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MODERN SEMANTIC THEORY: A CRITICAL ANALYSIS AND AN APPLICATION TO THE STUDY OF GERMAN PREPOSITIONS

by

Robert Thomas King

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

Doctor of Philosophy

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[Signature]

Houston, Texas

April, 1974
PREFACE

In order to limit the total number of footnotes in this dissertation, all references to scholarly literature are made directly in the text, in a fashion similar to that employed in many works in modern linguistics. Footnotes are reserved for longer parenthetical comments that would serve to break the train of thought if they were to be included in the text proper. Footnotes are numbered consecutively within each chapter, and they are all collected together at the end of the dissertation.

I would like to thank my colleagues in Frankfurt, especially James Monaghan and Professor Leonhard Lipka, for many helpful comments on my ideas. A colloquium on case grammar conducted by Prof. Lipka provided the basis for many of the observations included here. Professors James Copeland and Philip Davis of my examination committee have also made some very useful remarks in helping to tie everything together. Most importantly of all, I would like to thank my wife, without whose constant encouragement this dissertation could never have been completed.
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FOOTNOTES

BIBLIOGRAPHY
CHAPTER 0: INTRODUCTION

0.1.1. Semantics, the study of the meanings of words and sentences, has been a major concern of American linguistics only within the last decade. Previously, semantics had been regarded as a subject outside linguistics proper, as a branch of philosophy (cf. Hockett 1958), just as phonetics, the study of speech sounds, was held to be properly a branch of physics. Semantics, however, unlike phonetics, was not deemed a suitable subject for empirical investigation. Hence it was believed impossible to make theoretical statements about meanings, except in an extreme behavioristic sense (cf. Bloomfield 1933). Therefore, investigations in American structuralist linguistics began with phonetic studies, proceeding gradually into the more abstract areas of phonemics, morphology, and finally even a small bit of syntax. The emphasis was on so-called "empirical" investigations throughout.

0.1.2. Chomsky, although firmly grounded in structuralism, proposed (1957) a mathematical model of a language as a set of sentences generated by a recursive set of rules much like a mathematical automaton. Chomsky's studies were syntactically based, unlike the phonetically based proposals of structuralist linguists. The first attempt to discuss semantics within the general framework of Chomsky's model was made by Katz and Fodor (1963). Their suggestions for the "structure of a semantic theory" have had considerable influence on subsequent work, especially the notions of semantic marker and distinguisher, selection restriction, dictionary entry, and projection rule. Certain difficulties
in applying a semantic theory to the model of a generative grammar in *Syntactic Structures* (Chomsky 1957) led to attempts to revise this model. Katz and Postal (1964) showed that transformations could be made meaning-preserving if certain modifications of Chomsky’s generative apparatus were made. These and other modifications were incorporated in the reformulation of generative theory described in *Aspects of the Theory of Syntax*. This theoretical model proposes that every sentence has two main syntactic structures—a surface structure, which is phonologically interpreted to give a speech signal, and a deep structure, which is semantically interpreted to indicate the meaning of the sentence.

0.1.3. Katz and Fodor’s proposals and the theoretical model of *Aspects* have been applied by many researchers and have been found to be inaccurate and insufficient. Weinreich (1966) strongly criticized many of Katz and Fodor’s suggestions, and he proposed a semantic theory which, though based essentially on an *Aspects* model, nevertheless contained many original suggestions, especially for dealing with the interpretation of semantically anomalous utterances. A number of linguists, McCawley, Lakoff, Bach, and others, have reached the conclusion that a strict application of the Katz-Postal hypothesis (the meaning-preservingness of transformations) is inconsistent with the strict separation of syntax and semantics in the *Aspects* model, and they argue that there is no more justification for an autonomous level of syntactic deep structure than there is for an autonomous phonemic level, which generative grammarians unanimously reject. Rather, they feel that a linguistic theory should be semantically based and that symbolic logic, properly modified, provides an adequate system for semantic representation. These linguists are called "generative semanticists".
0.1.4. Chomsky and Katz reacted to the criticisms of Weinreich and the generative semanticists by modifying their own theoretical proposals. Chomsky and his followers (Jackendoff, Dougherty, Emonds, and others) have discarded the Katz-Postal hypothesis and now allow semantic interpretation of surface structures and even of intermediate structures. Katz argues that surface structure interpretations are irrelevant and unnecessary; he argues for a system of rules which assigns interpretations in terms of semantic markers with complex internal structure.

0.1.5. The inadequacy of grammatical relations as discussed in *Aspects* for determining semantic functions led Fillmore to propose a model of grammatical structure which treats semantic relations as deep-structure categories called "cases". A case grammar approach to semantics makes it possible to simplify the lexicon in a transformational grammar considerably. An approach to semantics based somewhat on Fillmore's ideas, but incorporating many original conceptions concerning language structure, has recently been proposed by Chafe (1970).

0.1.6. The most important developments in semantic theory in the last ten years have been the recognition that semantic structures of sentences can be analyzed linguistically with the techniques of symbolic logic, and that semantic relations play a major role in the determination of the way in which sentences are interpreted. There has also been an important change in the way in which language is viewed. Instead of as a set of sentences, a language is now viewed as a system of rules for relating meaning structures and sound structures.

