thinking, remembering, and imagining are mental activities.[25]

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[24] Ibid., 76.

[25] Ibid.

He continues:

> The semantic marker '(Motion)' indicates that chasing involves movement from place to place. This movement is necessarily done at a fast speed, as indicated by the semantic marker '(Speed(Fast))' which distinguishes "chase" from "creep," "walk," "trail," etc. Also, this movement is marked as having character of following, which distinguishes "chase" from "flee," "wander," etc. But it is necessary that the person or group doing the chasing have the purpose of trying to catch the thing being chased. This is indicated by the semantic marker '(Purpose)' together with the semantic marker it encompasses. This makes "chase" fall together with "pursue," on the one hand, and contrast with "run after," "follow," "trail" on the other.[26]

And to complete the description:

> The symbols 'X' and 'Y' are categorized variables. They designate the positions in readings at which other readings can be substituted by projection rules. 'X' is the variable for which readings of subjects can be substituted and 'Y' the variable for which readings of objects can be substituted. Thus, 'X' and 'Y' in (3.61) [(6)] designate, respectively, the position at which readings of the subject of "chase" can go and the positions at which readings of the object of "chase" can go.[27]

The important factor which requires close scrutiny in the above description of the reading for 'chase' is the categorized variable. The variable, designated as 'X' and 'Y' above, has as its range of values the readings that may be substituted for it. The variable is categorized in that its permissible readings are determined by

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[26] Ibid., 77.

[27] Ibid., 78.

the category of the variable:

> Thus, the letter 'X' designates one category, i.e. readings of subjects of the constituent in whose reading it appears, 'Y' another, direct objects, 'Z' still another, say indirect objects, and so forth.[28]

A categorized variable occurs on the lexical item level in readings wherever reference is made to other grammatical relations:

> Given a variable V categorized for the grammatical relation R in a reading for a constituent C_j that bears R to C_i, the readings of C_j are the values of V. Any such readings may be substituted for V just in case they satisfy the selection restriction associated with the occurrence of V in R.[29]

A description of the general form of the categorized variable follows. The categorized variable consists of a notational abbreviation 'X,' 'Y,' 'Z,' etc. of the grammatical relation that chooses the constituent to satisfy readings. There are brackets and angles also associated with the symbol 'X':

> The brackets contain a specification of a grammatical function and optionally a semantic condition, while the angles contain a function of semantic markers. Each of the letters 'X,' 'Y,' 'Z,' etc. is to be thought of as definitionally replaced by one such complex symbol of the form:

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[28] Ibid.

[29] Ibid., 78f.

(3.62) $[B_1 , B_2 , \ldots, B_k \{C\}]$

$< F \ (M_1) , (M_2) , \ldots, (M_j) >$

where the B's are category symbols of the base of the syntactic component and C is a semantic condition. The grammatical function appearing inside the brackets expresses the categorization of the variable and the semantic condition if there is one restricts the range determined by the category. The function of semantic markers in the angles is a selection restriction for the values of the variable.

Accordingly, the categorized variables to be used in semantic markers will be chosen from the enumeration:

$$\underset{\substack{X \\ < >}}{[NP, S]} \quad , \quad \underset{\substack{X \\ < >}}{[NP, VP, S]} \quad , \quad \underset{\substack{X \\ < >}}{[NP, PP, VP, S]} \quad ,\ldots$$

where '[NP, S]' is the grammatical function specifying the subject-of relation, '[NP, VP, S]' is the grammatical function specifying the object-of relation, '[NP, PP, VP, S]' is the grammatical function specifying the indirect-object-of relation, and so on.[30]

Consider what is important about the categorized variable, and why it is an advance in semantic theory for selectional features: it allows for the specification of semantic features and semantic selectional restrictions on the constituent level of the appropriate grammatical relation involved, and not just on the level of the lexical item. Yet it occurs in the lexicon and is

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[30] Ibid., 81.

attached to the phrase marker of the sentence when the lexical item is inserted into this structure. For example, semantic features are stated in terms of subject and predicate requirements and not just on the level of lexical categories. Until the categorized variable was developed, it was possible to state semantic features only in terms of the individual morpheme in the lexical entry, and one had to depend upon a proper application of the projection rules to allow a certain feature to be carried to a higher constituent in the amalgamation procedure. Not only is this procedure inconvenient, but it is not always precise, for sometimes a feature specification characterizes an entire constituent and cannot be properly attached to an individual lexical item.

Consider further details of the selectional restriction account in the variable. The angles under the symbol 'X' describe the selectional restriction that determines whether or not a reading can be substituted for an occurrence of that variable to form a derived reading. To use Katz's example, the variable categorized for the subject of "chase":

(7) [NP, S]

X

<(human) v (animal)>

requires that the reading of a subject contain either the semantic marker [+Human] or [+Animal]. Therefore, the sentence:

(8) The dog chased the rabbit

is acceptable, but:

(9)* The reflection chased a bandit

is not.[31]

In summary, semantic selectional restrictions are defined as part of the structure of the categorized variable. They occur as single restrictions, and they name semantic markers which must be a part of the reading for the given variable. The projection rule amalgamates by substituting readings as determined by the categorized variables in the lexical entries of the sentence string.

A final consideration: as Katz points out, this notion of projection rule should no longer be included within the semantic component of a grammar, since it is now a linguistic universal to be stated only once in

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[31] Ibid., 82f.

linguistic theory.[32] However, there is an important consequence of this proposal--the semantic component of a particular grammar consists only of a lexicon. This means that the lexicon, including selectional features and restrictions, increases in importance, and must be carefully specified. Katz devotes almost a chapter in his forthcoming book to the development of the lexicon entries for 'buy' and 'sell',[33] so as to show the operation of the categorized variable in the entry structure. When one considers the complexity necessary to correctly characterize one lexical entry, the very serious question arises--has such a specification become the victim of the law of diminishing returns? Surely a dictionary with such lexical items would be unwieldy if it were seriously considered; and on the conceptual level, such a lexical entry specification is far too complex to be a useful explanation of how meaning is conveyed through the individual morphemes.

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[32] Ibid., 90.

[33] Ibid., VII, especially 67-69.

CHAPTER FOUR

URIEL WEINREICH'S CRITICISM AND PROPOSALS

In the article entitled "Explorations in Semantic Theory," Uriel Weinreich pursues two objectives: he criticizes Jerrold Katz's semantic theory and he develops one of his own. Weinreich explicitly states that it is his intention to develop a semantic theory compatible with the form of grammar specified in Aspects. He agrees with Chomsky that transformations contribute no meaning element to a sentence and that those operations of the semantic component which are interpretive should be defined entirely on the deep structure of the sentence.[1]

According to Weinreich, semantic theories should "be so formulated as to guarantee that deep structures (including their lexical components) are specified as unambiguous in the first place and proceed from there to account for the interpretation of a complex expression from the known meanings of its components."[2]

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[1]Uriel Weinreich, "Explorations in Semantic Theory," Current Trends in Linguistics, ed. Thomas A. Sebeok (The Hague: 1966), p. 417.

[2]Ibid., 399.

He feels that Katz's preoccupation with disambiguation should be avoided. The work of combination must proceed from as simple a format as possible.

In accordance with this tenet of simplicity, Weinreich suggests that the form of the lexicon should be different from the Katz proposal, for it is necessary that the whole deep structure be free of ambiguities and not just the categorial component of the base:

> To do so, we must prevent lexical entries from contributing ambiguities, and so we stipulate that a lexical entry be so defined that its component--the set of its semantic features--is free of disjunctions. A polysemous or homonymous word (such as ball) will be represented in the theory by as many entries as it has meanings.[3]

Katz criticizes the proposal on two counts. First, this proposal of separate lexical entries for each different sense of a morpheme is merely a terminological difference without any significance for semantics. From the view of a formal theory of linguistic competence, whether the lexical pair (D,C) is listed once or n times has no bearing, although according to Katz it is more economical from the standpoint of the dictionary to list it only once. Second, to equate freedom from semantic

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[3] Ibid., 418.

ambiguities with homosemeity begs the question at issue: Weinreich presupposes that semantic ambiguity is a result exclusively of lexical ambiguity. But to make that assumption in some sense is to avoid the entire issue, for the aim here is to provide an account of all semantic ambiguity; and some ambiguity may be introduced by the combination of lexical items into constituents of the sentence. Thus Weinreich is in the position of assuming exactly what his theory is supposed to explain. Katz rejects the proposal for these reasons as "a less economical notational alternative."[4]

Consider this proposal of Weinreich's further. Since Chomsky proposes to incorporate the lexicon in the base component, both Katz and Weinreich agree that the entire lexical entry for each lexical item should be inserted at the same time, if possible. Moreover, an important principle of Chomskian theory is that the base component should generate syntactically unambiguous deep structures. It is a natural requirement to add that no ambiguity should be introduced by such total insertion of lexical entries. The consequence of this requirement

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[4]Katz (forthcoming), III, 31f.

is that the deep structure generated by the base component is syntactically and lexically free of ambiguity (though it might be semantically anomalous).

Since there are now several lexical entries for each single item, there are many more possible lexical insertions, and thus many more possible deep structures. Some of these, unless lexical insertions are blocked, will turn out to be semantically anomalous. For example, consider:

(1) The fish swam by the bank.

Where Katz would treat 'bank' as polysemous,one of whose senses would be discarded in amalgamation, Weinreich treats 'bank' as two distinct but homophonic lexical items. For Weinreich there are thus two separate deep structures, one of which receives the acceptable reading of a fish swimming by the edge of the river, and the other the unacceptable reading of a fish swimming by a building whose business is money matters.

Weinreich deviates from the Chomskian formulation in one major respect--he insists that there must be incorporation of some semantic features in the generation of a sentence prior to the insertion of some lexical items. He acknowledges that he wishes to "retreat"

to the position of "No syntax without semantics."[5] Yet he hastens to add that there also can be no semantics without syntax:

> (2) Practically, this means that semantic statements must in the future be accountable for the behavior of words in context, and that the objects of semantic analysis must be not mere strings of formatives,...but complete deep structures...whether well-formed or not, whether unambiguous or not. [emphasis mine.][6]

To continue:

> And, above all, the retreat to 'no syntax without semantics' does not in itself entail an abandonment of the goals of generativeness for linguistics. On the contrary: the syntactic work of the past decade has yielded explicit descriptions of linguistic mechanisms that had never before been understood, and there is good reason to hope that a generative approach to semantics will lead to advances in lexicology and grammar no less striking than those achieved in transformational syntax.[7]

The reasoning underlying Weinreich's entire discussion is to describe the semantic process so that it must be included in the generation of deep structure as well as in its interpretation. Accordingly he prescribes three places in the deep structure where semantic features shall appear--in the dictionary entries, as is

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[5]Weinreich (1966), 469.

[6]Ibid.

[7]Ibid., 469f.

the case with Katz's development; with the node which specifies a major class of morphemes such as noun or verb; and as special features assigned to phrase level constituents in the phrase-marker. The first proposal needs no elaboration; however, the other two should be investigated further.

Weinreich says a key feature for semantic theory is the distinction between major and minor classes of morphemes. The major classes include nouns, verbs, adjectives and adverbs, and the minor classes all others, such as articles, prepositions, etc.

> All members of a major class uniquely share a distinguishing semantic feature, such as [+Noun], [+Verb], etc....We intend the distinguishing feature of each major morpheme class, e.g. [+Noun], to be taken as semantic in the full sense of the word; more revealing names might be 'thingness' or 'substantiality'; 'quality' (for [+Adjective]), and so on. But these labels would have well-known disadvantages, too. We therefore borrow the terminology from syntax.[8]

For all major class tokens in phrase-markers, Weinreich includes the above-mentioned type of semantic feature. This feature is subject to the semantic rules which he includes as part of the semantic 'process' (term used in place of component). These rules are described below.

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[8] Ibid., 432f.

Unfortunately there is no further explicit discussion in his article of the rationale for introducing this feature for major classes of morphemes. The most that can be deduced from his sparse comments is that of all the elements with which syntax deals, the major morpheme classes are the best candidates to be the reference points in the base component for semantically relevant elements. Supporting this is the fact that there is some conceptual similarity among the members of each class of the major group, and no such similarity for the minor classes. The assignment of the semantic feature is then an explicit recognition of this fact. Any time there is a position in the derivation at which a member of a major morpheme class can be substituted, it is also possible for a semantic feature to be introduced here.

The second semantic feature type which Weinreich places in the categorial component of syntax, consists of features assigned to phrase-level constituents in the phrase-marker, i.e. to non-terminal nodes of the categorial component. Weinreich's grammar introduces a complex symbol (a feature such as [±Count]) into a rule which generates a non-terminal category, e.g. NP, that is

subject to further branching. Weinreich's examples include [±Count] for noun phrases, [+Manner] to verb-modifying phrases.[9] He mentions others, such as [±Plural], [±Time], etc., but the distribution of these features has special restrictions which require further explanation aside from the point as issue.

In the case of the [±Count] feature, placing it in the categorial component will cause the proper generation of deep structures for both normal interpretation of such phrases as 'some blood' and the acceptable but odd interpretation of 'a blood', meaning a blood type. Weinreich sketches the derivation of 'some blood' and 'a blood.' In the former derivation the feature [-Count] is attached to both elements of the string, and in the latter contradictory features [+Count] and [-Count] are attached.[10] The markers for these two derivations would be something like (3). Weinreich provides for an evaluation of such features by the semantic calculator, which will be discussed below. By derivations such as the above examples, the generation of semantically meaningful yet initially contradictory phrases is allowed.

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[9] Ibid., 433-435.

[10] Ibid., 436f.

(3) (a) some blood

(a) NP[-Count]
(b) Determiner [-Count]+Noun[-Count]
(c) Δ [-Count]+Noun[-Count]
(d) Δ [-Count]+ □ [-Count]
(e) some [-Count]+ □ [-Count]

[[Determiner]]
[-Definite
-Count
+Partitive]

(f) some [-Count]+ blood [-Count]

[[Determiner]] [+Noun
[-Definite -Count
-Count +Concrete
+Partitive] -Animate]

(b) a blood

(a) NP[+Count]

⋮

(e) a [+Count]+ □ [+Count]

[[Determiner]]
[-Definite
+Count]

(f) a [+Count]+ blood [+Count]

[[Determiner]] [+Noun
[-Definite -Count
+Count] +Concrete
-Animate]

[11]

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[11] Ibid.

For item insertion Weinreich proposes a "Lexical Rule" which inserts morphemes into the pre-terminal string in a fashion that guarantees that minor class morphemes match their appropriate slots, but makes no such guarantee for major class morphemes.

> The Lexical Rule thus permits not only 'fully grammatical' terminal strings such as (51i)(The journalists will confirm the rumor.), but also deviant strings such as (51ii)(The journalists will true the rumor.) ...We leave it to the Semantic Calculator to deal differentially with fully grammatical and deviant strings.[12]

Weinreich claims that such sentences as 51ii, though seemingly deviant, can be accorded a meaningful interpretation by the semantic calculator and so must be included in the set of generable deep structures. One can conclude from the above quotations that among the generated generalized phrase-markers must be those which might be considered deviant on purely syntactic terms. That is, the Lexical Rule generates strings which violate strict subcategorization rules (to use Chomsky's terminology), and would include examples like:

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[12] Ibid., 434.

(4) (a)* The boy which I saw

(b)* The child slept the car.

Weinreich thinks the examples of (4) are meaningful utterances, and so must be accounted for in a semantic theory. The Lexical Rule provides the mechanism for inserting needed semantic features in the derivation of deep structure to allow for the generation of these hitherto rejected sentences.

The Semantic Process

Weinreich's 'Semantic process' is presumably the equivalent of Katz's 'semantic component.' It consists of two different areas--the calculator and the evaluator. The calculator contains rules which distribute certain semantic features, mark contradictions, conflate redundant features and transfer some features among morphemes. The evaluator decides the normality or deviance of the deep structure.[13]

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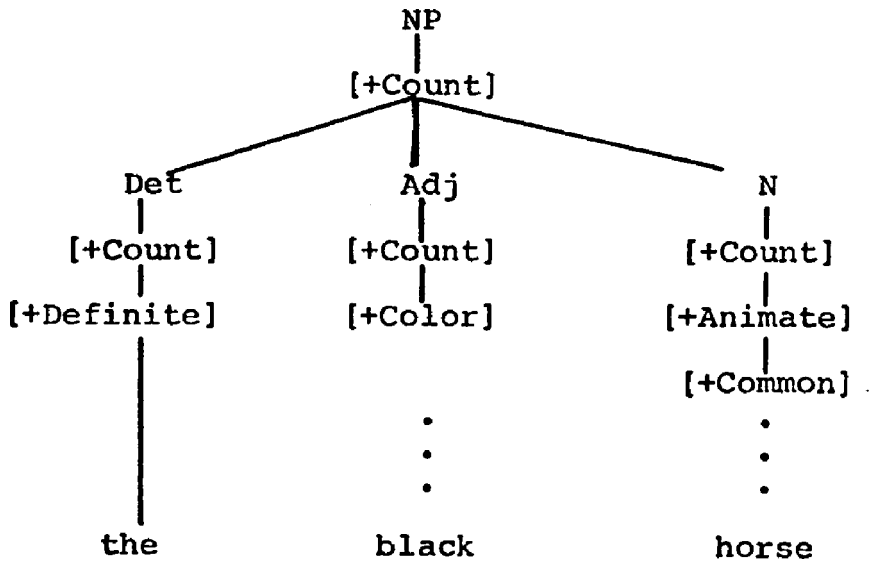
[13] Ibid., 445.