0.2.1. In discussing major developments in semantic theory in the last decade, one is faced with the problem of distinguishing between
original theoretical proposals in various models and further developments and criticisms of earlier proposals. A purely historical survey of semantic theory, besides filling many volumes, would often lead to tangents, and one would not always be able to tell where criticism of existing proposals leaves off and new proposals begin. Therefore, this dissertation begins with a survey of major directions in semantic theory since 1963. Each of these "major directions" represents a fairly independent and original approach to semantics, and each one is discussed in Chapter One as such, with little reference to other theoretical models. The development which the various models have undergone is not discussed, with the exception of Katzian semantics. Such a treatment necessarily ignores important theoretical contributions (e.g., by Bolinger and Bierwisch) which do not represent complete models. These are discussed in Chapter Two, which is concerned with the development of certain basic theoretical concepts in semantic theory. In this chapter it is possible to consider criticisms of one model by proponents of another. The role which these concepts can play in future theories of semantics is examined.

0.2.2. Chapter Three is concerned with various metatheoretical issues in semantics such as the distinction between object language and metalanguage, the status of semantic arguments based on intuition versus those based on introspection, the relation between language and cognition, and the application of meaning rules and presuppositions in a semantic theory. Chapter Four presents a theoretical model based on a logical analysis of semantic relations. Techniques of symbolic logic are applied in the representation of semantic structures of sentences; semantic relations, corresponding to Fillmore's cases, are treated as higher-order relational predicates. This model is compared in Chapter Five to other
models in semantics, especially generative semantics and case grammar. Chapter Six consists of an application of the model proposed in Chapter Four to the semantic analysis of German prepositional expressions. Chapter Seven presents some general conclusions to the present study.
CHAPTER 1: MAJOR THEORETICAL DIRECTIONS IN
SEMANTIC THEORY SINCE 1963

1.1. The Katz-Fodor Theory

1.1.1. In their paper, "The Structure of a Semantic Theory" (1963),\(^1\) Katz and Fodor undertake the first systematic treatment of problems of a semantic nature within the framework of the theory of transformational generative grammar outlined by Chomsky in his book *Syntactic Structures* (1957). The impact of their paper on subsequent linguistic research can only be compared to that of Chomsky's book itself. The solutions which Katz and Fodor (and later Katz and Postal) propose for certain problems of semantic representation have led to most of the extensive revisions of transformational generative theory which are reflected in *Aspects of the Theory of Syntax* (Chomsky 1965). Furthermore, the theoretical framework proposed by Katz and Fodor has provided the basis for most research in semantics within transformational grammar in the last ten years.

1.1.2.1. To be exact, Katz and Fodor do not "attempt to present a semantic theory of a natural language, but rather to characterize the abstract form of such a theory" (Katz and Fodor 1963: 479). That is, what Katz and Fodor attempt to develop is a semantic *metatheory*. They then apply this metatheory to certain concrete examples in English, but the important distinction of metatheory and theoretical application is not always clear.\(^2\) The first step in developing the metatheory, according to Katz and Fodor, is the definition and delimitation of the theorist-
ical object. Katz and Fodor, following Chomsky, feel that the most important linguistic ability possessed by human beings is the capacity to produce and understand an indefinite number of novel utterances (481). Therefore, the primary goal of a linguistic theory must be the explanation of the process by which a speaker of a human language extrapolates from the finite set of sentences which he has encountered to the infinite set of sentences of his language (482). A set of rules which formulates this extrapolation process can be regarded as a solution to the projection problem, that is, the question of how the finite set of known sentences can projected onto the infinite set of novel sentences. 3

1.1.2.2. Katz and Fodor believe that a transformational grammar provides a partial solution to the projection problem (483), insofar as it provides information about what a native speaker 'knows' about the phonological and syntactic aspects of his language. But such a grammar (consisting of phonology and syntax) does not provide information about how a speaker understands "the meaning of a sentence or the meaning of its parts" (483-484). This understanding of meaning is to be explained by a semantic theory. The lower bound on the domain of a semantic theory is established by the formula "linguistic description minus grammar equals semantics" (484). Semantics is thus negatively defined as everything of interest in linguistic description which cannot be handled by phonology and syntax. This attitude reflects the traditional animosity toward questions of meaning which Chomsky and his early followers had inherited from the structuralists. 4

1.1.2.3. The upper bound on the domain of a semantic theory is therefore identical with the upper bound on a linguistic theory. This upper bound must be carefully fixed, for Katz and Fodor believe that linguistic
(or semantic) theory has to be protected from the requirement that it explain the sum total of human knowledge. Therefore all aspects of extra-linguistic knowledge and contextual reference have to be eliminated from study by linguists, because virtually any sentence can be so contextualized (that is, a setting for it can be so constructed) that it can be made to mean almost anything (488-490). Thus, the upper bound on the domain of a linguistic theory (and hence a semantic theory) is provided by the following statement: "If speakers can employ an ability in apprehending the structure of any sentence in the infinite set of sentences of a language without reference to information about settings and without significant variation from speaker to speaker, then that ability is properly the subject matter of a synchronic theory in linguistics" (484). It goes without saying that such a narrow conception of the subject matter of linguistics has found less than universal support.