Of the several rules which operate in the semantic calculator, a few are of particular interest. One type introduces semantic features into the categorial component of the grammar and distributes them 'downwards' in the deep structure to join with the semantic markers of the dictionary items. That is, whenever a terminal node is attached to a non-terminal node containing a semantic feature, this feature is included in the set of semantic markers for the lexical entry at the terminal node. For example, the feature [+Count] attached to a NP in the deep structure is applied also to each of the terminal nodes of the NP, which can include determiners, adjectives, and nouns.[14]

Its phrase-marker has the form

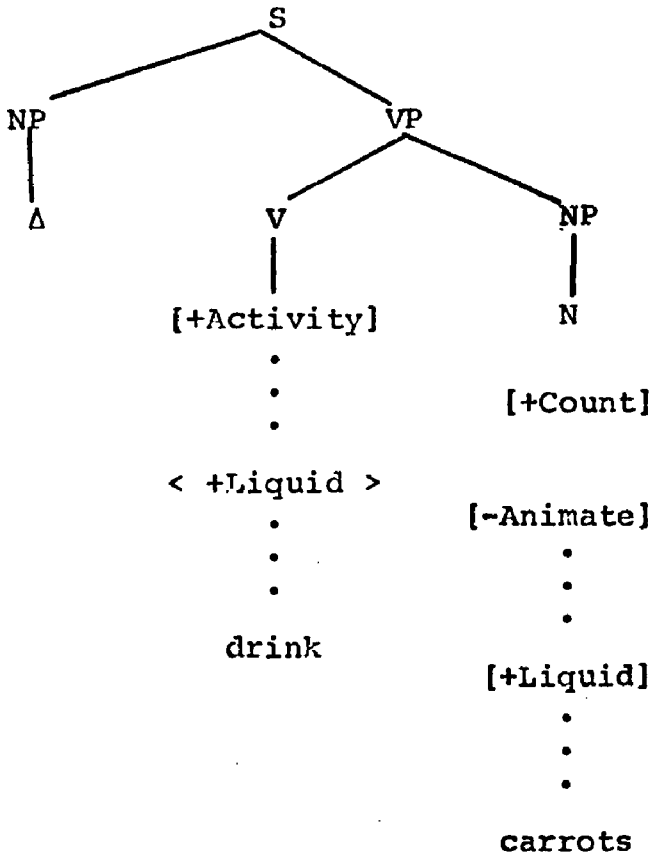
(5)



[14] Ibid., 455-459.

A second type of rule which operates in the semantic calculation is the one which governs the movement of transfer features.[15] The effect of this rule is to transfer a required feature of one lexical item to a sister constituent. Thus "the feature < +Liquid > is transferred from the Verb to the object Noun in drink carrots."[16] That is, for "...drink carrots...", a partial phrase-marker is:

(6)



[15]Transfer features seem to be the equivalent of Katzian selectional restrictions.

[16]Ibid., 459.

Such a rule distributes restrictions according to the tree structure so that the features are in position for the evaluator element.

Weinreich does not explain this rule in detail so as to stipulate what transfer paths for such features are allowable. The only information concerning paths that he provides is in the four examples he cites:[17] they are all a transference from a verb to a noun, be it in subject or object position. Perhaps it is unfair to judge Weinreich on this slight amount of information; however, some additional comments are in order. First, a feature requirement cannot always be attached to a single lexical item, but sometimes is only satisfied on the level of a noun phrase, e.g. the feature < floatable > normally cannot be transferred to the item 'car' but could be transferred to the noun phrase 'amphibious car.' Second, there is no mechanism in the Chomskian model to allow such a rule to function. In the actual process of generating the terminal string of the phrase-marker, complex symbols are attached to categories, and not to higher constituents. The only method for any transfer effect to be felt is through

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[17] Ibid.

amalgamation by projection rules in Katz's elaboration upon the Chomskian model. Third, Weinreich argues that these transfer features apply during the generative stage of the sentence derivation, and not in its interpretive stage. If so, such a device as Katz's would not be sufficient to handle this. (In fact, in Chapter Seven it is argued that this is precisely the case, and that a serious alteration of the Chomsky-Katz model is necessary.)

Weinreich's Criticisms of the Katzian Model

Weinreich argues for a deep interpenetration of syntax and semantics, as evidenced by his introduction of semantic features into the categorial component of the grammar. While primitive notions of each arena are to remain distinct, such as syntactic branching rules and operation of semantic features, linguistic theory must provide for "the sequential interdigitation of some syntactic and semantic rules and, in particular, for the appearance of semantic symbols in a derivation before the last syntactic rule has been applied."[18] Weinreich further states that such a theory is a statement of the facts of language and not any attempt at some theoretical compromise. In fact, he considers Katz's assumption

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[18] Ibid., 468.

that semantics begins where syntax ends as one of the sources of difficulty with the Katzian theory.[19] As intriguing as such an idea may be, it must be developed to a much greater extent before it can be seriously considered.

Weinreich's arguments against Katz are weak. When he criticizes Katz on Katz's own ground, the criticism is not successful on this point of syntax-semantics relation. One criticism Weinreich makes of the Katzian theory is that Katz does not distinguish acceptably between syntactic and semantic markers and thus the distinction is non-existent. Weinreich asserts that the grounds for the existence of markers is the same in both cases, namely, to prevent anomalies and ambiguities of sentences. Whenever a refinement of subcategorization features or semantic markers is required, failure to make this distinction would produce an ambiguous or ill-formed sentence. Weinreich contends that all ill-formed sentences have some degree of ambiguity, and so the result is the same. With respect to anomalies, he claims that Katz does not distinguish between their syntactic and semantic manifestations, so there could be none.[20]

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[19] Ibid.

[20] Ibid., 402-405.

Katz replies to this criticism[21] with the statement that Weinreich has misrepresented his semantic theory. Thereupon he outlines the distinction between the two kinds of markers in terms of the functions they perform within linguistic theory:

> Our demarcation between syntactic and semantic markers define a marker as syntactic just in case it appears essentially in a rule of the syntactic component and defines a marker as semantic just in case it appears essentially in a lexical reading of a dictionary entry of the semantic component.[22]

Then, a footnote:

> A marker appears essentially if the successful operation of the rules requires the information it contributes. To say that the rules require such information means that that component cannot be better formulated without these rules.[23]

One must conclude from a study of Weinreich's writing that his criticism of Katz is inconclusive. In terms of the stated goals of the syntactic and semantic components, Katz makes the distinction of function necessary for the purpose of keeping these two components separate. He carefully describes semantic features as attached to lexical items and operating

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[21]Katz (forthcoming), III, 40-48.

[22]Ibid., 43.

[23]Ibid.

solely with the projection rule. Also he describes syntactic features as attached to categories and operating to determine lexical insertion possibilities and the structure for transformational rules. Weinreich's intuitions are interesting, and indeed one can trace their thread in the fabric of some of the proposals of the counter-movement. However, Weinreich never expands any of his criticisms of the Katzian formulation so as to be a clear indictment of the semantic component.

CHAPTER FIVE

PROPOSALS OF THE COUNTER-MOVEMENT-- GEORGE LAKOFF, JAMES McCAWLEY, CHARLES FILLMORE

The New Model for Transformational Grammar Theory

A group of studies in syntax has been conducted by Charles Fillmore, George Lakoff and James McCawley since the appearance of Aspects. All of these investigations conclude that deep structures are more abstract than are the structures as proposed and presupposed by Katz. That is, deep structure is further removed from surface syntactic structure than had originally been imagined, and individual examples would appear instead to be more similar to the semantic structure of the sentences investigated. It may be useful at this point, therefore, to review the counter-movement's argument and some examples of these studies so as to gain a better perspective of the status of deep structure. For this purpose, illustrations will be drawn from Lakoff's work on adverbs, Fillmore's study of case, and McCawley's discussions on several topics.

A. Criticisms and Untenability of the Chomsky-Katz Thesis

Several proponents of the counter-movement have suggested, following Weinreich's initial suggestion, that in some sentences transformations must occur before lexical items are inserted into the sentence structure. The ramifications of this suggestion are twofold, namely, lexical insertion does not take place at a single point, as the Chomsky-Katz model suggests it does, and as a consequence, the formulation of deep structure within the model must change.

McCawley proposes several arguments to show that lexical insertion does not take place at a single point in the model, but as certain transformations change the surface structure of a sentence, additional lexical items are inserted. He argues that there are ordering transformations, the nominalization transformation,and some regrouping transformations such as reflexivization which must precede lexical insertion.[1]

These lexical insertion arguments lead to the result that the nature of deep structure within the Chomsky-Katz model will change. However, one need not evaluate the counter-movement's arguments concerning a shift in deep structure wholly upon the strength of the discussion of lexical insertion. Lakoff poses the

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[1]Each of these arguments is analysed in Chapter Six, pp. 148-158.

problem more clearly in his discussion of the role of the instrumental adverb in deep structure. He basically argues that the instrumental adverb must be excluded from deep structure or else some significant generalizations concerning selectional restrictions will not be accounted for.[2]

To prove his point Lakoff discusses the two sentences:

(1) (a) Seymour sliced the salami with a knife

(1) (b) Seymour used a knife to slice the salami.

Lakoff presumes that the two sentences are synonymous. Within the Chomsky-Katz framework, to derive the same reading for both sentences (which is the criterion for synonymity) the sentences must have the same deep structure or else receive the same reading through semantic projection rules. According to the transformational model of Chomsky the sentences must have different deep structures. Yet Lakoff shows in point after point that linking them by semantic projection rules would not work, for the rules thus required are ad hoc and unwieldy, and too language-specific.

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[2]George Lakoff, "Instrumental Adverbs and the Concept of Deep Structure," Foundations of Language, IV (1968).

As an example, consider the discussion concerning the subject of both sentences. Lakoff's examples are:

(2) (a) John killed Harry with dynamite

(b) John used dynamite to kill Harry

(3) (a)* The explosion killed Harry with dynamite

(b)* The explosion used dynamite to kill Harry.[3]

If the sentences (2a) and (2b) have separate deep structures, then different constraints are needed to rule out (3a) and (3b). To exclude (3a) would require a selectional restriction between instrumental adverbs and subjects; it would be a new type of restriction stating that instrumental adverbs require animate subjects. In the other case, to rule out (3b) one would need to employ another rule--that 'use' in this sense requires an animate subject; such a subject-verb constraing is common in syntax. The disadvantage lies in the need for different constraints to express the same fact--that (3a) and (3b) are ungrammatical for semantically the same reason. Lakoff is convinced that implicit in the statement of the distinctness of the deep structures is that the non-occurrence of (3a) is entirely unrelated to the non-occurrence of (3b), and that this

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[3]Ibid., 14.

is incorrect; in actual fact, the source of the ungrammaticality is identical and should be so shown.[4]

As an aside, it might very well be the case that within the Chomsky-Katz model one can note some relationships between the different deep structures. On a lexical item level one can express possible relationships in terms of their features, e.g. , the two verbs may have the same selectional restrictions for their subjects. A more precise statement would be that such a requirement is just a local one, and a coincidence at that, but that there is no over-all relation between the sentences.

After rejecting the possible avenues open within the Chomskian model, Lakoff strongly suggests another possible solution. The force of his argument in this article lies with the suggestion that the two sentences have a common underlying structure considerably more abstract than originally anticipated. Lakoff's individual arguments are generalizations about co-occurrence and selectional restrictions, and he argues in each case that a grammatical generalization is preserved if the sentences have essentially the same underlying structure.[5] The

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[4]Ibid., 14f.

[5]Ibid., sections 3-7, 10 and 12.

particular arguments that Lakoff uses to build his case are closely reasoned and well constructed;[6] the result is that one is gradually persuaded that a strong argument exists for a single underlying structure to the two sentences (1a) and (1b). The nature of this structure is such that the instrumental adverb and other adverb types as well are excluded from this definition of deep structure; therefore, there are fewer grammatical categories and relations involved than had previously been thought. Consequently, such deep structures must be more abstract (further removed from surface structure).[7] Lakoff stresses that a reevaluation of the constraints on deep structure definition must be made.

Another criticism of the Chomskian model comes from Charles Fillmore. His criticisms concern the role that grammatical case plays in transformational grammar theory. One suggestion Fillmore makes[8] is to drop the distinction between 'noun phrase' and 'prepositional phrase' in the deep structure and to incorporate the use of case therein. Further, Fillmore elaborates on the

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[6]Witness his discussion above about the noun phrases.

[7]Ibid., 5, 23-28.

[8]Charles Fillmore, "Toward a Modern Theory of Case," Modern Studies in English, eds. David A. Reibel and Sanford A. Schane (Englewood Cliffs, 1969).

use of case in the base component and suggests that the larger constituents, such as 'subject' and 'object,' serve no function.[9] One result of Fillmore's analysis of grammatical case is that deep structure seems to be much more abstract and semantically motivated than Chomsky's model proposes.

Before leaving this discussion of criticism of the Chomskian model, one final point should be mentioned. McCawley agrees with Chomsky that there is a definite need to posit the existence of both semantic and surface syntactic representations.

> However, it is necessary to provide some justification for the hypothesis of an intermediate level (deep structure) between these two levels: there is no a priori reason why a grammar could not instead consist of, say, a 'formation-rule component', which specifies the membership of a class of well-formed semantic representations, and a 'transformational component', which consists of rules correlating semantic representations with surface syntactic representations in much the same fashion in which Chomsky's 'transformational component' correlates deep structures with surface syntactic representations. Moreover, the burden of proof in choosing between these two conceptions of linguistic competence rests with those who posit the existence of the extra level.[10]

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[9] Charles Fillmore, "The Case for Case," Universals in Linguistic Theory, eds. Emmon Bach and Robert T. Harms (New York, 1968). Lakoff and Ross (1967), 2f. also make this claim.

[10] McCawley (1968c), p. 165.

One must agree with McCawley that there is no a priori reason for positing a deep structure. However, if one chooses to formulate a new model for transformational grammar without a deep structure theory, one must be certain to include a mechanism for presenting the semantic and syntactic representations for all generable sentences and exclude all non-sentences. The Chomskian model stripped of deep structure definition could not accomplish this task, so for that particular model some kind of a deep structure is necessary.

B. A New Model

As an alternative to Chomsky's formulation of linguistic structure, members of the counter-movement, including McCawley, Lakoff, Ross and Fillmore, have suggested[11] that the appropriate linguistic model for transformational grammar theory consists of a single system of processes which transform the semantic representation of a sentence into a surface representation. Syntactic transformations and the insertion of lexical items intermingle within this system between the semantic representation and its surface form.

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[11] To cite a few sources: McCawley (1967), no. 9 (15-18), (1968c), 165-167, Fillmore (1967), p. 88, and Ross (1967), 1-6.

To justify such a single set of rules, proponents of this position state that semantic and syntactic representation cannot be substantially different, and the nature of what differences there are must be carefully analysed. In the development of this new position, their analysis of these differences has led to the conclusion that the difference in formal nature is only apparent. Indeed they have developed arguments to show that the 'deep' or necessary syntactic categories correspond exactly with the categories of symbolic logic, and rules for their combination correspond to formation rules for symbolic logic.[12] Their study has centered around the tenet that most syntactic categories are derived rather than basic. For example, Fillmore suggests that prepositions are derived from the noun phrases they co-occur with; therefore, the category of prepositional phrases should be deleted and only noun phrases should occur in semantic representation.[13] The list of basic and necessary categories of syntactic representation is still being trimmed by the various proponents.

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[12]McCawley (1967), and in discussion all of the proponents at the Texas Conference on Language Universals in 1967.

[13]Fillmore (1967), 367-370.

The summation of this theorizing is that if the correspondence is valid, then semantic representations are of the same nature as underlying syntactic representations. McCawley envisions this nature as expressible by trees whose non-terminal nodes are labeled by symbols one can interpret as syntactic categories.[14] Within the Lakoff-Ross terminology the model functions as

> a universal set of rules and well-formedness restrictions which generate the correct set of concepts (i.e., well-formed predicate calculus formulas) and every grammar consists of a set of transformations which map each concept (somehow) into the large set of surface structures which can be used to express each concept.[15]

If these proponents can show that the formal nature of both representations is the same, there is no point of demarcation between a syntactic and a semantic component, and thus there is no need for an intermediate level of deep structure. However, as the references to various articles show, no such model has been sufficiently developed as yet to provide a clear alternative to the Chomskian model.

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[14] James McCawley, "Where Do Noun Phrases Come From?", to appear in Readings in English Transformational Grammar, eds. Jacobs and Rosenbaum, 9.

[15] Lakoff and Ross (1967), 6.

The Place of Selectional Restrictions

Of prime importance to the proponents of the counter-movement is the proposal that only semantic properties have any role in selectional restrictions. They reason that what counts in selectional restrictions is the semantic impetus to generate a sentence that is a well-formed expression of a sentence concept. It is also part of the reasoning that syntactic considerations are purely incidental to selectional restrictions and only provide a framework for sentence formulation.

Proponents of the semantic primacy for selectional restrictions argue for this primacy both within the framework of the Chomskian model, and on much stronger footing, within their own proposed model.