1.1.3.1. Let us now consider Katz and Fodor's concrete proposals for a semantic theory. Most previous discussions of semantics had dealt mainly with the meanings of individual words and the semantic relationships between individual words in a paradigmatic sense. This is of course an extremely important aspect of semantics, especially as treated in recent developments in structural semantics (cf. Lyons 1963,1968) and the theory of lexical fields (cf. Geckeler 1971). Katz and Fodor realize that a theory of semantics must somehow also account for the way in which the meaning of a sentence is related to the meanings of its parts. This might be called syntagmatic semantics. Katz and Fodor perceive this relation as a combinatorial one, in the sense that the meaning of a sentence may be obtained by combining the meanings of its elements according to certain rules. This conception is referred to in this disser-
tation as the **combinatorial hypothesis**. It has several possible forms. The development of this hypothesis in modern semantic theory is discussed in Chapter 2.

1.1.3.2. If one attempts to combine meanings according to certain rules, there must be some meaning units which serve as input to the first combinatorial process. These are the morphemes of a language. It should be pointed out that the Katz-Fodor theory was devised as an adjunct to the early formulation of generative grammar represented by Chomsky (1957). In this formulation the minimal syntactic units are the morphemes of a sentence, and these must be combined in order to arrive at the meanings of higher constituents of the sentence until the meaning of the entire sentence is represented. Thus, a semantic theory must contain representations of the meanings of these minimal syntactic elements. The set of all such representations comprises the **dictionary**. The choice of the term is obvious, but it must be made clear that conventional dictionaries are inadequate in that they do not show how meanings are structured. Katz and Fodor try to remedy this by constructing a dictionary which would consist of representations of meanings which are adequate as input to the first set of combinatorial rules (494-503). The nature of a dictionary entry is as follows. It is normally represented as a tree, with possible branching at nodes represented by **grammatical** (later called **syntactic**) and **semantic markers**. The grammatical markers indicate the possible form-classes in which the lexical item may occur (noun, verb, etc.). The semantic markers indicate the semantic relations which hold between various senses of a lexical item, and between one lexical item and others (human, animate, etc.). **Distinguishers** are added at the bottom of the tree to specify whatever aspects of meaning are not already indicated by
the semantic markers. There is no further branching under a distin-

guisher. Thus, the various meanings of a lexical item can be conceived of as dis-

tinct paths within its dictionary entry. Each such path, consisting of

a set of grammatical and semantic markers followed possibly (but not

necessarily) by a distin- guisher, corresponds to exactly one meaning (or

reading) of the lexical item. A lexical item has as many readings as

there are distinct paths in its dictionary entry.

1.1.3.3. Grammatical markers will not be of concern at this point.
The concept of semantic marker derives from the componential analysis

of vocabulary which had proved useful in anthropological linguistics

(Goodenough 1956) and in the study of lexical fields (cf. Geckeler 1971,

Lyons 1968, etc.). The successes of componential analysis in phonology

(Jakobson, Fant, and Halle 1952, etc., up to Chomsky and Halle 1968) also

provide impetus to attempts to apply a similar analysis to semantics.
The fact that such an application to semantics leads to many more diffi-
culties than in phonology is discussed in Chapter 2. We will content

ourselves here with Katz and Fodor's characterization of the function of

semantic markers and distinguishers: "Thus, the semantic markers assigned

to a lexical item in a dictionary entry are intended to reflect whatever

systematic semantic relations hold between that item and the rest of the

vocabulary of the language. On the other hand, the distinguishers

assigned to a lexical item are intended to reflect what is idiosyncratic

about the meaning of that item" (Katz and Fodor 1963: 497). That is,

the semantic markers are basic to the semantic structure of the vocabulary

of a language. If a marker such as (Male) or (Human) were eliminated

from a semantic description of a language, the entire system of semantic

relations would be affected, just as the elimination of the feature
[Grave] in a phonological system would result in a totally new system. But distinguishers can be eliminated or changed without affecting any part of the semantic system beyond the one reading to which the distinguisher is attached. Distinguishers are conceived of as being unique, as belonging to only one reading.

1.1.3.4. The boundary between markers and distinguishers is not an easy one to draw. Basically, the distinction is "between that part of the meaning of a lexical item which is systematic for a language and that part of the meaning of the item which is not" (498). Semantic markers are theoretical constructs which enter into the process of disambiguation of utterances. Distinguishers do not. Therefore, semantic information which is necessary for disambiguating utterances must be assigned to markers. Another consideration is one of systematic economy. The addition of new semantic markers increases the conceptual complexity of a theory. There must come a point where the addition of new markers increases the conceptual complexity of a theory more than it adds to the explanatory power of the theory. At such a point, one should stop adding markers and assign the rest of the relevant semantic information (if there is any) to distinguishers, which are not contained in the conceptual apparatus of the theory. At this point, one is assumed to have an optimal, finite set of markers which reflects "exactly the systematic features of the semantic structure of the language" (500). Semantic markers may be considered to be linguistic universals in the sense that the set of semantic markers used in describing the semantic structure of a particular language is a subset of the set of all possible semantic markers for natural languages (516-517).
1.1.3.5. If meanings are to be combined according to certain rules, there must be some way to avoid combining meanings (or 'readings') which are incompatible. A generative grammar of a particular language must be capable of generating all the sentences of that language and only the sentences of that language. Within the syntactic component of a grammar, the phrase structure rules and transformations assure that no syntactically anomalous sentences are derived, but (in a Syntactic Structures model) do not assure that no semantically anomalous sentences are generated. A semantic theory, then, must show how the combinatorial rules apply in such a manner as to exclude the composition of incompatible readings. One could do this by constraining the form of rules themselves, but this leads to too many complications. Katz and Fodor prefer to further characterize semantic readings by stating the requirements that must hold if a particular reading is to be combined with other readings. This is done by adding to each reading (at the bottom of the path, under the distinguisher, if there is one) a set of selection restrictions. These selection restrictions explicitly indicate which syntactic or semantic features another reading must have if these two are to be united by the combinatorial machinery to produce another reading (500-501).