A. Selectional Restrictions Within Deep Structure

Within the Chomskian orientation (i.e., that selectional restrictions function in the deep structure) several arguments are presented to substantiate the claim of only semantic selectional restrictions. First, McCawley argues that the representation of the entire syntactic constituent has a part in the determination of restriction violations and not just the 'head' of

the constituent. To support this claim, McCawley gives examples that show that the same selectional restriction is violated by information introduced by the head noun and by information introduced by a modifier. He uses as examples:

(4) (a) My neighbor is the father of two.

(4) (b)* My sister is the father of two.

(4) (c)* My buxom neighbor is the father of two.[16]

Whereas sentence (16)(a) is acceptable because the noun as subject is initially unspecified as to sex, (b) and (c) are instances of selection restriction violations involving sex inconsistencies.

From this discussion McCawley concludes that the entire syntactic constituent is involved in restriction evaluation rather than just the head. Agreed. Katz also essentially adopts this orientation when he discusses the functioning of the categorized variable;[17] however, he is only speaking of semantic restrictions.

A second assertion concerning deep structure selectional restrictions is also proposed by McCawley--namely, only semantic information plays a role in selections. The argument here is that selectional restrictions

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[16]James McCawley, "Concerning the Base Component of a Transformational Grammar," Foundations of Language, IV (1968), 265; and McCawley (1968c), 133f.

[17]Katz (forthcoming), III, 78-85.

are defined in terms of properties of semantic representations and to determine whether a constituent meets or violates a selectional restriction, one need only consult this representation. McCawley cites two examples to show that whenever a sentence is unacceptable a semantic feature is actually violated.

> For example, while one might suggest that name has a selectional restriction involving the feature 'proper' (vs. 'common'):
>
> (32) a. They named their son John.
> b.* They named their son the red-headed boy over there.
>
> or that count has a selectional restriction involving the feature 'countable' (vs. 'mass'):
>
> (33) a. I counted the pigs.
> b.* I counted the sand. ...
>
> the restrictions actually involve the semantic properties of designating a proper name:
>
> (35)* I counted the pig.
> (36) I counted the crowd.[18]

McCawley's claim is that since selectional restriction evaluation is thus only a semantic activity, it should be separate from the base component. The base component should generate a class of deep structures without consideration of selectional restrictions.[19]

There are several consequences of the above assertion. First, McCawley is stripping the base

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[18]McCawley (1968a), 266. Similar examples are found in (1968c), 134f. (McCawley's argument seems to be dubious; consult Chapter Six for a constructive proposal based on the Count/Mass distinction.)

[19]McCawley (1968c), 135f.

component of all of its selection powers. Second, whenever selection can be stated arbitrarily either in syntactic or semantic terms, he considers the semantic selection is the correct one. Third, semantic considerations provide the main impetus for selectional evaluation, and syntactic considerations are only supportive. Fourth, whenever in the Chomsky-Katz model syntactic selectional restrictions would prevent the generation of the structure, such a structure would be generable and lead to a perfectly well-formed sentence which, however, is semantically anomalous because the amalgamation process is blocked.

Notice as an aside, for anomalies one may want to block amalgamation to avoid "nonsense," as in:

(5) * The lazy house sat down to lunch.

For other sentences one may want to allow amalgamation to proceed so that a false sentence will result, as in:

(6) The blind man saw the train coming.

Thus, an additional result of McCawley's suggestion is that the analysis of anomaly must be more complex.[20]

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[20]Consult Chapter Three, pp. 59-63, for an analysis of the distinction between contradiction and anomaly. In Chapter Six this discussion is resumed and continued in Chapter Seven.

A third proposal concerning selectional restrictions within the conventional framework is a result of the nature of lexical items. McCawley adopts Weinreich's proposal concerning lexical items. Instead of grouping together into a single entry those readings which have a given phonological shape and belong to a single syntactic class, as Katz and Fodor do, McCawley suggests that there is no a priori reason against taking 'lexical item' to mean a combination of a single semantic reading with a single phonological shape, syntactic category and set of specifications of exceptional behavior. To support this suggestion he observes that the transformations which require the identity of a pair of lexical items[21] in fact demand the identity of the specific readings involved. One example which McCawley elaborates upon in this connection is:

(7) * John is as sad as the book he read yesterday.

Obviously the source of the anomaly lies with the assumption of identity between the two senses of 'sad'. If different readings for the same lexical item cause separate lexical entries to be defined, the anomaly is

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[21] such as the various deletion and regrouping transformations.

accounted for. In the example the first occurrence of 'sad' has the reading 'experiencing sadness, said of a living being,' and the second occurrence has the reading 'evoking sadness, said of an esthetic object.' Since the occurrences of 'sad' are two different lexical items, the transformation which embeds the one sentence into the other is blocked.[22]

When lexical items are cast in such an atomistic setting, the nature of disambiguation changes. Within the Katz-Fodor description of lexical items, disambiguation consists of discarding combinations of readings which violate selectional restrictions. If the Weinreichian orientation were adopted disambiguation would

> ...consist in eliminating a certain subset of a set of deep structures which terminate in homophonous Weinreich lexical items; the projection rules would apply separately to each of these deep structures, each application of a rule consisting in attaching to a node a reading which is obtained by combining in some way the single readings attached to the nodes it directly dominates, and the entire deep structure would be judged anomalous or nonanomalous rather than combinations of readings discarded whenever a selectional violation is encountered.[23]

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[22]McCawley (1968c), 125-128.

[23]Ibid., 128.

One result of requiring homosemous lexical items, as McCawley notes, is that judgment of anomalous sentences requires analysis of the entire deep structure of the sentence and not a strict constituent analysis. To explain this point, let us trace the logical development of the argument. Katz's procedure of amalgamation works from embedded clauses, discarding the anomalous constituents due to the polysemous lexical items. McCawley criticizes Katz's procedure, for if one discards an inappropriate reading on an embedded level, to want to resurrect it later defeats the whole purpose of discarding it in the first place. McCawley suggests that if one is disambiguating a structure with polysemous lexical items, to save the anomalous readings of constituents would be unwieldy. Normally in the interests of economy one would save anomalous readings only as a last resort, i.e., when there is no possible reading for the constituent. To illustrate this point, McCawley uses the sentence:

(8) It is nonsense to speak of a king as made of plastic.

Suppose 'king' has two readings, 'monarch' and 'chess piece.' Katz's procedure would work from the embedded clause to speak of a 'king as made of plastic,' and

mark it so that 'king' means 'chess piece.' Thus the sentence would be marked as uniquely meaning 'it is nonsense to speak of a chess piece as made of plastic' and exclude the correct interpretation which replaces 'king' with 'monarch'.[24] McCawley's procedure with respect to the example (8) would be to provide two deep structures for the sentence, which differ only in the lexical reading for 'king'. To handle the embedded anomaly, each deep structure would undergo semantic interpretation, i.e., the constituent readings would be amalgamated to derive a reading for the sentence represented by each structure, whether this reading were satisfactory or not.

B. Selectional Restrictions Within the New Model

According to the proposal of the counter-movement for a new model for transformational grammar theory, syntactic transformations and insertion of lexical items occur because of semantic requirements. Both lexical item insertion and transformations depend upon well-formedness conditions and restrictions on 'possible message.'[25] The semantic representations predict the

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[24]McCawley uses this example in Ibid., p. 129.

[25]McCawley (1969), 2.

selectional restrictions that are required. Witness McCawley's elaboration:

> It is not clear that such restrictions, to the extent that they are valid restrictions, have anything to do with deep structures and lexical items rather than with semantic representations and semantic items that appear in them. If it in fact turns out that the 'selectional restrictions' of all lexical items are predictable from their meanings, then they are not restrictions on how lexical items may be combined but rather restrictions on how semantic material may be combined, i.e., restrictions on 'possible message.'[26]

McCawley gives several examples throughout his writings of lexical items which from their meanings predict the restrictions upon other constituents and upon themselves. The verb 'to diagonalize' requires an object which denotes a mathematical matrix,[27] the adjective 'benign' meaning 'noncancerous' can only be coupled with a noun denoting a tumor,[28] and from lexical items concerning marriage, such as 'divorce,' 'adultery,' 'engaged,' 'spouse,' one can predict required semantic representations in subject and/or object with opposite values for the feature [±Female].[29] McCawley's point is that it is the semantic motivation of communicating a

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[26] Ibid.

[27] James McCawley, Review of Sebeok (ed.) Current Trends in Linguistics, Vol. 3, Language, XLIV, 583.

[28] McCawley (1968c), 134.

[29] McCawley (1968a), 263, fn. 12.

well-formed sentence that sets up the required predictions and restrictions, and syntactic considerations only provide the framework of specification whenever necessary.

To better define restrictions on 'possible message' would depend, in McCawley's opinion, upon an enumeration of constraints surrounding essential and accidental properties of things as well as delineation of categories. Without conducting an extensive analysis, McCawley draws some limits upon the range of selectional restrictions. Many restrictions simply do not function under unusual circumstances, say reports of dreams, beliefs and in metaphoric usage.[30] But there are still constraints on combination of semantic material; for example, only a quantity of time can elapse:

(9)* I dreamed that my toothbrush elapsed.[31]

The meaning resident in a lexical entry puts constraints upon 'possible message,' as shown by the example (9). Such restrictions precede and are different from the individual presuppositions which govern the discourse at hand.

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[30] McCawley (1969), 4 contains many examples.

[31] Ibid., 5.

Notice that one can say:

(10) I dreamed that my toothbrush was a quantity of time and that my toothbrush elapsed.

The reason for (10)'s acceptability is that the appropriate meaning relationship between 'quantity of time' and 'elapsed' is established by the remainder of the sentence. By his analysis of 'possible message' McCawley seems to be describing an important distinction between the constraints imposed on 'possible message' by meaning considerations and those by presuppositions. The implication is present that selectional restrictions function in terms of both, but with different effect.

Lakoff has a very interesting proposal with respect to selectional restrictions and anomaly. In discussing the presumable nature of deep structure, Lakoff states that one of the defining conditions is that it is here that selectional restrictions can be stated naturally in terms of grammatical relations. If one instead defines selectional restrictions in terms of semantic anomaly, as McCawley and Lakoff suggest, then to remove selectional restrictions from the level of deep structure, one must define semantic anomaly not in terms of projection rules operating on deep structure, but in terms of well-formedness conditions on semantic

readings. Projection rules would remain, but anomaly would be evaluated upon the result of the projection rules by some external condition, namely, well-formedness, and not determined by projection rules themselves. Perhaps it is the case that the external conditions are the presuppositions one has.

> For example, projection rules would be set up so that they define semantic readings for 'I knew the answer with a sliderule' and 'I used a sliderule to know the answer.' The sentences would receive the same readings, and an appropriate well-formedness constraint would state that both were semantically ill-formed in the same way.[32]

In this way one would be imposing the condition of co-occurrence restrictions on the level of semantic representation rather than on the level of deep structure. If Lakoff and others of the counter-movement can meaningfully generate constraints on well-formedness and anomaly, then they have located a substantial place within their new model for selectional restrictions. The success of this proposition lies, however, in the specification of the well-formedness criteria.

Analysis of the general nature of anomaly is not extensive among the counter-movement groups, but they have drawn some distinctions worth noting. One such instance occurs in a discussion by McCawley of

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[32] Lakoff (1968), 27.

Paul Postal's work.[33] Postal points out that in the consideration of the status of the sentence

(11)* The waitress hurt himself.

(i.e., whether it is ungrammatical or merely anomalous), it is anomalous only if either of the two incompatible elements can be interpreted metaphorically. In this case the test is passed, for one could be speaking of the masculinity of a waitress or the effeminacy of a waiter. McCawley suggests that consideration of sentences such as this should rest on the distinction between 'meaning' and 'presupposition':

> The information that my neighbor is a woman would be classified as part of the presupposition rather than the meaning of (b) ('My neighbor hurt herself.'), corresponding to the fact that one would not utter such a sentence in order to convey the information that that individual has suffered an injury. This distinction is supported by the fact that (b) is more correctly paraphrased by
>
> (d) My neighbor suffered an injury.
>
> than by
>
> (e) My neighbor, who is a woman, suffered an injury.
>
> One does not use a sentence like (b) to inform his listener of his neighbor's sex unless he is being rather devious.[34]

Thus it is part of the information of (b) that an injury was sustained, but only a presupposition that the person referred to is female. Unfortunately the proponents of

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[33] McCawley (1968a), 257, fn., in personal correspondence with Postal.

[34] McCawley (1968a), 257, fn. 6. This same analysis occurs in (1968c), 139ff.

this position have not developed guidelines or rules for such a distinction between presupposition and meaning. Until they do so, such proposals are merely in the discussion stage.

Based on this distinction, however, one further suggestion concerning selectional restrictions deserves notice. McCawley in several places mentions a suggestion Fillmore made in personal communication. Fillmore thinks that selectional restrictions are not restrictions imposed by a lexical item on other syntactic constituents, but rather presuppositions about the intended referent of the constituent. Fillmore suggests that the meaning of an item imposes a selectional restriction on the item itself, so 'bachelor' has the meaning 'not having a wife' and therefore has the selection restriction concerning an intended referent of 'human, male, adult.'[35] McCawley elaborates upon this illustration:

> If I assert that the selectional restriction imposed by a property is that the item to which the property is applied be a 'candidate' for having the property and assert that candidacy for not having a property is the same as candidacy for having the property, then 'human', 'male', and 'adult', which are necessary to make one a candidate for having a wife, will be imposed as 'selectional restrictions' by <u>bachelor</u>. This approach is confirmed by

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[35] McCawley (1968a), 268; (1968d), 584.

> the fact that the other conditions which are involved in candidacy for having a wife also play a role in the applicability of bachelor; for example, one would not call a Roman Catholic priest a bachelor, even though he is human, male, and adult, and has no wife.[36]

By his suggestion Fillmore is drawing a distinction between meaning and presupposition. He says that restrictions concerning the item itself involve the intrinsic meaning of the item, while those restrictions referring to the constituents to which semantic material is transferred involve presuppositions about that constituent. Surely more work must be done in defining this distinction, but the suggestion seems promising, to say the least. Notice that this suggestion may be understood as a variant of Weinreich's proposal, discussed above, that semantic material is transferred from one constituent to another. In the Fillmore case, the suggestion is that presuppositions about the intended referent, rather than meaning, are transferred.

However, Fillmore's proposal suffers from a weakness. If the only effect selectional restrictions have upon other constituents occurs in the form of presuppositions about these intended referents, the

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[36] McCawley (1968a), 268.

formulation is too narrow. Consider the sentence:

(12) The waitress hurt herself.

This sentence is legitimate because of the common presupposition of the referent of waitress. To say:

(13) The waitress hurt himself

can be legitimized by the presupposition of the masculinity of a particular waitress which overrides the common meaning constraint between the sex of a noun and its reflexive. On the other hand,

(14)* A waitress hurt himself

is unacceptable because the meaning constraint is violated and no definite referential consideration is present to override this. However, consider

(15) At the transvestites' ball, did a waitress hurt himself?

This sentence possesses a set of presuppositions, not necessarily of reference, which serve to legitimize the sentence.

One can draw a conclusion from the analysis of sentences (12) through (15) : frequently presuppositions boil down to presuppositions of reference. However, in other instances, they are presuppositions of propriety or meaningfulness. Thus selectional restrictions can profitably be viewed as presuppositions, not only about referents, but as expressions of general meaning properties.

CHAPTER SIX

THE IMPORTANT ISSUES FOR SELECTIONAL RESTRICTIONS

Within transformational grammar theory, selectional restrictions state what features need to occur among sentence constituents for them to combine into admissible utterances. Some co-occurrence restraints seem to depend upon syntactic factors, as in the case of gender agreement in pronoun substitution transformations. Others seem to depend upon a meaning constraint imposed by one lexical item onto another constituent and its parts. At times the semantic restriction has a syntactic counterpart, at times not.

No matter how widely or narrowly one defines the field over which selectional restrictions range, their prime function is to insure that only meaningful sentences are generated. The two different viewpoints concerning the place of selectional restrictions within a transformational model have been outlined and discussed in preceding chapters. However, for both viewpoints, any description of selectional restrictions is subordinate to other considerations of the model. For this reason the

nature of selectional restrictions is not investigated in depth. The greatest activity in this direction has been among those of the counter-movement who have mentioned the selectional role of restrictions in various writings, although even here they have not conducted any detailed analysis of the subject.

It is my conviction that selectional restrictions have a central place in any model for a transformational grammar and that the viewpoint one has concerning the nature of selectional restrictions determines in large measure the direction of the development of the entire model. Indeed the Chomsky-Katz model discussed in the earlier chapters has weaknesses which can be traced to an inadequate handling of selectional restrictions. The formulations and suggestions of the counter-movement have served to pinpoint these vulnerable points; yet the specification of an alternative model which they provide is incomplete, so it cannot withstand a detailed analysis.

To crystallize the problem areas of both models, let us contrast how the two groups of proponents handle important issues within transformational theory. The issues we will consider include: synonymy and deep structure, syntactic/semantic selectional restrictions,

single/double selectional restrictions, lexical insertion and the lexicon, anomaly.

Synonymy and Deep Structure

The issue of the deep structure characteristic of synonymous sentences is treated differently by the proponents of the two models. Each formulation depends upon selectional restrictions operating among sentence constituents. The nature of the restriction operation determines the characteristics of deep structure within the model. Let us examine the viewpoints of the two competing theories so that we can evaluate the importance of selectional restrictions with respect to this issue.