1.1.3.6.1. This leads us now to the nature of this combinatorial machinery itself (503-516). It consists of a relatively small set of projection rules, one rule for each grammatical relation expressed in the output strings of the syntactic component of a generative grammar. In a Syntactic Structures model, there must be two types of projection rules: one type for application to kernel sentences produced by phrase structure rules and obligatory transformations, and the other for the output of optional and generalized transformations. Katz and Postal(1964)
propose doing away with the second type. We will only consider the first type here.

1.1.3.6.2. Projection rules operate by amalgamating readings of grammatical structures to produce readings for higher grammatical structures. The process of amalgamation proceeds from the smallest constituents (the morphemes) to the largest constituent, the sentence. The readings of two or more constituents are combined if and only if the constituents are all immediately dominated by the same node. The output of this combinatorial process is a set of readings for the node. This set of readings is combined with the sets of readings for sister nodes (all dominated by the same, higher node) to derive a set of readings for the higher node. The process is followed until a set of readings is derived for the highest node, the sentence. In each case, those individual readings which have incompatible selection restrictions are not combined to produce a new reading.

1.1.3.6.3. It should be noted that projection rules operate exactly as do phrase structure rules, but in reverse. If there is a phrase structure rule \( NP \rightarrow \text{Det} + \text{N} \), then there is a projection rule which combines the set of readings for Det and for N to give a set of readings for NP. This projection rule is distinct from the one which combines the sets of readings for V and for NP to give a set of readings for VP, assuming that the phrase structure rule \( \text{VP} \rightarrow \text{V} + \text{NP} \) has appeared in the derivation of the sentence to be analyzed. There is no projection rule which directly combines readings for Det and V, for instance, since Det and V do not appear in any phrase structure rule of the form \( X \rightarrow \text{Det} + \text{V} \), where \( X \) immediately dominates Det and V. In general, there is one projection rule for each grammatical relation (attribution, predication, etc.).
1.1.4. In summary, the Katz-Fodor theory rests on three basic assumptions: 1) that the meaning of a lexical item is best represented by a dictionary entry of the type discussed, consisting of a set of readings corresponding to paths which are sequences of grammatical markers, semantic markers, possibly distinguishers, and selection restrictions; 2) that a projection rule operates by amalgamating sets of readings for grammatical constituents which are immediately dominated by the same node, according to the grammatical relation which holds between the constituents, to give a set of derived readings for the dominating node; 3) that selection restrictions operate to prevent the amalgamation of readings which are semantically incompatible, or equivalently, these readings are combined in such a way as to give a null reading as output.
1.2. The Katz-Postal Hypothesis and the Standard Theory in Aspects

1.2.1. As mentioned earlier, the Katz-Fodor theory of 1963 was proposed as an adjunct to the Syntactic Structures model of a transformational generative grammar. But the proposals of Katz and Fodor led to a rethinking of this model and gave impetus to attempts to revise it. The necessity of two types of projection rule, one for kernel sentences produced by phrase structure rules and obligatory transformations, and the other for the outputs of optional and generalized transformations, was felt to be unsatisfactory. Furthermore, the lexical items which appeared at the bottoms of Syntactic Structures derivations were difficult to deal with semantically because they required unnecessarily complicated dictionary entries. In addition, several other inadequacies of the earlier model were becoming evident (coreference, agreement, etc.), and although these were not direct consequences of the difficulties with the semantic theory, they helped convince Chomsky and his coworkers that a thorough revision of transformational generative grammar was necessary. We will be concerned here with the revisions of the semantic theory.

1.2.2.1. In order to clarify and simplify the notion of projection rule, Katz and Postal (1964) analyze in detail the effects of transformations upon meaning (30-70). They assert that obligatory transformations never change meaning (31) and that therefore projection rules of the first type need apply only to the phrase-markers generated directly by the application of phrase-structure rules, before transformational processes have been applied to them. The question of explaining the semantic effect of obligatory transformations is vacuous, since these transformations do not change meaning.
1.2.2.2. Although numerous optional transformations (particle inversion, passivation, etc.) are felt to be meaning-preserving (31-33), there is nevertheless a large class of optional transformations which do change meaning under the Syntactic Structures model. As long as the effect is to reduce meaning (as in deletion transformations) there is no problem (43), since projection rules operating on the outputs of such transformations are unable to reconstruct the full semantic content of the input phrase-markers. Hence, projection rules should apply in such cases only to these input phrase-markers. Deletion transformations can be made meaning-preserving if one adopts "recoverability of deletion" as a condition on these transformations (81). Transformations which add meaning (the interrogative and negation transformations, for instance) can be restricted so that they operate only on input phrase-markers which already contain some indication of the meaning which the transformation was to add (33-46). That is, one can allow phrase-structure rules to generate such items as I (imperative), Neg (negative), and Q (question), and the relevant transformations will be permitted to apply only to phrase-markers which contain the appropriate indicator. For example, the interrogative transformation will no longer change a declarative sentence into an interrogative one, thereby altering its meaning; rather, it will apply only to a phrase-marker which already carries the indication that it is interrogative. In this way, the burden of changing meaning is switched from the transformational component to the phrase-structure component of a generative grammar. Virtually any case of a meaning-changing singulary transformation can be handled in this way. If, for instance, the passive transformation is deemed to change meaning, one can simply require that it apply only to phrase-markers which contain
a constituent Passive, and which are therefore distinct from otherwise identical phrase-markers which lack this constituent. If one allows such modifications in the phrase-structure component, it is unnecessary to have projection rules which apply to the output of optional transformations which previously changed meaning, for the input phrase-markers to these transformations already contain the necessary semantic information which the transformation was to add. The projection rules need only apply to untransformed phrase-markers in order to indicate the difference in meaning between, for example, the declarative and imperative forms of a sentence.

1.2.2.3. Generalized transformations afford different problems, because their function is the combining of kernel sentences in a recursive fashion so that the finite set of kernel sentences generated by a Syntactic Structures grammar could be extended to the infinite set of sentences in a natural language. Katz and Postal consider in detail the effects of generalized transformations on meanings and the nature of the projection rules which would have to deal with such effects (46-67). They conclude by proposing a way of eliminating such projection rules by eliminating the necessity of generalized transformations (67-68). This is done by removing recursivity from the transformational component and assigning it to the phrase-structure component. This can be accomplished by allowing phrase-structure rules to be recursive in nature, in particular by permitting the self-embedding of the symbol S (cf. Chomsky 1965). Projection rules need only then apply to untransformed phrase-markers which are generated by a set of phrase-structure rules, some of which may be recursive. Katz and Postal argue, in fact, that projection rules of the second type are only necessitated by the inadequacy of the syntactic component to provide formal objects which can be semantically
interpreted by projection rules of the first type alone (6?). They believe that they have removed some inadequacies of the syntactic component which had caused unnecessary complication in the formulation of projection rules.

1.2.2.4. The result of this reformulation of the relation between the phrase-structure and transformational components of a generative grammar may be expressed as the Katz-Postal hypothesis: Transformations are meaning-preserving. The impact of this hypothesis is more far-reaching than that of a merely formal readjustment within a theory, however. It gives rise to the idea that all sentences can be conceived of as having two main structures: a deep structure generated by the phrase-structure rules and lexical insertions, and a surface structure which is the output of all the transformational processes which have been applied to the deep structure. Since transformations preserve meaning, the meaning of a sentence is totally determined by its deep structure, which is interpreted by the semantic theory outlined above. The surface structure serves as direct input to a set of phonological rules which determine the actual phonological shape of the sentence. This idea of two structures, one directly related to meaning, the other directly related to sound, is a very satisfying development because it concurs with a lot of earlier ideas about language: the Saussurian dichotomy of form and content, for example, or, more importantly for generative grammarians who are interested in cognitive processes (Chomsky 1965 and 1968), and who are seeking a philosophical background for their ideas, the rationalist doctrines of innate ideas and Universal Grammar (Chomsky 1966b).
1.2.3.1. The results of the extensive revisions of transformational generative grammar in the early 1960's (a large number of which were prompted by Katz, Fodor, and Postal's work in semantics) are presented in *Aspects of the Theory of Syntax* (Chomsky 1965). In this book Chomsky proposes a model of a more or less unified theory of generative grammar in which semantics is no longer considered an adjunct to the theory but rather an integral part of the theory itself.5

1.2.3.2. In this theory, the three areas of phonology, syntax, and semantics are regarded as independent components whose theoretical domains are clearly defined so that they do not intersect. The syntactic component is regarded as the 'generative' component since it alone contains rules of a generative nature, the phrase-structure rules. The phonological and semantic components are regarded as 'interpretative' in that they merely 'interpret' the outputs of the syntactic component and are incapable of generating sentences themselves (1965: 141).

The syntactic component consists of two parts: the base and the transformational component. The base consists of a categorial component and a lexicon. The categorial component is made up of context-free phrase-structure rules, some of which are recursive in nature. The lexicon consists of all the morphemes in the language, but each morpheme (referred to as a "lexical entry") has a complex representation, conceived of as a set of features, phonological, syntactic, and semantic. The phonological features indicate the underlying phonological form of the lexical entry, and are used by the phonological component in determining the phonetic form of a sentence. The syntactic features are of three types: category features indicate the form-class of the lexical item (noun, verb, etc.); strict subcategorization features
indicate the syntactic environment in which the lexical item may occur (following a determiner, preceding a noun phrase, etc.); and \textit{selectional features} indicate the lexical environment in which the lexical item may occur. That is, they specify that certain verbs can only occur in construction with an animate subject, for example. Nouns are held to select the verbs with they appear in construction (114-115).