In his article "Instrumental Adverbs..." George Lakoff discusses the underlying structure(s) of the two sentences:

(1) Seymour sliced the salami with a knife

(2) Seymour used a knife to slice the salami

which he judges to be synonymous. He develops at least eleven different arguments to show that it is more plausible for transformational theory that the sentences have the same deep structure than that synonymous sentence readings be derived from different underlying structures.

An important aspect of this article is that the

nature of the several arguments employed is predominantly the same. Lakoff repeatedly argues that generalizations about selectional restrictions and co-occurrences cannot feasibly be stated unless the sentences in question have the same deep structure. He frequently employs arguments to the effect that for there to be two separate deep structures, one must postulate several ad hoc rules with respect to selectional restrictions for the sentences (1) and (2); whereas, if there were only one structure, the selectional restriction rule postulated could be a general one.[1]

A similar issue to the one raised by Lakoff about the nature of the underlying structure of such synonymous sentences is treated in a discussion by Katz.[2] In this discussion, Katz develops an apparatus for explaining the synonymy of two paraphrases which are conversely related. The two sentences he uses as examples are:

(3) John sold the book to Mary

(4) Mary bought the book from John.[3]

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[1]The arguments of this proposal are discussed in Chapter Five, pp. 93-97, and so need not be repeated here.

[2]Katz (forthcoming), VII.

[3]Ibid., 6.

Within the Chomsky-Katz model a possible syntactic solution to this problem is to provide the same underlying phrase-marker for the two sentences. Notice, however, if this option is taken, one must account for the lexical differences between the two sentences. A semantic solution, on the other hand, would consist in formulating the lexical readings for the words of both sentences so that the sentences have at least one reading in common.

At this point it would be advantageous to analyse Katz's thinking regarding a syntactic solution, for his reasoning pinpoints his orientation concerning selectional restriction possibilities. He explores three alternatives, and rejects them all. First, he immediately opposes the suggestion that the phrase-markers of one of the sentences (3) and (4) could be derived from the phrase marker of the other, as is the case with stylistic variants. In this case the base rules generate an underlying phrase-marker for the more basic sentence, and a set of transformational rules derive the other marker by operations something akin to the exchange of subject and object in the derivation of passive sentences. The two surface sentences would then have at least one common reading. However, such an analysis for sentences (3) and (4) requires that one of the two sentences in question be treated as more basic

than the other. Since there is no reason for choosing one of the two sentences as more basic, this solution is not acceptable.[4]

Another syntactic solution which Katz discounts is for a single underlying phrase-marker to have an abstract structure reflecting the content of the synonymous sentences. He suggests that such a marker would have the following, or a similar form:

(5) John sold the book to Mary $\left\{\begin{matrix}\text{for which}\\ \text{and}\end{matrix}\right\}$ Mary paid a sum of money to John.[5]

This structure would be impossible, in Katz's opinion, for it would require that the underlined clause be ellipsed in derivation. Such a result would violate the transformational principle of recoverability of deletion. (This is the principle that a deletion operation can eliminate only a dummy element or a constant but not a lexical item.)[6]

Before proceeding to the next syntactic solution that Katz offers, let us compare his second suggestion with the first. The first suggestion is a straightforward

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[4]Ibid., 9.

[5]Ibid., 12.

[6]See Chomsky (1965), 144-147.

derivation of one phrase-marker from the other. The second is in some sense a complicated variant on the first, because it still presumes that one sentence is more basic, and the complications are resolved by deletion. In fact, the underlying phrase-marker (5) is just the underlying phrase-marker for the more basic sentence plus other information. One knows that (3) is the more basic sentence, for (5) makes verbatim use of it in the phrase-marker. There is one genuine difference between the two suggestions, however. (5) is an attempt to combine the semantic information conveyed by both sentences, although the importance placed on each derived sentence is not equally represented in the phrase-marker.

A third syntactic solution which Katz discounts is a more radical suggestion. It is that the sentences could be derived from a single underlying phrase-marker that represents a common abstract deep structure which itself has no direct surface representation. Katz objects that such a formulation would seriously violate accepted grammatical principles; namely: the proposal would require that the underlying phrase-marker contain language-specific abstract constituents such as an abstract verb spanning 'buy' and 'sell' and an abstract preposition spanning 'to' and 'from'. These constituents

would have to be stated so that one set of transformations gives the surface structure of (3) by using the abstract morphemes in the form 'sell' and 'to' and the other set provides the surface structure of (4) by using the abstract morphemes in the form 'buy' and 'from'.[7]

Katz objects that such a proposal introduces a number of irresolvable problems. First, he claims that the requirement for these abstract constituents is undesirable, for they are not linguistic universals, but requirements of the particular language in question (e.g., for English, that it have particular abstract morphemes spanning just two particular lexical items in the language). A second objection: the difference of grammatical relations involved for a particular morpheme in the two sentences, e.g., 'John' as subject of (i.e., having the form [NP,S]), or as indirect object of (having the form [NP, PP, VP, S]) cannot be eradicated by hypothesizing some abstract morpheme spanning a small set of morphemes. These notions are relational and so cannot be stated in terms of substantive elements introduced into syntactic theory. Such a characterization would have to be given "by a formal relation among such substantive elements labelling nodes in underlying phrase-markers and the domination relations specified by those

[7]Katz (forthcoming), VII, 9.

nodes and their branches."[8] Any such choice would be 'arbitrary' and 'absurd', to use Katz's terms. Third, any proposal of the sort under consideration conflicts with clear linguistic intuitions that 'John' is the subject of (3) and the indirect object of (4) and vice versa for 'Mary'.[9]

Let us consider this third solution further. In addition to the previously noted criticisms, Katz objects to this suggestion in general because it is ad hoc. Sets of abstract morphemes would have to be devised for every such transformational use, and there would be a need for as many transformations as there are such possible combinations; thus no rule generality nor language independence is possible. In addition, it is not clear whether the proposal applies to any two synonymous sentences, in which case the list of abstract morphemes and transformations would be very lengthy, or if not all synonymous sentences, how one draws the necessary limitations. This solution surely is ad hoc if everything in the marker is seen as lexical and only the verb and preposition are considered abstract.

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[8] Ibid.

[9] Ibid., 11f.

In the third suggested solution, between any pair of paraphrases conversely related, all the words that differ have to be postulated as abstract. The third suggestion is similar to the second suggestion in that the marker contains language-specific abstract constituents and so is not acceptable on those terms. However, if one were to modify the phrase-marker so that it is universal, then these two objections would disappear. Katz's other objections consist in his conviction that the use of one lexical item in the two paraphrases must be accounted for by a formal specification of its syntactic relationships as well as an intuitive explanation of the use of the lexical item in both sentences. This accounting must show how the categories 'subject of' and 'indirect object of' can be mutually substituted.

There are several important points to note regarding all three suggested solutions. First, in general, the entire line of thinking is syntactically oriented. In this respect Katz has made the interesting observation that linguistic notions must be syntactically definable.[10] That is, generalizations in linguistics require language elements to be specified in terms of

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[10]Point made in a class discussion on April 30, 1969, conducted by Jerrold Katz at Rockefeller University.

syntactic classes. In this way statements can all be phrased within a framework of the syntactic structure involved.

With such a syntactic orientation, one should ask whether the basic nature of the syntactic components is purely formal or is intuitive as well. Katz's arguments seem to be cast in terms of equating one's intuitive notions of word usage with syntactic category, as in his discussion of 'John' as indirect object and subject. However, it is not at all clear that our intuitive notions must coincide with the syntactic categories in question. One could think of John as the initial owner of the book, no matter how the sentence is stated. (Yet, if someone says, "Give me a sentence about John", the reply might well put 'John' in the subject position as in 'John sold a book' rather than 'Mary sold a book to John'. As a general disposition toward our language, replies of the sort demanded do put the topic in subject position.)

The second point concerns the general progression of the suggestions. Notice that the first suggestion is a concrete dependence of the phrase-marker of one sentence upon the other. The second is a hybrid, for

it combines semantic information into one abstract form, but it also is a variant of the first suggestion. Finally, the third leads naturally to Lakoff's proposal[11] that the underlying phrase-marker for the sentence pair be a completely abstract structure, and function as a logical representation of the sentence, which is realized in various lexical phrasings.

The third point concerns another suggested underlying phrase-marker for the two sentences. If the string of the common underlying phrase-marker for (3) and (4) were:

(6) Possession of the book is transferred from John to Mary in exchange for some money,

could sentences (3) and (4) be derived therefrom by some syntactic rules? Katz was asked this question in a class discussion, and he considered the prospect inconceivable. While the above representation is in some sense a semantic reading of (3) and (4), to state that the sentence is actually derived from such a marker is not possible within the model, for no transformational rules produce such type of derivation. Further, as a general remark, Katz stated:

> The more one departs from the syntactic character of the sentence, the less intuitive is the sentence under discussion.[12]

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[11] Supra, pp. 93-97.

[12] Stated in class discussion on April 30, 1969, conducted by Jerrold Katz at Rockefeller University.

One might conclude from this statement and the rejection of (6) as a possible underlying phrase-marker that in Katz's opinion the semantic considerations are subordinate to the syntactic structure.

Katz discusses at length the semantic solution for explaining the synonymy of sentences (3) and (4). The verbs 'buy' and 'sell,' Katz says, are 'process' words, i.e., they express "a change or transition from one state to another over a given time interval."[13] He therefore proceeds to develop the apparatus for a semantic marker for process words.[14] Then, using this marker, he represents the meaning of 'buy' and 'sell' so that the projection rules can automatically assign sentences like (3) and (4) the same derived reading.[15] In this solution, the lexical readings for the two verbs are the same except that the positions of the categorized variable of the subject and the indirect object (i.e., 'John' and 'Mary') are reversed in the two readings. Thence the projection rules operate to derive the same reading on the whole constituent level for the two sentences.

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[13]Katz (forthcoming), VII, 75.

[14]Ibid., 15-58.

[15]Ibid., 58-73. The lexical readings for these verbs are found on p. 67f.

One can conclude from Katz's discussion that within Katz's framework, the direct approach in accounting for synonymy between different constituents is to derive a common reading from a combination of lexical readings during the interpretative component of the model. However, in this case the synonymy of the two sentences is not a result of a single phrase-marker in deep structure, but rather depends upon deriving two synonymous interpretations from two complex sets of lexical readings.

One can also envision another position, in addition to Katz's and Lakoff's as outlined above, which is theoretically weaker from the standpoint of linguistic theory. According to this theory, one could allow synonymous sentences to have different deep structures, which themselves need have no reading in common. The criteria for synonymy in this situation would be based upon the logical equivalence or interdeducibility of the underlying sentence structures (or the sentences themselves), based on rules something like logical transformations. Such an approach, if successful, would establish a correlation between features of logic and linguistic theory and aid in the convergence of the two viewpoints. However, such new transformational rules would need to be of a considerably different sort than

the rules that logicians have in mind when they speak of deducibility. Such rules must be derived within the linguistic framework, and so use linguistic terminology and cannot be taken directly from logical theory.

Within the framework of transformational theory considered in this paper, such a proposal is at present not fully applicable to the sentences generated by any of the models investigated. Even if one were to agree that the linguistic meaning of a sentence is adequately expressed in terms of its logical form, we can put only a relatively small number of natural language sentences into standard logical form. In particular, such statements as

(7) John saw Mary hit Sam

do not go naturally into any kind of ordinary predicate calculus. The logical notation necessary to represent such statements is not entirely developed at present.

Although the prospect of relating logical and linguistic notions of synonymy is a thought-provoking one, present logical theory cannot account for all acceptable natural language sentences. Accordingly, let us put this prospect aside and deal only with the two strictly linguistic arguments concerning synonymy and deep structure.

The line to be drawn between the two viewpoints outlined above is clear: according to the Chomsky-Katz model, meaning relations within sentences are expressed via the syntactic and semantic structure of the sentence as well as by the selectional restrictions which are attached to lexical items. In the counter-movement viewpoint exemplified by Lakoff, such meaning relations provide the impetus for deep structure generation; so the resultant deep structure is developed according to semantic requirements.

Consider how this dichotomy affects the particular situation of synonymy. The unity of concept which synonymous sentences express is derived by a combination of syntactic and semantic elements according to separate existing selectional restrictions in the two components of the Chomsky-Katz model. Thus synonymy has no direct relationship to the nature of deep structure. In the model of the counter-movement, the semantic identity of the synonymous sentences requires the identity of the deep structures of these sentences, and the formulation of selectional restrictions reflects this unity. To generalize: the notion one has as to the role of selectional features in a model of transformational grammar has a part in determining the relationship of synonymy and deep structure.

Are There Both Syntactic and Semantic Selectional Restrictions?

Proponents of the conventional model for transformational grammar, Chomsky and Katz, distinguish between syntactic and semantic selectional restrictions on the basis of the location of the restrictions in the two separate components of the model. They contend that there are different rules for the two sets of restrictions and the restrictions fulfill entirely separate model requirements. On the other hand, proponents of the counter-movement argue that selectional restrictions are only semantic, and syntactic considerations have no proper place in such discussion. An important issue to be resolved is: Are there both types of selectional restrictions, and how must they operate?

Consider the usage of the [±Count] distinction--is it a syntactic restriction, a semantic restriction, or both? McCawley contends that all selectional restrictions are predicted from meaning, hence are only semantic. As an example of this generalization he discusses the feature [±Count]. This feature has a selectional restriction involving the feature [+Count] as in:

(7) I counted the pigs

and

(8)* I counted the sand.

(Note that 'counted' is used in the sense of 'enumerate', and not in the sense 'include in an enumeration'.)

McCawley thinks that the selectional restriction in these examples actually involves the property of designating a set, and this is the only type of restriction involved.[16] Thus in the example (7), the feature [+Count], indicating set designation attached to 'pigs', accounts for the appropriateness of the relation between 'pigs' and 'counted', whereas the absence of this feature for 'sand' in (8) is the reason for its unacceptability.

Katz suggests that the McCawley example shows there are instances of valid semantic selectional

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[16]McCawley (1968a), 266, and (1968c), 134f.

restrictions, but such examples provide no conclusive evidence for the claim that there cannot be purely syntactic selectional restrictions as well. In fact, he argues that for important linguistic reasons, such features as [±Count] cannot carry semantic information. The synonymy relationship between two constituents requires that the same semantic representation must be assigned to each, and the syntactic features which represent the different structures of the constituents cannot be semantically significant.

> For if syntactic markers that differentiate one construction from another with which it is synonymous are taken to carry semantic information, then the semantic distinction they reflect would have, contrary to our hypothesis, prevented the constructions from being synonymous in the first place.[17]

Katz lists pairs of synonymous constituents, one of which has the feature [+Mass] and the other the feature [+Count]. The examples include

(9) (a) fog/ground level clouds

(b) footwear/articles of wearing apparel for the feet.

(c) camping-gear/artifacts for use in camping

(d) noise/loud, senseless, unmusical sounds.[18]

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[17]Katz (forthcoming), VIII, 19.

[18]Ibid., 19f.

By these examples Katz shows that the [±Count] features which are present here must be purely syntactic selectional features.

Note that this entire criticism by Katz is constructed upon the premise that synonymy depends upon identical specification of semantic features. One can profitably compare this position with Katz's viewpoint concerning the relationship between synonymy and deep structure discussed above. Katz separates syntactic and semantic aspects of deep structure so that the relationship of synonymy pertains exclusively to the semantic component of grammar. Because of this, he can require that distinctions with respect to features of synonymous constituents must be syntactic, or else synonymy would not be preserved. On the other hand, the counter-movement position concerning synonymy and deep structure does not place separate constraints upon semantic and syntactic aspects of a relation. Rather, generative requirements, namely, features and restrictions, are the impetus for producing a single deep structure from which synonymous sentences are derived.

One can make a further generalization concerning the divergent positions on these issues: The more one contrasts the semantic situations described

by both groups, the more apparent becomes their disagreement as to the definition of the role of semantics in transformational grammar theory. Continually the counter-movement viewpoint concerning semantics is more encompassing than the Chomsky-Katz stand. As the role of semantics shifts, so does the role of selectional restrictions.

In order to clearly develop the contrast between the two groups concerning syntactic and semantic selectional restrictions, let us consider one of the examples which Katz merely lists to show the distinction between [+Count] and [+Mass] features and analyse its implications in greater depth. Using the example (9b) we can produce the synonymous sentences:

(10) (a) The footwear is in the closet

(b) The articles of wearing apparel for the feet are in the closet,

but not:

(11) (a)* The footwear are in the closet

(b)* The articles of wearing apparel for the feet is in the closet.

The examples show that the synonymous constituents need to satisfy different syntactic selectional restrictions with respect to singularity/plurality in verb agreement

when they are used as the subject of a sentence. Agreement between noun and verb concerning singularity/-plurality is clearly a syntactic requirement. Such agreement is stated as occurring between the noun phrase "head" and the verb. Consequently there is a definite need for syntactic selectional restrictions, such as the [±Count] feature, within the Chomsky-Katz model.

One can characterize the issue between the proponents as the question: Are there semantic features which will accomplish the task of identifying any syntactic features needed? In the case of the example (9a) the syntactic mass/count distinction is present; can this distinction be underwritten by the semantic feature [±Count]? With respect to this feature, 'fog' has the specification [-Count], whereas 'ground level clouds' has the feature [+Count]. Then, adopting McCawley's framework, one could say that the syntactic requirement is met by the presence or absence of the semantic feature [+Count].

However, for (9b) a similar analysis is not possible. Consider the two sentences:

(12) (a) I counted the footwear in the store window

(b) I counted the articles of wearing apparel for the feet in the store window.

Both sentences are acceptable because the direct object in each case contains the semantic feature [+Count]. The distinction here is that the word 'footwear' has a syntactic feature [+Mass] and a semantic feature [+Count]. 'Footwear' is an example of a collective noun which functions as a mass noun in that it takes a singular verb and has no plural form. Yet it contains the semantic feature [+Count], and designates a set.

The semantic characterization which McCawley propounds cannot work within the Chomsky-Katz framework to provide syntactic features. A simple consideration of the pair 'footwear/articles of wearing apparel for the feet' will show McCawley wrong. First, the [±Count] feature specification in sentences (12a) and (b) show that the feature [+Count] is more than just a semantic feature designating a set, for both expressions designate a set, yet one is count and the other is mass. The second reason is a more general one--if the semantic feature [+Count] is present in one sentence and absent

in the other and the apparently syntactic requirement actually arises from semantic considerations, one expects the sentence in which the feature is absent to be anomalous; yet neither sentence is anomalous.

Because of examples such as (12), one can conclude that a semantic feature (here the feature [±Count]) cannot always be used to account for a syntactic requirement. On this analysis McCawley's suggestion fails, and Katz is substantiated. Indeed, Katz states[19] that wherever syntactic restrictions appear to have semantic counterparts they must be treated as two separate sets of features with different conditions of application.

Although the proponents of the counter-movement, particularly McCawley, claim that selectional restrictions have exclusively a semantic role in the theory of transformational grammar, this argument fails for

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[19] Ibid., p. 28.

the Chomsky-Katz model. The need for syntactic selectional restrictions within this model has been decisively shown by Katz, as described above.

The argument for only semantic restrictions is better formulated in the context of the model of the counter-movement.[20] There is a simple reason for this: the semantic orientation of the new model causes all but the formal syntactic elements of sentence generation to be stated in semantic terms. However, the entire formulation of this model is in the discussion stage; it has not been formally specified or completely constructed. The proposals of the counter-movement proponents cannot be discounted, however, because they contain constructive suggestions and are clearly important to grammar.

There are a few conclusions that one can draw from the discussion in this section. First, Katz has

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[20]Consult supra, Chapter Five, pp. 109-112, for a discussion of these arguments.

demonstrated that syntactic selectional restrictions are necessary for some feature requirements within the Chomsky-Katz model. For example, for synonymity to be a semantic relation, the [±Count] distinction must be syntactic in at least one sense. Second, the proposal by the counter-movement that only semantic restrictions are needed for a model of grammar requires a more precise, complete formulation before it merits a position as a serious alternative to the Chomsky-Katz model.

This issue of syntactic/semantic selectional restrictions will be explored again in the next chapter, where it will be argued that in the Chomsky-Katz model such bifurcation of selectional restrictions causes grave problems for the model. Several alternative solutions to the dilemma will also be proposed.

Single/Double Selectional Restrictions

Another issue between the two groups is the nature of selectional restrictions--whether they need have a single or a double specification. Chomsky compares both alternatives for the complex symbol rule which adds syntactic selectional features to the verb.

The rule

(13) $[+V] \rightarrow CS/ \begin{Bmatrix} \alpha \frown Aux\_\_ \\ \_\_Det \frown \alpha \end{Bmatrix}$, where α is a N, α being a variable ranging over specified features[21]

adds single features such as [+[+Human] Aux__] and [__Det[+Abstract]] to a transitive verb. One marks the required relationship between verb and subject and the other between verb and object.

The rule which adds double restrictions

(14) $[+V] \rightarrow CS/\alpha \frown Aux\_\_Det \frown \beta$, where α is a N and β is a N [22]

adds one feature such as [+[+Human]Aux__Det[+Abstract]], which marks a single restriction between subject, verb and object. Chomsky states that in general he has no preference for either sort of rule. However, he states that there are instances of a need for double restrictions. For example, such a restriction is apparently required to account for the admissibility of the verb 'command' in sentences (15) a, b, and c, and not d:

(15) (a) John commanded our respect

(b) John commanded the platoon

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[21]Chomsky (1965), 97. A further discussion on this rule is found in Chapter Two, pp. 29-30.

[22]Ibid., 107. The context of a discussion of this rule is found supra, Chapter Two, pp. 32-34.

(c) John's resignation commanded our respect

(d)* John's resignation commanded the platoon.[23]

'Command' allows both human and abstract subjects and human and abstract objects, but not independently. If the restrictions were listed singly, there would be no indication that the combination of abstract subject with human object (d) is not acceptable.

However, Lakoff argues that Chomsky's analysis of 'command' is unacceptable.[24] 'Command' has a different meaning in (b) than it does in (a) and (c), so the analysis outlined above is not necessary. The one meaning in (b) would have a restriction that both subject and object be human, the other in (a) and (c) a restriction that the object be abstract. Lakoff concludes that no need for double selectional restrictions would then arise since the first three sentences would be generated and the fourth excluded.

There is an interesting aspect to the Chomsky-Lakoff disagreement that deserves discussion. Surely Lakoff is correct that there are two senses of the verb 'command' involved in Chomsky's formulation. Lakoff's proposal for making the rule into a set of

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[23] Ibid., 119.

[24] On the Nature of Syntactic Irregularity, Indiana University dissertation (1965), E-2; above discussion found in McCawley (1968a), 262f.

single restrictions also seems appropriate. Nevertheless, one should notice why the dichotomy of views arose in the first place. Chomsky adopts the convention that the identity of lexical entries is unique at the category level. However, he does not pass judgment upon whether the multiple senses of morphemes should be listed together to comprise a polysemous entry, or should be expressed by as many entries as there are senses. In the example involving 'command', Chomsky uses the convention of polysemous entries. On the other hand, Lakoff adopts the convention that there are as many entries as there are senses of morphemes, and consequently his single restriction analysis follows naturally.

To pose the question of this section succinctly--are both types of restriction rule statements necessary? For most cases single selectional restrictions suffice. Verbs whose choice of subject and object are independent of one another, or for which only one feature specification is possible (which amounts to the same thing) seem to need only single restriction rules. For example, 'hit' in the sense of 'to strike a blow' requires the subject to have the feature [+Concrete], and the object to have the same

feature. Lakoff's argument in effect says that all verbs are of this sort.

In a discussion concerning selectional restrictions McCawley outlines Lakoff's argument and then generalizes his conclusion:

> Until a clear case of something requiring double selectional features can be found, it would seem worthwhile to propose as a linguistic universal that only single selectional features are needed to characterize co-occurrence restrictions between lexical items.[25]

However, there are examples of selectional feature requirements which for both subject and object specification depend upon a particular feature of one of the constituents. For example, the verb 'is' when it takes the predicate nominative requires the subject nominative to have the same feature. Unless this double restriction can be expressed appropriately, as for example

$$(16) \quad [+V] \rightarrow Cs / \left\{ \begin{matrix} [+\text{Human}]\,\text{Aux}\_\_\text{Det}\,[+\text{Human}] \\ [-\text{Human}]\,\text{Aux}\_\_\text{Det}\,[-\text{Human}] \end{matrix} \right\}$$

one could not generate the acceptable sentences and exclude the ungrammatical ones. In addition, recall the discussion in Chapter Two concerning the phrase 'a very frightening person', in which it was shown that

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[25]McCawley (1968a), 263.

'frightening' contained a double selectional restriction as part of its complex symbol. Thus within the framework of the Chomsky-Katz model, both types of selectional restrictions seem necessary. (The framework of the counter-movement offers no reference point for this particular issue, and so need not be considered here.)

Lexical Insertion and the Lexicon

According to the Chomsky-Katz model, the terminal string of the generalized phrase-marker is formed from the pre-terminal string by insertion of lexical formatives. This insertion occurs in the syntactic component only if there is a coincidence between a feature of a node of the string and a corresponding feature set which is part of the definition of a lexical item. Chomsky does not specify the structure for the lexicon which contains the lexical entries. Whether or not lexical entries are uniquely specified as to lexical categories does not concern him, so long as the requirements for matching of feature sets with phrase-marker nodes are met.[26] According to Chomsky's development of the model,

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[26]Consult Chapter Two, pp. 39-40, for further discussion of Chomsky's viewpoint on this issue.

lexical insertion takes place once in the derivation of a sentence, i.e., to form the terminal string of the phrase-marker.

In his formulation of the lexicon, Chomsky does not mention semantic information. For this reason Katz considers alternative procedures for the insertion of lexical features in sentence generation--(1) that all lexical information be inserted when the lexical item is inserted into the terminal string in the syntactic component, or (2) that there be separate insertions for syntactic and semantic features. Single insertion of lexical features would be preferable in Katz's opinion, but is not crucial for his model. What is crucial in Katz's formulation is that the semantic information must be incorporated into the underlying phrase-marker before the semantic component begins any interpretation of the marker. Thus a separate insertion of semantic features would occur between the activity of the syntactic and semantic components of a model. That is, lexical insertion is complete before semantic interpretation or transformational analysis proceeds.[27]

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[27]Consult Chapter Three, pp. 57-58, for further elaboration of Katz's thinking concerning this matter.

On the contrary, McCawley proposes that lexical insertion does not take place at a single point as in the Chomskian model, but as certain transformations change the surface structure of a sentence, additional lexical items may be inserted. He provides several examples in support of this claim, which can be divided conveniently into two groups: insertion examples which follow certain deletion transformations, including insertion of pronouns and words which function in a manner similar to anaphoric pronouns; and second, examples of insertion of other classes of lexical items following transformation of the sentences.

Examples of the first kind involve sentences such as:

(17) Do you know John and Mary? He and she are a doctor and a teacher respectively.[28]

Compare (17) with its unacceptable counterpart:

(18)* Do you know John and Mary? She and he are a doctor and a teacher respectively.

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[28]James McCawley, "Meaning and the Description of Languages," Kotoba no uchū, II, 11 (1967), 53, and James McCawley, "The Role of Semantics in a Grammar," Universals in Linguistic Theory, eds. Emmon Bach and Robert T. Harms. (New York, 1967), 168.

McCawley claims that in the example (18) the referring phrase is inserted late in the transformational derivation. This lexical insertion cannot take place until the final order of the noun phrases in the surface structure is specified.

The second insertion type involves a heterogeneous group of examples. In his formulation in Aspects, Chomsky allows for the limited insertion of pronouns following certain transformations;[29] however, some pronoun insertion is not apparently that simple nor would it seem to have as few instance types as Chomsky implies. Rather, a large group of ad hoc transformational rules need to be postulated to handle the actual cases of different pronoun lexical insertion possibilities.

McCawley suggests that there are several example types possible which show that certain transformations redistribute the semantic information of a sentence in such a way as to force lexical insertion to follow these transformations. For instance, the nominalization transformation uses the verb of the sentence and adds the appropriate element to it:

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[29]Chomsky (1965), pp. 128-147.

from:

(19) Edison invented an electrical device

to:

(20) The inventor of an electrical device.[30]

The transformation cannot be only a matter of a suffix change because there are instances in which the re-grouping caused by this transformation has no surface structure realization,[31] as in:

(21) George passed an examination

to:

(22)* The passer of an examination.

This argument that the nominalization transformation must precede lexical insertion is conclusive only if pre-lexical transformations can account for all acceptable and unacceptable results and post-lexical transformations cannot. The example set (21) and (22) contains a verb without a nominal form. Yet if the feature complex of 'pass' were so specified as to block the given transformation, e.g., by having the feature given as a strict subcategorization feature, then that would

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[30]James McCawley, "Lexical Insertion in a Transformational Grammar Without Deep Structure," Papers of the 1968 Regional Meeting; Chicago Linguistics Society, eds. Darden, Bailey and Davison (Chicago, 1968), 5f.

[31]Ibid., 6.

account for (22) being unacceptable on the basis of a post-lexical transformation attempt. Because of these considerations, McCawley's examples do not seem to support his argument.

What would support McCawley's claim would be a noun resulting from the agent-nominalization transformation acting upon a verbal which has no lexical form. Then the transformation of nominalization would have to precede lexical insertion. McCawley thinks that Lakoff provides an example of such a phenomenon in the sentences:

(23) (a) China's agression against India shocked everyone.

(b)* China agressed against India.[32]

However, there is a verb 'agress' (only spelled 'aggress') in the dictionary, and so the sentences (23) do not support the claim.

Another type of prelexical transformation of the regrouping sort involves reflexivization. McCawley develops a type of example to show that the reflexivization transformation must occur before a prelexical rule, and so be prelexical itself. McCawley's examples are:

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[32] Ibid.

(24) (a) John showed Harry a picture of himself

(b) John showed Harry Picasso's picture of himself

(c)* John showed Harry Margaret's picture of himself.[33]

McCawley says that in (24a)the reflexive may refer to either John or Harry; in (24b)it may refer only to Picasso; and in (24c)the reference of 'himself' to 'Margaret' is ungrammatical. He concludes that at least in some cases, the reflexivization transformation must occur before lexical insertion.

However, consider these examples further. Clearly (24a)is ambiguous as to its reference. Suppose one were to replace 'Picasso' in (24b)by 'Sam'. Then (24b)would appear to be triply ambiguous with respect to its reference. In other words, perhaps all the addition of the possessive noun does to the example is add an ambiguity, not resolve one. When one examines(24c) following (24b), one gains the impression that the examples are not speaking about mere possession of a picture of someone, but rather self-portraits by Picasso and Margaret--thus

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[33]Ibid. Note, however, that the prelexical rule in question is the above-discussed nominalization transformation, so the second argument depends upon the first.

the conclusion about the antecedent of 'himself'. Surely this reference is a possible one for (24b), but it seems to be merely in addition to the triple possibilities mentioned above. And finally, (24c) seems acceptable but ambiguous in reference to having 'himself' refer to John or Harry; certainly it would be ungrammatical for 'himself' to refer to 'Margaret'. Certainly the example seems somewhat odd, but some of this oddness can be dispelled, as in:

(25) John showed Harry Margaret's picture of himself as a baby.

One is forced to conclude that the examples of (24) are not sufficient to support his argument.

A third example in this group results from transformations on the structure underlying the sentence

(26) I persuaded John to help me to

(27) John decided to help me.

McCawley takes this example from Lakoff's work on the deep structure of sentences in his dissertation. Lakoff suggests that there are "inchoative" and "causative" transformations which regroup semantic information prior to the insertion of lexical items. He suggests that the sense of 'persuade' in sentence (26) is the causative

of 'decide' in (27). Before lexical insertion of the verb, a transformation upon the deep structure of (26) changes it to the deep structure of (27).[34]

Concerning this third example type, there are serious considerations to review. First, the analysis is very deep here, and to specify the structural requirements for this transformation would be very complex. Consequently, it is very difficult to determine to what extent the transformation between (26) and (27) is a single analysis or an instance of a general structural change. The limits to the operation of each transformation are very complex. However, some remarks are in order with respect to the change in question. One needs to answer the question, what are the criteria on a verb to allow this transformation to take place? The first criterion is that not all verbs will allow such a transformation. Secondly, even in the context of

(28) I (verb) John (infinitive phrase)

the shades of meaning which are transmitted are not consistent. Compare,

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[34]McCawley (1967) 9 (15) and 11 (54). George Lakoff and John Ross, Is Deep Structure Necessary? (1967), 1f, also argue for variable lexical item insertion.

(29) (a) I told John to build a post office

(b) I persuaded John to build a post office

(c) I helped John to build a post office.

The second point concerning (26) and (27) is that it is not clear that (26) and (27) can be considered synonymous, for semantically (27) is weaker than (26). Hence, if transformations preserve semantic information, (27) cannot be transformationally derived from (26).

The third point is that presumably there are many sentences which have the same form and apparently the same structural analysis, yet the transformation in question is not applicable to them. The question which requires an answer on this point is whether 'decide' is transformationally derivable from all of these; the obvious answer is that the transformation, if it exists, is post-lexical. If 'decide' is derivable, then special attention will need to be paid the extreme ambiguity which results.

All the preceding arguments concerning the timing of lexical insertion suggest that in some sentences transformations must occur before lexical items are inserted into the sentence structure. If this conclusion is accepted, the formulation of deep structure within the

model will change. However, since the examples that McCawley gathers to support this argument are generally weak, one need not reject the Chomskian model on their account.

In fact, where is the reader left? The argument that more than a single stage of lexical insertion is necessary in the Chomsky-Katz model has not been conclusively proven, so one can readily accept Katz's theoretical tenet that single insertion is preferable because of simplicity. McCawley's arguments will have to be greatly buttressed to show the necessity for multiple insertions within the model. Presently they do not substantiate his claim.

Anomaly

The formal languages of the logician are so framed that grammaticality (i.e., well-formedness) coincides with meaningfulness. Chomsky in Syntactic Structures observes that in natural languages apparently neither is necessary or sufficient for the other. For example,

(30)* Colorless green ideas sleep furiously

is syntactically well-formed, but not semantically meaningful, and

(31)* Read you a book on modern verse?

is meaningful but not syntactically well-formed.[35]

In effect, since syntactic criteria rule out the second of these but not the first, presumably for a complete linguistic theory the first example type would have to be ruled out as anomalous according to certain semantic criteria.

Katz with J. A. Fodor in "The Structure of a Semantic Theory" and with Postal in An Integrated Theory of Linguistic Descriptions developed the semantic criteria to handle this gap in linguistic theory. The basic technique, as discussed earlier in Chapter Three, is to define semantic amalgamation among sentence constituents by projection rules which combine sentence constituents according to the features attached to lexical items.