1.2.3.3. The idea of applying a feature analysis to syntax is an outgrowth of the success of such analyses in phonology and semantics (cf. Maclay 1971: 172). The use of syntactic features in complex lexical entries appears to afford a considerable simplification of the phrase-structure rules. Phrase-structure rules which introduce lexical items (\( N \rightarrow \text{boy, man, ...} \)) are replaced by lexical insertion rules which substitute complex lexical entries for the dummy symbols which comprise the bottom lines of the new phrase structure derivations (see Chomsky 1965). The use of complex symbols also permits the representation of both singular and plural forms of a noun in one lexical entry. Problems of coreference and agreement are also simplified. Category features specify the dominating nodes (\( N, V, \text{etc.} \)) under which lexical items can be inserted, and strict subcategorization rules ([\(+\_\text{NP}\)] for example) replace the earlier context-sensitive phrase-structure rules by specifying the syntactic environment into which the lexical item can be inserted. Thus, the categorial component can be defined to consist of only phrase-structure rules of the context-free type.

1.2.3.4. The introduction of selectional features is one of the most important innovations of the \textit{Aspects} model. Whereas the famous sentence \textit{Colorless green ideas sleep furiously} is regarded as grammatical in the \textit{Syntactic Structures} model, since it can be generated by the phrase-
structure rules employed in that model, it is held to be ungrammatical in the Aspects model, since, for instance, the lexical entry for sleep contains the selection feature <+ animate Subject> and can therefore not appear in construction with ideas (whose lexical entry contains the feature [ - animate]) as its subject. The reason why qualities such as animateness, which were previously regarded as semantic, are now held to be syntactically relevant, is that they appear to function in the application of purely syntactic cooccurrence relations. The choice of who or which as relative pronoun is believed to be purely syntactic in nature, but this choice clearly depends on whether the noun to which the relative pronoun refers has the feature [human] or not. Thus [+ human] is regarded as a syntactic feature, as well as a semantic feature. 6

1.2.3.5. The outputs of the base component are deep structures. These deep structures serve as inputs to the transformational component, whose outputs are surface structures. These surface structures are interpreted by the phonological component to give phonetic representations of sentences. Since transformations no longer change meaning, the deep structures contain all of the semantic information of the sentences they represent, and they therefore serve as full inputs to the semantic component. As described before, this semantic component assigns sets of readings to each lexical item and amalgamates these readings by means of projection rules which successively destroy the phrase structure until a set of readings is derived for the entire sentence. A semantically interpreted deep structure is defined as a "set of pairs with respect to the P-marker [that is, the deep structure], one member of which is a set of readings, each reading giving one of the meanings of the string dominated by that node in the P-marker" (Katz and Postal 1964: 22).
1.2.4. Much linguistic research since 1965 has been devoted to a thorough examination of the Aspects model and its implications for a total theory of human language (psycholinguistics, sociolinguistics, etc.). It has been applied, accepted, modified, extended, and rejected in turn. We will here consider primarily the effects of its semantics (i.e., the semantic of Katz and Fodor 1963 as modified by Katz and Postal 1964) on subsequent developments in the field.
1.3. Weinreich’s Semantic Theory

1.3.1. Perhaps the most intellectually satisfying early reply to the Aspects model and Katz-Fodor semantics was provided by Uriel Weinreich in his important paper, "Explorations in Semantic Theory" (1966). In his preface to the recent republication of this paper in book form, Labov (1972) tells us that Weinreich, who had always been critical of the virtual exclusion of semantics by structuralist linguistics and early generative grammar, and who had done some important work in semantics on his own (Weinreich 1963), at first greeted Katz and Fodor’s proposals with enthusiasm and began to apply them to a large number of practical examples. Labov writes (6), "It soon became plain to us as students that Weinreich had given more attention to exploring and developing Katz and Fodor’s ideas than they had themselves." It was this intense occupation with Katz and Fodor’s semantics that eventually changed Weinreich’s initially affirmative attitude to an increasingly critical one. His extensive knowledge of philosophical logic led him to the conclusion that Katz and Fodor had overlooked or oversimplified a considerable number of important semantic facts. He was especially disturbed by the essentially destructive nature of Katz and Fodor’s projection rules which appeared to him to result in semantic interpretations which did not, for example, distinguish the meanings of Cats chase mice and Mice chase cats (Labov 1972: 6-7, Weinreich 1966: 33-34). His attempts to improve on Katz and Fodor’s semantics led to the proposal of a new semantic theory (44-111) which altered the Aspects model of syntax in a far-reaching manner, although Chomsky’s model was basically accepted (44). Weinreich’s model of a new semantic theory has never been applied or developed in its entirety, perhaps because of Weinreich’s early death in 1967, but many of its features have found acceptance in other theories, especially in generative semantics.
Furthermore, his highly critical and careful methodology in the examination of problems in semantics could well serve as an example for other linguistic theoreticians to follow.

1.3.2.1. Weinreich's semantic theory accepted as its goal the explanation of "the way in which the meaning of a sentence of specified structure is derivable from the fully specified meanings of its parts" (44). The word 'derivable' was important, because Weinreich did not regard the relation between the meaning of a sentence and the meanings of its parts as a merely combinatorial one, as do Katz and Fodor. Weinreich pointed out that certain semantic features are unordered, as in Katz and Fodor's formulations, but other semantic features are definitely ordered and stand in a particular relation to one another (cf. Weinreich 1963). Unordered groups of features were called clusters by Weinreich; ordered groups were referred to as configurations (46). Weinreich showed (48-61) that the distinction between ordered and unordered sets of semantic features was important in any combinatorial process because the semantic analysis of some constructions called for the formation of configurations as well as, or instead of, clusters of semantic features. The formation of a cluster of features was called linking (47-48). A construction was called fully linking "if all features of all constituents form a single cluster" (48). An example of a linking construction is attribute + head phrase. That is, the phrase white wall describes an object which is both white and a wall; it combines the features of white and the features of wall in an unordered fashion. Weinreich discussed other examples of linking in some detail, including the fact that some linking may be incomplete--for example, in the phrase black chair, the adjective black links with the feature 'furniture' of chair by not with the feature 'sit' which is ordered with respect to
'furniture'. (That is, 'furniture' and 'sit' form a configuration) (50). Linking is not in general associative. This explains why the two phrases astonishingly white wall and astonishing white wall have different meanings (50–52). Weinreich regarded linking as a semantic and not a syntactic property of a construction (53).

1.3.2.2. Weinreich discussed three types of non-linking constructions (54–60): nesting, or transitivity, delimitation, and modalization. An example of nesting is provided by the construction Verb + object noun phrase, as in fix teeth. It is clear that the features of fix and teeth are not simply combined to form a cluster with the meaning fix teeth, but that the features are placed into a configuration that indicates by its ordering the semantic relation which holds between the two elements of the phrase. Semantic relations will be discussed later. Delimitation was used by Weinreich primarily in the senses of quantification and deixis, as in the formation of such phrases as some sheep, these sheep, five sheep, one sheep, and even all sheep. Modalization refers to "an instruction to interpret the constructed semantic entity not literally, but with some qualification, such as suspension of belief about the truth of an assertion or a disclaimer of responsibility for its truth" (60). Modalization is indicated by moods of verbs, sentence adverbials (perhaps, certainly), etc. Weinreich realized "the highly tentative nature" (60) of these suggestions and Bierwisch (1968)(see Bierwisch 1971: 410, fn. a) has criticized them, but Weinreich's basic assertion, that semantic features cannot in general be so naively combined as Katz and Fodor suggested, still stands.

1.3.2.3. Perhaps the most influential innovation that Weinreich proposed was the concept of transfer feature (1966: 61–65) as an improve-
ment over Chomsky's notion of selectional feature and Katz and Fodor's conception of selection restriction. Weinreich felt that Katz-Fodor semantics could not express the fact that in the phrase hit something, the word something must refer to a physical object. In Katz-Fodor semantics hit has the selection restriction \(+\) physical object as Direct Object\), but something does not possess the semantic feature \(+\) physical object\), so that the phrase hit something would not be assigned a reading; that is, it would be designated as semantically anomalous. Our native linguistic intuition for English tells us, however, that the word something in this phrase does indeed refer to a physical object, although in general it does not have to. The best way to explain this intuition, Weinreich asserted, is to reinterpret the selection restriction \(+\) physical object as Direct Object\) as a transfer feature. In the process of interpreting the construction hit something, this feature would be transferred to the direct object something, which would then be naturally interpreted as belonging to the class of physical objects. Transfer features are useful not only in the analysis of indefinite pronouns, however. The phrase herd of animals is understood to mean 'group of livestock' since herd carries the selection restriction (transfer feature) \(+\) livestock\) (62). Similarly, to sail a craft means 'to sail a (water) craft'.

1.3.2.4. Transfer features are also useful in explaining why the phrases during the war and even during the wall are understood as referring to the time periods during which the war war was fought or the wall stood: the feature \(+\) time\) is simply transferred from the preposition during to its objects. The fact that many semantically deviant expressions, such as a grief ago (105) or Scientists study the if (68), are understandable
at all seems to be due to the transferral of certain features. Branding such expressions as meaningless is dodging the problem. Jacobs and Rosenbaum (1971: 46) make use of the concept of transfer feature to help explain certain problems of style, but they fail to give Weinreich credit for the idea. Weinreich also pointed out (63) that the semantic conflict between a transfer feature and an inherent feature (\textit{loud circle}) was less than that between two inherent features (\textit{square circle}).

1.3.3.1. Weinreich felt that the standard theory distinction between a lexicon (syntax) and a dictionary (semantics) was unnecessary. His concept of \textit{dictionary} subsumes the two. It consists of an unordered set of morphemes (81) which are divided into \textit{major} and \textit{minor} classes (65-66). Major class morphemes are nouns, verbs, adjectives, and adverbs; minor class morphemes are articles, prepositions, conjunctions, tense affixes, etc.\textsuperscript{10} A major class morpheme is represented in the dictionary by a sequence of phonological and semantic (but not syntactic) features. (Such features as \texttt{[+ Noun]} or \texttt{[+ Verb]} are regarded as fully semantic.) A minor class morpheme is represented by a sequence of phonological features, a syntactic marker (e.g., \texttt{[[Preposition]]}), and semantic features.