By the time of Aspects, Chomsky chose to restrict the notion of full grammaticality, to disallow all anomalous sentences and allow their generation only by relaxation of syntactic rules. He characterizes their

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[35]Syntactic Structures, p. 15.

similarity to fully grammatical sentences as the fact that the grammatical violation which causes a deviance occurs on a low level in the derivation of the sentence. Chomsky argues that there is in fact a gradation of deviance among sentences which depends upon the level of the syntactic rule which is violated. The higher the violated rule or syntactic feature is in the derivation, the greater the deviation. An example of this order of deviance is:

(32) (a)* Sincerity may virtue the boy

(b)* Sincerity may elapse the boy

(c)* Sincerity may admire the boy.[36]

In (32a) the violation is a category violation of the noun 'virtue' instead of a verb. In (32b) a strict subcategorization restriction [+__NP] is violated. In (32c) the selectional restriction [+Animate__] is violated.

Even after this formulation in Aspects, Katz continues to speak in general of the blocking of deviant sentences by the failure of semantic constituents to amalgamate. Immediately, however, the question arises, is the semantic operation of the blocking of amalgamation

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[36] Aspects, p. 152. Consult Chapter Two, pp. 42-50, for a full discussion of Chomsky's handling of deviant sentences.

necessary if the syntactic rules can account for all deviance? No, of course not. Were syntax fully able to account for deviance, the semantic doubtfulness of the sentences in question would be due to the necessary relaxation of constraints on syntactic generation, not to any distinctly semantic principles that had been violated.

However, consider the sentences:

(33) The blind man saw the train coming

and

(34) The illiterate woman wrote a letter to her congressman.

The inappropriateness of these sentences leads to another issue involving anomaly. Are the semantic structures of contradictory sentences related or not?[37] Selectional restrictions are defined so that their violation causes amalgamation to cease in semantic interpretation. In the case of anomaly, amalgamation is blocked because the requirement of a particular selectional restriction is not met. In the case of contradiction two lexical

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[37]Consult Chapter Three, pp. 59-60, for a description of anomaly and contradiction within the semantic component of his model.

entries are present in a constituent that cause at least one reading with antonymous senses.

It appears from the above two descriptions that anomaly and contradiction are wholly separate phenomena. However, when one tries to use these descriptions to account for whether sentences (33) and (34) are anomalous or contradictory, the clear distinction between the two phenomena quickly fades away. Such an occurrence leads one to suggest that the distinction could be a matter of degree, not kind.

In any case, the consideration of anomaly in this section has identified two basic questions which need to be resolved. First, are syntactic criteria adequate to account for semantic features? Second, what is the relationship between contradiction and anomaly? In Chapter Seven, constructive suggestions are proposed for each of these questions which indicate that the proper consideration of selectional restrictions can resolve these issues.

CHAPTER SEVEN

THE CENTRAL ROLE OF SELECTIONAL RESTRICTIONS

Throughout this dissertation the concern has been to analyse and emphasize the importance of the role of selectional restrictions in any model of transformational grammar. In particular, the two polar viewpoints of the two existent models have been analysed to compare the operation of selectional restrictions within those frameworks. Now, let us consider several problem areas within these models, and show how an analysis of these areas from a different orientation, namely, one stressing the centrality of selectional restrictions, will resolve the issues.

Syntactic/Semantic Selectional Restriction Dichotomy

The relationship between syntactic and semantic selectional restrictions was discussed with respect to both models in Chapter Six.[1] Within the Chomsky-Katz model it was shown that there is a definite need for both syntactic and semantic selectional restrictions. However,

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[1]Supra, pp. 134-143.

because the model contains a bifurcation of semantic and syntactic components, a problem area arises concerning the introduction of a certain class of selectional restrictions. Let us consider a specific member of this class, the feature [±Human].

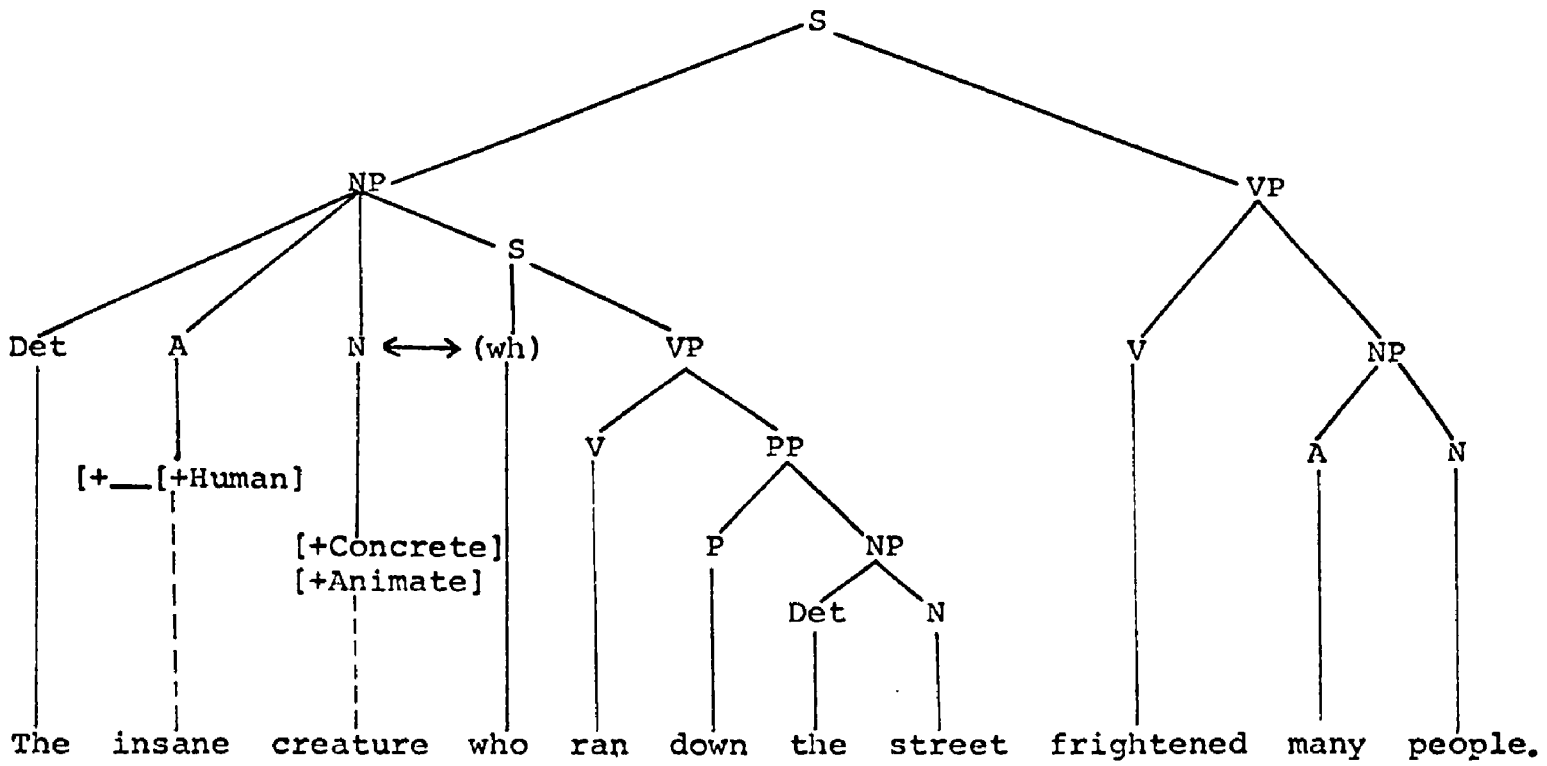
The syntactic feature [+Human] accounts for the occurrence of the relative pronoun 'who' as opposed to 'which' in generating a relative clause as a part of a sentence. In the sentence:

(1) The insane creature who ran down the street frightened many people,

the subject noun 'creature' is unspecified as to the syntactic feature [±Human]. (Consult (2) for an abbreviated surface phrase-marker of this sentence.) Why, then, does the pronoun 'who' occur? The feature [+Human] comes from the adjective 'insane'; according to a semantic rule it transfers this feature to the noun phrase 'insane creature' when the adjective is amalgamated to the noun. The semantic rule is that semantic features of the sub-constituents are attributed to the entire new constituent when amalgamation occurs.

This explanation is not acceptable for syntactic features, however. The requirement of agreement of the syntactic feature [+Human] with the relative pronoun is

(2)


S
NP
VP
S
Det
A
N ⟷ (wh)
VP
V
NP
[+___[+Human]
V
PP
A
N
[+Concrete]
[+Animate]
P
NP
Det
N
The
insane
creature
who
ran
down
the
street
frightened
many
people.

a syntactic requirement which must be satisfied by a syntactic transformation. The feature must be present in the proper place as a result of the syntactic generation of the phrase-marker, and before semantic interpretation takes place. The Chomskian model provides that syntactic selectional restrictions are stated on the lowest level of sentence generation in the syntactic component; in the case under consideration the feature [+Human] is stated as part of the complex symbol for 'adjective'. However, the model provides no mechanism for carrying the requirements of syntactic selectional restrictions to other level constituents, in the example, to the noun or the noun phrase level. The transformational rule for relative pronoun selection depends upon the presence or absence of [+Human] in the preceding noun, not in the noun phrase constituent.

Before any suggestions about a possible solution to this dilemma are considered, note a different example which raises the same issue:

(3) The tall creature who is in my class speaks German impeccably.[2]

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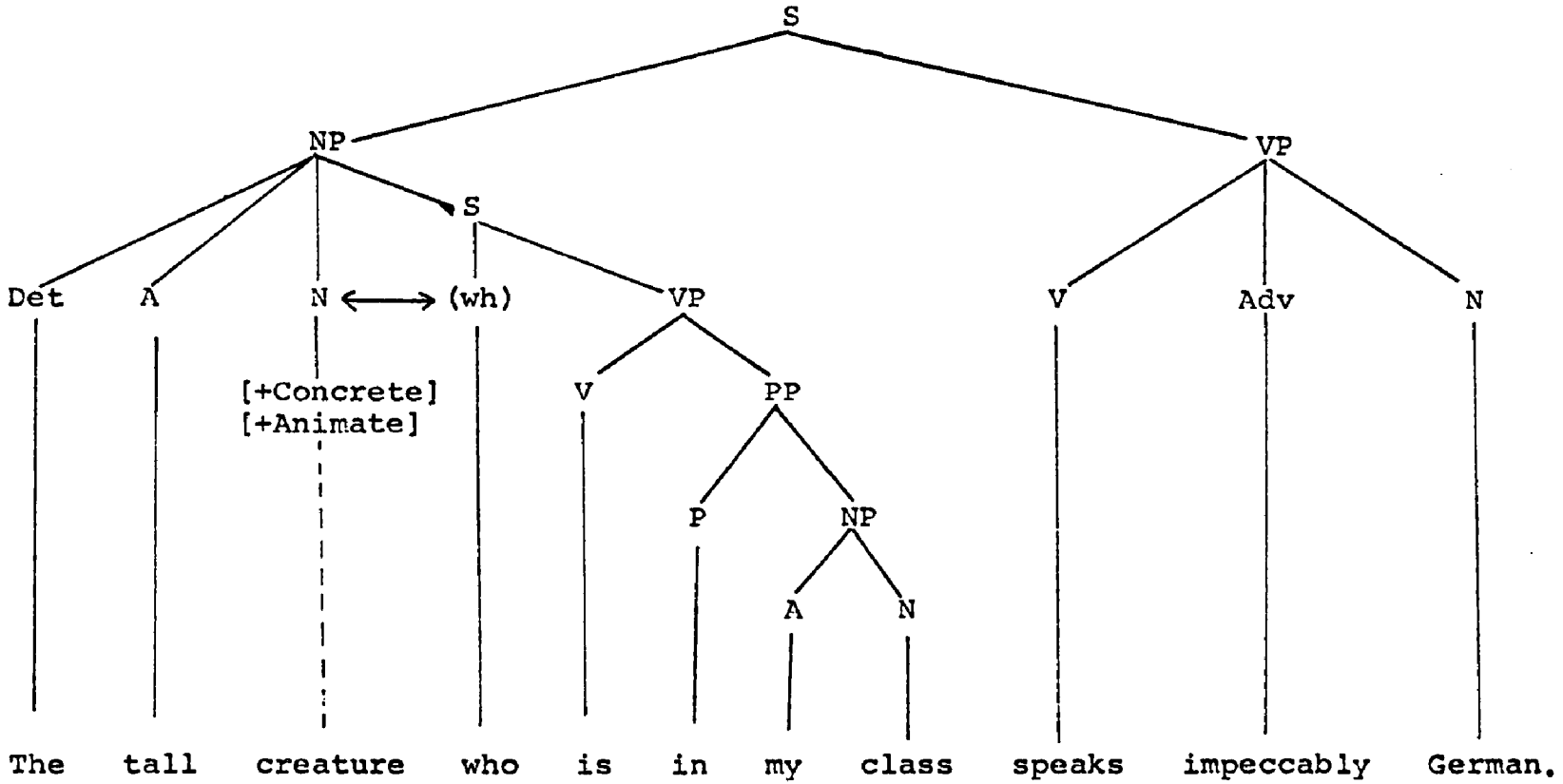
[2]Robert Barnes has suggested a similar example which does not depend upon a noun in the subject position: 'All those who are in the next room speak impeccable German.'

(4)

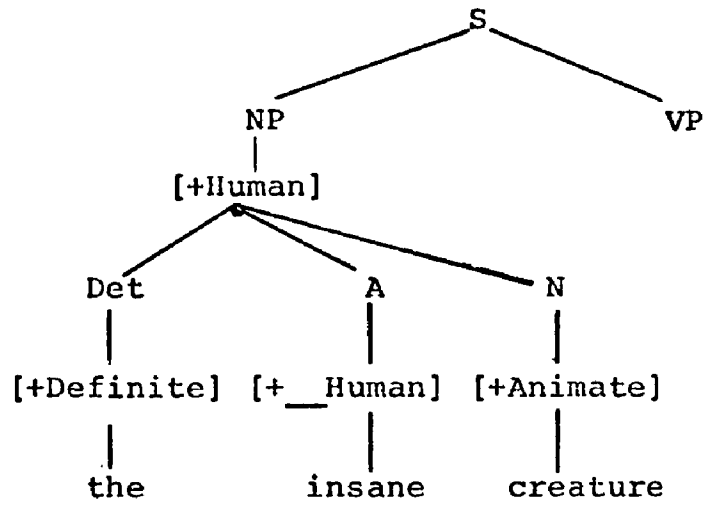

S
NP
VP
S
Det
A
N ⟷ (wh)
VP
V
Adv
N
[+Concrete]
[+Animate]
V
PP
P
NP
A
N
The
tall
creature
who
is
in
my
class
speaks
impeccably
German.

(4) represents a partial phrase-marker for this sentence. For meaningful amalgamation in common usage, the verb 'speaks' requires a subject with the semantic feature [+Human]. Since 'creature' and 'tall' are completely unspecified as to this feature, either syntactically or semantically, the amalgamation proceeds with the verb putting such a specification onto the subject constituent. This amalgamation procedure Katz calls transferring a "Selector" onto another constituent. Although semantic features are passed along in this way during semantic interpretation, there is no apparent comparable way to derive the required syntactic feature [+Human] for the subject in this procedure.

To state the problem succinctly, a transformation involving a relative pronoun 'who/which' requires the feature [±Human] to be part of the complex symbol of its antecedent noun. In the case where the noun is unspecified with respect to the feature, one must account for how the feature is supplied. If the feature is supplied on the noun phrase level, this would depend either upon complex symbols being attached to phrase level constituents, which is contrary to present Chomskian theory, or would depend upon a result of amalgamation of the adjective and noun, which is a semantic activity and supposedly is a linguistic operation which occurs independently of any transformational operations.

There are several possible ways to resolve this issue; however, they all involve modification of the Chomskian model. First, one could allow complex symbols to be specified on a higher constituent level in addition to the category level which is presently the case. Consider the example sentence (1): the noun-phrase node of the derivation in subject position, namely 'the insane creature', would have a complex symbol containing the syntactic feature [+Human]. The partial phrase-marker for such a suggestion would be:

(5)



If this procedure occurred during the generation phase of the syntactic component, the transformational rule could refer to the entire noun phrase, and the production of 'who' would be acceptably accounted for. However, in the Chomskian theory, it is specified that complex-symbol

rules operate only after all the rewrite rules of the categorial component, so that no higher constituent can be assigned a complex symbol. Thus this suggestion would require a change in Chomsky's formulation. This solution if adopted would account for example (1) but would be of no use for phrase-level constituents which are unspecified with respect to a feature, such as in example (3).

A second alternative consists in proposing an intermediate stage between the syntactic component generation and the semantic component amalgamation. In this stage complex symbols would be transferred to other nodes of the deep structure according to specific rules. An example of such a rule which requires minimal change to the existent model would be a rule which transfers a complex symbol to the node in the derivation which immediately dominates the lexical category. Such complex symbol expansion would occur as a one-directional rule, from the particular category node to its immediately dominating node. Whereas the Chomskian transformation involved in (1) is specified by a rule such as the following:

(6) wh + Det + N → $\left\{\begin{matrix}\text{who, if N has [+Human]}\\ \text{which, if N has [-Human]}\end{matrix}\right\}$

with the intermediate process just outlined, the rule

would instead look like:

(7) wh + NP → $\left\{\begin{array}{l}\text{who, if NP has [+Human]} \\ \text{which, if NP has [-Human].}\end{array}\right\}$

This suggestion adds a complication to the Chomskian model, for it seems to duplicate a great deal of the semantic processing; but it has the advantage of being an additive feature rather than one requiring substantial revision of the model.

Note that this particular change would also account for (1) and not (3). To handle (3) according to the second solution would require an entirely different rule which has wide-ranging ramifications for the model. This rule would cause a syntactic feature to be transferred to the sentence level of the phrase-marker and then to the 'relative' node of the clause which requires the antecedent feature. To formulate such an operation is so complicated it is impractical to entertain seriously,especially in a case of a sentence which is more complex than (3), say one that contains several relative clauses. Consequently, rules for an intermediate distributive level to handle sentences such as (3) would be very complicated and cumbersome and defeat the whole purpose of the suggestion. One must conclude that this second suggestion has a very limited application.

Finally, a third possibility would be to designate a set of features which occur as both syntactic and semantic features, and include [+Human] in this set. Then whenever a portion of a derivation is unspecified as to a feature which is a member of this set and the feature is introduced by some amalgamation procedure, it carries with it both its syntactic and semantic properties. However, this proposal alone is not sufficient, for amalgamation would occur too late for transformations to produce 'who'. The requirement would have to be added that deep structure transformations occur following semantic interpretation. Unfortunately, the Chomskian model introduces only syntactic features by complex-symbol rules, and the semantic and transformational operations occur independently and only upon the underlying phrase-marker. To add the suggested formulation would require at least two changes in the syntactic theory. Notice that if the Chomskian model were changed to allow such dual features and to permit transformations to occur after amalgamation, the changes would account for the sentence generation of both (1) and (3).

Thus, the third suggestion offered, of combining semantic and syntactic features to introduce them both

simultaneously, and relocating transformational operations is the most general suggestion, and would account for both examples. The general factor which both examples have in common is an introduction of such a dual feature during the semantic phase. However, the similarity ends here. (1) is a case of adding a feature on a low-level constituent and carrying it along as amalgamation progresses until it is used in a high-level constituent. (3) involves introducing a feature on the highest level of amalgamation (the subject-verb level) which is actually used at a level much lower in the phrase-marker; thus (3) involves a distributive kind of rule.

Lexical Insertion and the Lexicon

There are separate and incompatible formulations proposed by the two divergent groups concerning the timing of lexical insertion and transformation specification. The crux of both arguments is how semantic information is incorporated into the generation of a sentence. According to the Katz model, semantic information is made part of the evolving sentence by lexical insertion after the syntactic generation of a sentence and before any semantic or transformational processes begin; thus transformations have no effect on lexical insertion.

The argument of the counter-movement, on the other hand, is that lexical insertion takes place following certain transformations. In either case, it seems to be the judgment of the theorists that meaning is preserved in transformational change. However, each group has its own rules concerning what synonymy substitutions can be made.

On this issue, the separate protagonists have reached an impasse. Whether one formulation for lexical insertion is better than the other depends upon the requirements of the model it serves. However, a clear specification of the functioning of selectional restrictions in lexical insertion for each model would provide a communication bridge between the two groups.

For the Katz model the timing of lexical insertion between the processing of the syntactic and semantic components means that all necessary selectional restrictions must be incorporated into the generation before any transformations or semantic work take place. This means that selectional restrictions must be so specified that they allow only fully grammatical and meaningful sentences tc be processed. Thus an evaluation of Katz's use of lexical insertion turns into a discussion of the functioning of anomaly in his model, and this topic will be scrutinized in the next section.

However, the question of lexical insertion in the model of the counter-movement involves some interesting and useful formulations for selectional restrictions, and these considerations deserve analysis. It was pointed out in Chapter Six[3] that the counter-movement contends the sentences

(8) (a) I persuaded John to help me

(b) John decided to help me

have the transformational relationship of (8b) being derived from (8a). Part of their argument consists in the presumption that underlying meaning is preserved in such a transformation but lexical insertion of different items reflects only a different expression of the meaning involved.

Consider the co-occurrence restraints imposed on the above sentences. These restraints appear to be strongly semantic, for compare them with:

(9) (a) I told John to help me

(b) John decided to help me.

Seemingly the transformation from (9a) to (9b) also involves a 'causative' factor, as Lakoff puts it. However, 'persuade' and 'told' do not appear to have the same sense.

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[3]Supra, pp. 155-157.

To illustrate this point further, consider a similar transformation set which is anomalous.

(10) (a)* I persuaded my dog to help me

(b) I told my dog to help me

(c)* My dog decided to help me

I can command my canine, but can I say I persuaded him? I think not. What this leads to is that the persuade/-decide transformation presupposes a rational thinking process which appears as a semantic selectional restriction on one of the nouns of the sentences.

Consider another example of the same kind of transformational factor:

(11) I persuaded the creature who stood in the doorway to move.

For the lexical item 'who' to be inserted in the above sentence, the transformation must work on the semantic feature attached to 'creature'.

Note that the basis of the foregoing discussion is that semantic selectional restrictions interact with transformations on sentence structure. There is an immense difference here in these transformation types from the Lakoff examples

(12) (a) Seymour sliced the salami with a knife

(b) Seymour used a knife to slice the salami.

In (8)-(11) there is no recoverability of deleted constituents possible in the transformations; the transformations occur in only one direction. However, in the sentences of (12) the deleted constituents can be recovered, and the transformation can proceed in either direction.

These considerations about lexical insertion substantiate the main thesis of this dissertation, namely, both semantic and syntactic restrictions are part of the generative process that produce acceptable sentences. To illustrate this point, consider variations on (11).

(13) (a) I told the creature who stood in the doorway to move.

(b) I told the creature which stood in the doorway to move.

(c) The creature who stood in the doorway decided to move.

(d)* The creature which stood in the doorway decided to move.

The same transformation produces (13a) and (13b) and so is ambiguous. Note also that 'decide' has the semantic restriction '<human>' attached to it so as to make (13c) acceptable and (13d) unacceptable.

Thus selectional restrictions with both syntactic and semantic manifestations must occur in the generative part of a grammar.

Anomaly

Two problems concerning anomaly were posed in Chapter Six[4] as a result of an analysis of the treatment of anomaly in the literature. The first problem concerns the adequacy of syntactic criteria for anomaly, and the second concerns the relationship between contradiction and anomaly.

Let us first consider the second issue: the relationship between contradictoriness and anomaly, for it is in the close scrutiny of these phenomena that an answer to the question of the adequacy of syntactic criteria will also emerge. The basic reason for wondering about the relatedness of these two concepts arises in the framework of the Chomsky-Katz model. Semantic anomaly is the result of the blocking of the amalgamation process by the violation of a certain semantic selectional restriction, i.e., the context requires a certain feature which is not there. Contradiction arises from the occurrence

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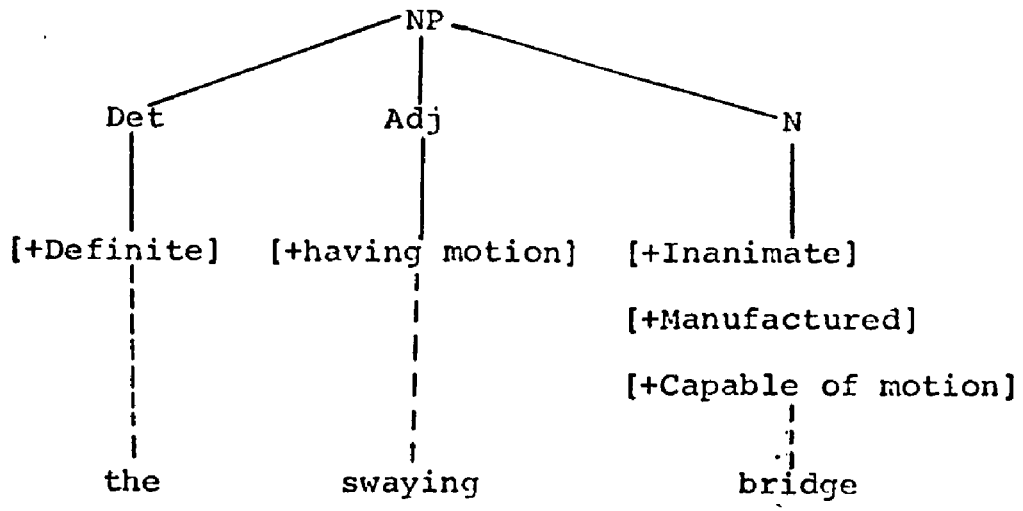
[4]Supra, pp. 158-162.

of two members of an antonymy set in the reading of a constituent. On the face of it, there is no reason to question the distinction between contradiction and anomaly. However, a closer look reveals a similarity which requires analysis.

In general, the distribution of semantic selectional restrictions is such that if the head of a constituent has a certain feature, then a subordinate part of the constituent must have the feature or be unspecified with respect to the feature, else amalgamation is blocked. For example, the constituent 'the swaying bridge' has a partial phrase-marker something like:

(14)



In this case amalgamation proceeds because there is an agreement of features among constituent members.

On the other hand, if two members of an antonymy set are present in a reading for a constituent, then a contradiction can occur. However, the conditions for amalgamation may be met, namely, that there is agreement among the feature specifications of the constituent members. To illustrate this phenomenon, consider the constituent

(15) His important remark is trivial.

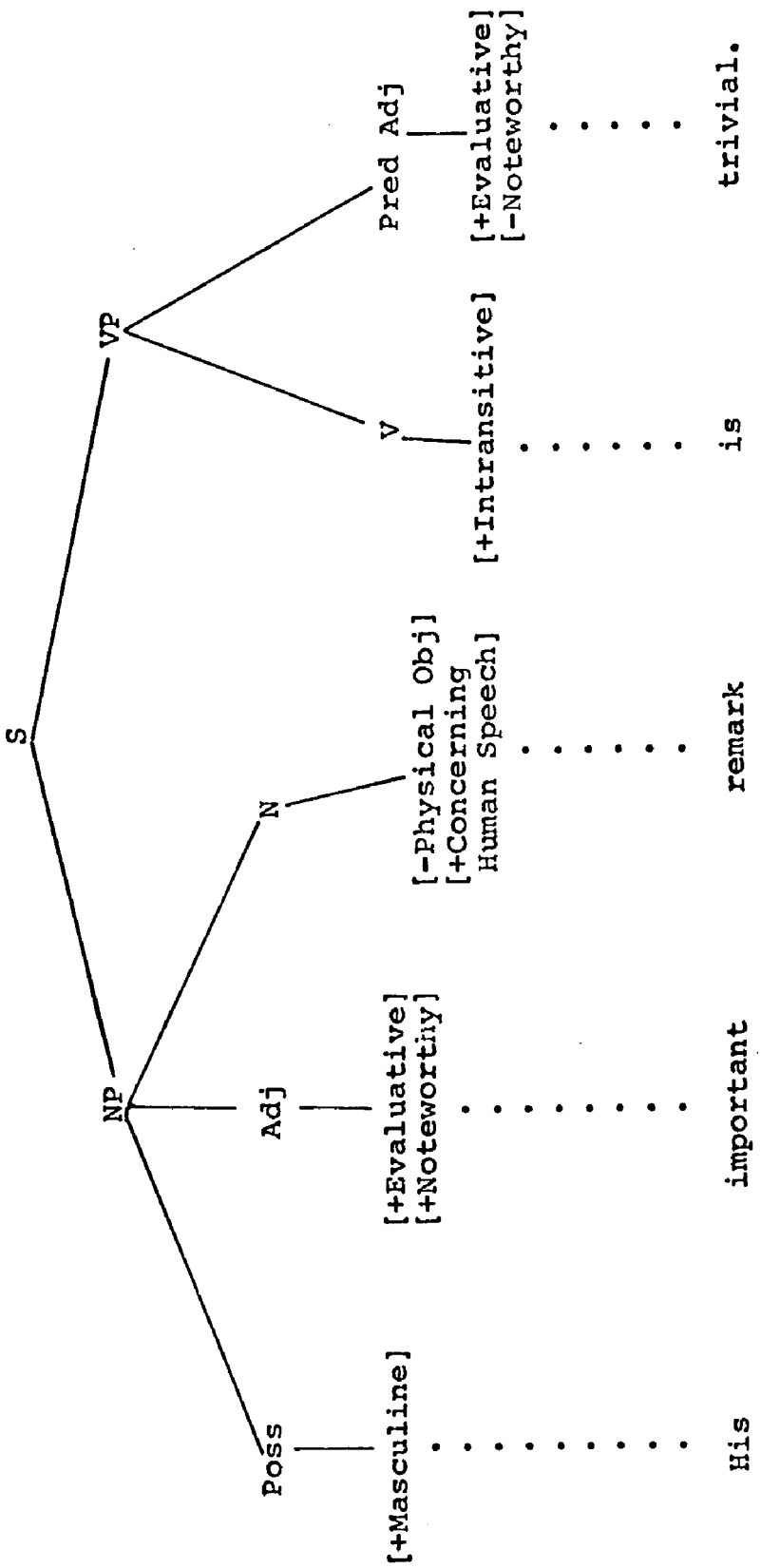
A partial phrase-marker for this sentence is something like (16). In the case of this sentence, two members of an antonymy set, 'important' and 'trivial', are present at the constituent level of the entire sentence. Amalgamation is not blocked, for there is no violation of any restriction. That is, semantic features of restrictions are presently not specified so as to block amalgamation of antonymous members within a constituent when they occur. One must conclude that (15) is not anomalous. It has a meaning, but the meaning is contradictory.

Contrast (15) with a clearly anomalous sentence having a somewhat similar phrase-marker.

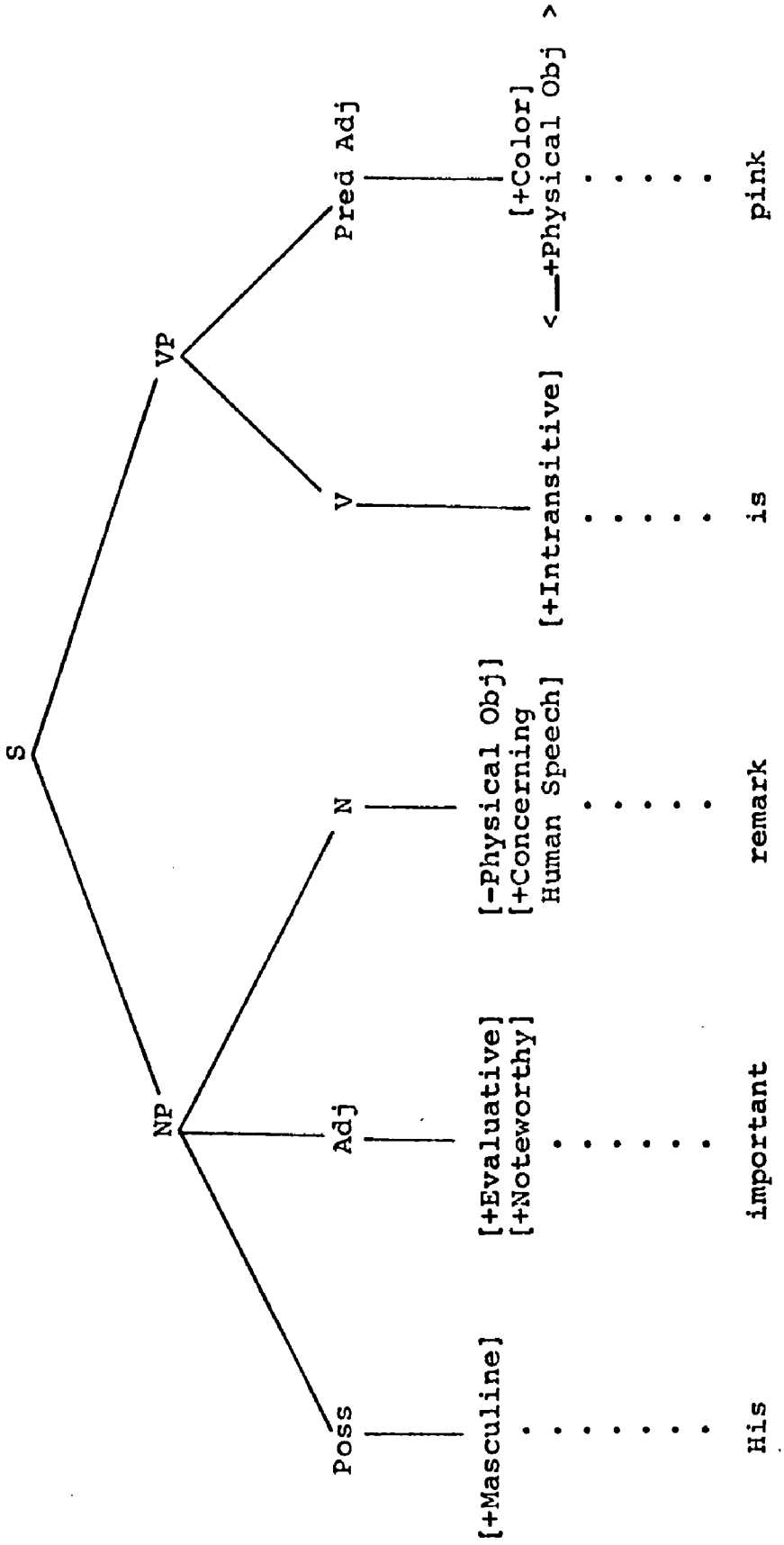
(17)* His important remark is pink.

A partial phrase-marker for this sentence could be like (18). Amalgamation for this sentence is blocked at the

(16)


S
NP
VP
Poss
Adj
N
V
Pred Adj
[+Masculine]
[+Evaluative]
[+Noteworthy]
[-Physical Obj]
[+Concerning
Human Speech]
[+Intransitive]
[+Evaluative]
[-Noteworthy]
His
important
remark
is
trivial.

(18)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[+Evaluative]
[+Noteworthy]
[-Physical Obj]
[+Concerning Human Speech]
[+Intransitive]
<___>
[+Color]
[+Physical Obj]
His
important
remark
is
pink

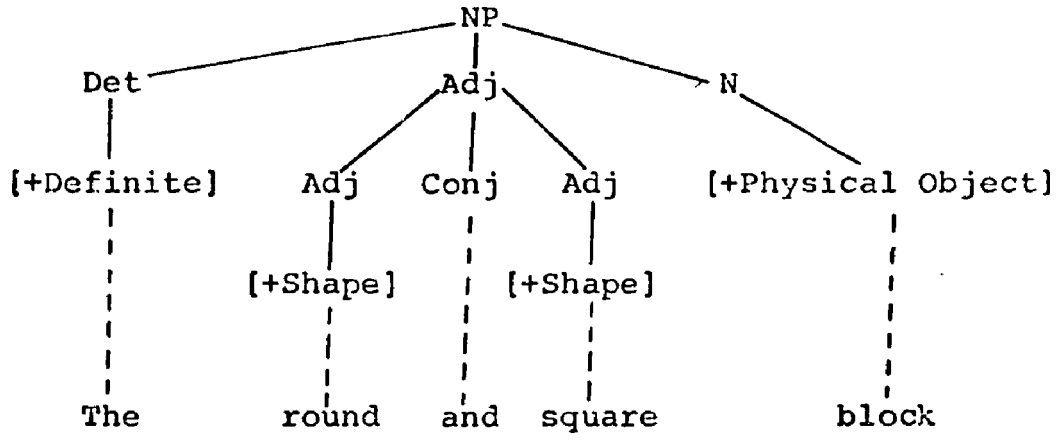
same constituent level that the previous sentence has a contradiction, because a selectional restriction is violated here, namely, that 'pink' requires a noun with the feature [+Physical Object].

Consider another example of contradiction and its portent for the issue at hand. The constituent

(19)* The round and square block

is contradictory, for 'round' and 'square' belong to antonymy sets. A partial phrase-marker for this constituent looks something like:

(20)



Again, the constituent is not anomalous, but rather contradictory, since there is no selectional restriction in the derivation of this constituent that is violated.

Contrast (19) with a constituent having a similar structure:

(21)* The pink and important remark.

This constituent is anomalous simply because the selectional restriction attached to 'pink' requires a noun with the feature [+Physical Object].

Finally, consider a third example of contradiction. The sentence

(22) It is not accurate to say that a blind man saw the train coming

contains a contradiction, but the entire sentence is acceptable, for the higher level clause is so designated as to allow such a phenomenon. Interestingly, the same mechanism which allows a contradiction to be present in an embedded constituent also allows an anomalous constituent to be present in the same place, as in:

(23) It is not accurate to say that his important remark is pink.

The distinctions just drawn concerning contradiction and anomaly seem to show that contradiction is not a sub-class of anomaly, but is apparently a phenomenon unto itself.

Let us pursue this entire question of the relationship between contradictoriness and anomaly from a different approach. Consider the above definition of these two terms further. It appears as though anomaly arises when amalgamation of a subordinate subcomponent to its head is blocked, whereas contradiction arises when constituents are incompatible, yet this incompatibility is not reflected in the selectional restriction. Suppose a subordinate subconstituent and its head are antonyms. Amalgamation is blocked here only if the selectional restrictions indicate that a violation occurs. What is the type of restriction involved? Consider

(24) female uncle

Is the selectional restriction of 'uncle' that is placed on the adjective '<human>' or '<male>'? If '<male>', then (24) is anomalous, for the restriction is not met. If the restriction is the higher level one, '<human>', then amalgamation is permitted and contradiction results, because the antonymous markers [+Male] and [+Female] are present.

Recall that Katz suggests that the selectional restriction states the distinction between the range of

senses with which a given sense can unite to form a new sense and the range of senses with which it cannot. Anomalies occur when two parts of a constituent do not have an intersection of their range of senses for combination. Contradictions occur when two subconstituents have the same range of senses, but can not be used simultaneously.

This distinction would hold up without difficulty if there were an intrinsic level of senses or semantic markers in terms of which selectional restrictions are formulated. If lower level semantic markers do not enter into the formation of selectional restrictions, then the violation of selectional restrictions which results in anomaly would depend upon a violation on a higher level in the conceptual hierarchy. However, there is no such explicit intrinsic level of markers. In fact, it is not even clear that semantic markers can be given a hierarchical organization at all. Still further, it is not clear that there is any level distinction to be made between those markers which can enter into selectional restrictions and those which cannot.

Thus, the uncertainty as to exactly what is a selectional restriction contributes to the uncertainty

about calling a phenomenon a case of contradiction or anomaly. There are two kinds of contradiction: first, an incompatibility between two sister constituents where there is no question of blocking amalgamation; and second, incompatibility between the head and a subordinate element of the constituent, which can escape blocking or succumb to it depending upon the specification of the selectional restriction.

In any case, the distinctions cannot be explicated in terms merely of what concepts can fit together, or where one places selectional restrictions. Therefore, in some sense the distinction between contradiction and anomaly is arbitrary. If one wants the selectional restriction of 'uncle' to be '<male>', then the constituent "female uncle" is anomalous; if not, the constituent is contradictory.

One suggestion worth consideration is to call all such instances anomalous, and talk about grades of anomaly in terms of high or low level restriction violation. For example,

(25) (a) 'female uncle' is a low level violation of the restriction '<male>'.

(b) 'female rock' contains a higher level violation, '<-animate>'.

(c) 'female idea' contains an even higher level violation, '<-physical object>'.

One could then seriously consider a development of a hierarchy of anomaly similar to the ordering of syntactic deviance that Chomsky suggests. If one retains the stipulation of a single selectional restriction, but breaks the restriction into several parts, then the more parts of the restriction that are violated, the higher is the degree of anomaly. This would in effect define a partial order on anomaly. To illustrate this suggestion, consider the phrases:

(26) (a) intangible uncle
(b) plastic uncle
(c) barking uncle
(d) female uncle

Surely there is an ordering of anomaly among these phrases, and it directly corresponds to the hierarchical order of restrictions applicable here:
'<physical object>', '<animate>', '<human>', '<male>'.

Consider one further point: both series (25) and (26) are strong evidence for the rejection of the proposal that one constituent is contradictory and the other is anomalous. For in both series, the violations involved are of the same type, and differ only on their

level of generality. One is therefore led to the conclusion that anomaly can be best stated in terms of a partial ordering of the violation of selectional restrictions, and that judgments of contradiction are a separate phenomenon, outside the framework of the linguistic model. Secondly, since anomaly is a semantic phenomenon, and selectional restrictions are necessary to define its occurrence, then semantic selectional restrictions are necessary within any model for a transformational grammar.

In the discussion of the adequacy of purely syntactic criteria in the accounting for anomaly it was shown that Chomsky and Katz differ as to how they handle anomalous constituents within the framework of their models. It is clear from the above discussion that some anomaly restrictions are decidedly semantic in nature and require semantic specification within the model. For the Chomsky-Katz model to handle all acceptable sentences, modification to account for this particular semantic specification is necessary.

The orientation of the counter-movement model rejects any dichotomy of syntactic and semantic components. Proponents of the counter-movement model suggest

that acceptable sentences are dependent entirely upon well-formedness criteria of a particular nature: selectional restrictions need to be specified with respect to constraints of 'possible message.'[5] These selectional restrictions are semantic in that they are constraints on what is meaningful to say acceptably, but there is no determination as to whether the rules which generate acceptable sentences need to be semantic or syntactic.

From the above discussion one can conclude that while syntactic selectional restrictions will allow the generation of only grammatical sentences, there are still instances of semantically anomalous sentences that can be generated. Thus syntactic criteria alone are not sufficient to produce acceptable sentences.

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[5]Consult Chapter Five, pp. 109-112, for a full development of this argument.

CHAPTER EIGHT

CONCLUSION

This paper has considered the role of selectional restrictions in transformational grammar theory. In order to put this role into its proper perspective within the framework of the theory, the development of the restriction phenomena in the literature has been discussed and critically evaluated. Selectional restrictions can be characterized as being an integral part of any model of transformational grammar, yet their precise role has not been clearly designated. As one proceeds with the development in the early chapters, significant problem areas arise in the existent models of transformational grammar. At least one resolution for each problem area can be suggested by a careful study and elaboration of the precise role of selectional restrictions within the particular model. What are the conclusions one must draw from this extended analysis?

First, the Chomsky-Katz model needs to be modified to include selectional features (markers and restrictions) in the generative component that are of

a semantic nature. This can be accomplished in two ways--one way is to introduce semantic features on the phrase level of a structural derivation, and add distributive and transformational rules for the use of these features. The second way to include selectional features in the generative component is to define a class of restrictions which are both syntactic and semantic, and require that any inclusion of one grammatical part of the feature automatically includes the other and to delay transformational activity. By either method the result is that only grammatical and non-anomalous sentences are produced, and the technique accounts for non-grammatical or anomalous sentences. However, to intermingle syntactic and semantic features, and to give semantic features generative functions, changes the Chomsky-Katz model in a significant manner.

Second, the claim of the counter-movement that acceptability of sentences depends partly upon semantic considerations is well-founded; however, their formulations suffer from one of two serious inadequacies: their attacks on the Chomsky-Katz model tend to be weak, and their own model proposal is not one that can be adopted wholesale. The reason for the latter inadequacy is they

have not precisely described how sentences are generated from a completely semantic orientation. In particular, they do not provide a mechanism for excluding sentences that are meaningful but not grammatical, as

(28) (a)* Me showed him my fist

(b)* Me no want her here.

On the other hand, the sentence

(29)* Colorless green ideas sleep furiously

never is produced in their model, for anomalous sentences do not conform to specific well-formedness criteria.

Third, I suggest that a certain set of semantic and dual (semantic/syntactic) selectional restrictions must be included in any generative portion of a model so as to assure the production of only grammatical and meaningful sentences. Those selectional restrictions which need to be incorporated in the generative component of a model are all those needed to provide for later transformational use, and to guarantee linguistically meaningful sentences.

How might one formulate such a model? It is possible to modify either existent model to accomplish this objective. However, the model more easily modified is the Chomsky-Katz one, perhaps because it is more

clearly delineated. In the reformulation as in the original, the generative process proceeds according to rewrite and expansion rules which produce underlying deep structures. In these derivations, however, semantic and dual selectional restrictions may now be incorporated wherever they are needed to resolve any questions of acceptability, on the whole sentence or the phrase level of the derivation.

To more clearly show how sentences could be generated from such a revised model, consider how several sentences could be derived on a changed version of the Chomsky-Katz model. First, the sentence

(1) The insane creature who ran down the street frightened many people

presents the problem to the Chomsky-Katz model of accounting for how the pronoun 'who' rather than 'which' is selected. The following are the rules that could handle such an example. The rewrite rules of the categorical component would be something like:

(2) (a) S → NP⌢VP

(b) VP → V⌢(NP)(Prep. Phrase)

(c) NP → (CS)((Det)(Adj)N(S'))

(d) Prep-Phrase → P⌢NP

(e) Det → (pre-article <u>of</u>) Article (post-article)

Notice that (2c) introduces a complex symbol on the phrase level in the derivation; this means that a subcategorization rule is introduced earlier in the generation of a sentence than the Chomsky-Katz model stipulates. The other subcategorization rules then continue:

(3) (a) N → CS

(b) Adj → CS

(c) V → CS

(d) [+Det__] → [±Count]

(e) [+Count] → [±Animate]

(f) Article → [±Definite]

(g) [+Animate] → [±Human]

(h) [+V] → CS/[+Animate]__[+Animate]

(i) [+Adj] → [+__Human]

By rules such as (2) and (3) the phrase marker for sentence (1) would contain a syntactic feature which accounts for 'who', but which occurs on the phrase rather than lexical category level. The transformational rule which specifies the structure of the phrase-marker being transformed also needs to be changed:

(4) wh + NP → $\left\{\begin{matrix}\text{who, if NP has [+Human]}\\ \text{which, if NP has [-Human]}\end{matrix}\right\}$

By the combination of rules (2), (3) and (4) the sentence (1) is generated.

Another example type which this paper has considered presents a different requirement for changing the Chomsky-Katz model. The sentence

(5) The tall creature who is in my class speaks German impeccably

has generation rules something like:

(6) (a) S → NP⌢VP

(b) VP → V⌢(NP)(N)(Prep-Phrase)(Manner)

(c) NP → (Det)(Adj)N(S')

(d) Prep-Phrase → P⌢NP

(e) Det → (pre-Article of) Article (post-Article)

(f) N → CS

(g) Adj → CS

(h) V → CS

(i) [+Det__] → ±Count

(j) [+Count] → [±Animate]

(k) Article → [±Definite]

(l) [+V] → CS/__NP

The set of rules (6) does not of itself account for the proper generation of sentence (5). Two methodological rules need to be included in the model: first,

whenever in the semantic interpretation a semantic feature is introduced by some amalgamation procedure, the syntactic aspects of this feature, if any, are introduced simultaneously. In the particular sentence (5) the phrase 'the tall creature' is unspecified as to the feature [±Human]. Since the verb 'speaks' requires a subject with the semantic feature [+Human], the semantic feature is introduced onto the phrase 'the tall creature'. By the above general rule, the syntactic feature is also introduced. Second, the requirement must be added that deep structure transformations do not proceed until semantic interpretation is complete, else not all necessary syntactic features would be present. The particular transformational rule which is then employed to produce the pronoun is stated in (4).

With the addition of these two methodological rules, the derivation of sentence (5) proceeds in the following manner: first, the uninterpreted deep structure as generated by the rules (6) does not contain the needed feature. Second, the interpreted deep structure is in a prepronoun form, but the feature that will admit the necessary transformation is not present. And third, the appropriate transformation introduces the relative pronoun in the proper place.

The complete details of how selectional restrictions function in sentence generation are not resolved here, although several descriptions of their possible incorporation within a model have just been given, for they would depend upon details of the underlying grammar. However, the feature [±Human] has been mentioned as an example of a feature whose dual functions are needed to assure production of well-formed sentences. In the case of the transformation that selects 'who' or 'which' for a relative clause, the feature [±Human] must be specified in the superordinate clause for the appropriate transformation to take place. However, the feature is introduced on semantic grounds because a constituent subordinate to the noun requires the noun with which it amalgamates to have the marker [±Human]. Such examples lie at the heart of the restriction system, for in some cases it is only by means of a dual role that an acceptable sentence is generated.

Fourth, this paper suggests that any formulation of a model for transformational grammar must proceed from an initial methodological commitment that the role of selectional restrictions is of central concern to the development of the theory. Once a model for the theory formulates the role of selectional restrictions to assure grammaticality and meaningfulness, then the other aspects of the model can be developed.

One such example of a required shift in model development is the result of analysis which has been developed in this paper concerning anomaly and contradiction. In one existent model a clear description of the relation between anomaly and contradiction is not given, and so some questions concerning anomaly are not resolved. However, this paper suggests that a useful device to provide the needed criterion of well-formedness or acceptability is to preserve Chomsky's formulation of degrees of deviance from grammaticality for the syntactic portion of the generation and to add a similar formulation for semantically anomalous constituents. Within a framework of a partial ordering of anomaly the relation between the notions of anomaly and contradiction is clearly defined in terms of the selectional restrictions which are present in sentence generation.

What is paramount for model development of transformational grammar theory is that the subordinate position that the role of selectional restrictions presently have in the two existent models be traded for a priority position in any formulation. What prompts this strategic shift in methodology is the evidence accumulated in this paper that when selectional restriction influence is not clearly defined from the logical

beginning of the development of a model, then later incorporation of restriction criteria is not completely satisfactory or else not readily included.

In summation, there are several things one can say about the nature of the model which will accommodate selectional restrictions in a central position. The model should produce only grammatical and meaningful sentences. This production would be best described as a single process which generates exactly the acceptable sentences, that is, those which are both syntactically impeccable and linguistically meaningful, and uses both syntactic and semantic features in this generation.

One can characterize such a model for sentence production as occurring in two stages. The first stage is a single, generative process in which the essential structure of only acceptable sentences is produced. This stage is a pre-transformational one that is composed of syntactic, semantic and dual features. The process generates the acceptable sentences from a methodological viewpoint which does not discriminate between either a semantic or a syntactic orientation.

The second stage for the model should be a separate development of two independent processes--

syntactic transformations on the one hand, and semantic processes on the other hand. The transformational processes include final lexical insertion following transformations, and phonological developments.

Once the theorist places selectional restrictions in the generative stage of sentence production and couples restriction formulation with its appropriate fit into structural descriptions, he will have a theoretical resolution to the question of how to produce only grammatical and semantically meaningful sentences. Note that it is the proper use of selectional restrictions in this framework which is the key to well-designed models.

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