1.3.3.2. The usefulness of this distinction is seen in Weinreich’s conception of a grammar (67-80). It consists of a set of branching rules with recursive power (81) which generate trees whose terminal elements are dummy symbols of three types: $\Delta$, for the insertion of minor class morphemes; $\Box$, for the insertion of major class morphemes; and $\Theta$, which is an empty dummy symbol not replaced by a morpheme from the dictionary. In the operation of the Lexical Rule (67-68), a minor class morpheme is substituted for each occurrence of $\Delta$, if the syntactic marker of the minor class morpheme agrees with the category symbol which immediately dominates
the occurrence of Δ, but the symbol □ may be replaced by any morpheme, major or minor, and without regard as to whether the 'form-class' agrees with the category symbol dominating the occurrence of □ or not. "The Lexical Rule as here formulated guarantees that minor-class 'slots' are filled only by appropriate minor-class morphemes. It specifically does not guarantee, however, that major-class 'slots' are filled by morphemes of the appropriate (or any) major class" (68). Thus, Weinreich's grammatical theory explicitly accounts for the fact that any morpheme belonging to a particular major class (Noun, for instance) can be used as if it belonged to any other major class (Verb, for instance), as in Billy Jean King decisioned Bobby Riggs. Likewise, minor-class morphemes can be used as if they belonged to major classes: The ifs and buts of the situation are quite involved.\footnote{11} Major-class morphemes may not be used in minor-class slots, however, and minor classes may not be substituted for one another. The reason for this is that the minor-class slots indicate the framework of semantic relations within the sentence (i.e., its logical form), whereas the major-class slots function as variables which can be replaced by any contentive without affecting the structural form of the sentence.\footnote{12}

1.3.3.3. After considering several alternative analyses of such phrases as a blood and some flood (i.e., apparent violations of the selectional features \(<\text{- Count}\>\) and \(<\text{+ Count}\>\) respectively), Weinreich proposed that such features be attached to non-terminal nodes in a phrase-structure derivation (69-80). That is, \([\text{+ Count}]\) could be regarded as a feature of the Noun Phrase as a whole; a subsequent rule would distribute this feature downward into lexemes dominated by the NP node. Similarly, certain verb-modifying phrases, called phrases of circumstance by
Weinreich (72), would carry features such as [+ Time] or [+ Place], which would be attached to the node dominating the phrase. Weinreich asserted that all concord relations could be handled by feature assignment to non-terminal nodes and redistribution, without the use of transformations. For example, number agreement between subject and verb could be handled by attaching the feature [+ Plural] to the node S itself, and distributing it downwards. Weinreich discussed many other possible applications of this technique (75-80). He regarded all the features so far discussed as being semantic, in contrast to Chomsky and his followers, who say they are syntactic. But Weinreich showed in his treatment of idioms (89-95 and Weinreich 1969) that even features universally considered to be semantic should be attached to some non-terminal nodes. For example, the VP-node dominating the idiom shoot the breeze ('chat idly') must carry the features [+ Verb, + Activity, + Vocal, + Communicative, ..., + Human], several of which are unmistakably semantic in nature. Even if taken together, the dictionary entries for shoot, the, and breeze do not contain all of these features. They belong rather to the phrase as a whole. In a semantic interpretation of idioms, the meanings of the constituent lexical items must somehow be suppressed (1966: 101).

13.3.4. Weinreich's grammatical theory (81-83) consists, first of all, of a base which is a set of branching rules with recursive power defined on an alphabet of category symbols, complex symbols (category symbols paired with matrices of semantic features), and dummy symbols. The preterminal strings generated by the base, together with dictionary, form the input to the Lexical Rule, which performs lexical insertions as described earlier. The output of the Lexical Rule is a set of Generalized Phrase Markers. The Generalized Phrase Markers are operated
upon by singulary, meaning-preserving transformations, some of which may be morphophonemic in nature, to produce input strings for the phonological component, which produces phonetic representations. Generalized Phrase Markers are also submitted to a Semantic Process consisting of a Calculator and an Evaluator. The Calculator has several functions (96-109):

1) The Redistribution Rule—the semantic features of each complex symbol are distributed downward into each lexeme dominated by the complex symbol to form clusters with the semantic features provided for the lexeme from the dictionary;

2) The Concord Rule—semantic features subject to concord rules are duplicated in appropriate formatives, according to concord paths which are specified for each language, but are not listed in the general theory;

3) The Transfer Rule—the transfer features of lexemes are shifted into clusters of inherent features of other lexemes according to specified transfer paths;

4) The Idiom Rule—the semantic features of the constituent morphemes of idiomatic expressions are suppressed;

5) The Linking-and-Nesting Rule—this rule has two phases: First of all, the features designated for linking are assembled. Then Rules 6 and 7 apply to the assembled features. Finally, the actual linking is effected;

6) The Conflation Rule—all tautologies, i.e., redundant features, are eliminated;

7) The Construal Rule—all contradictions are eliminated. If a transfer feature has been added to a cluster which contains an inherent feature incompatible with the transferred feature, the latter is construed
as dominant, but the inherent feature remains. According to the degree
of disagreement between transferred and inherent features, a deviance
marker is assigned to the feature matrix: DEV 1 marks only slightly
deviant patterns; DEV 2 denotes greater deviance; and so forth.

1.3.3.5. The Semantic Evaluator computes a quantitative measure of
the deviance of a sentence from normality (109-111). The method is not
particularly important. Weinreich proposed adding the number of DEV
symbols and their indices separately to give a binomial index. The
degree of deviance tolerated in a particular context could be indicated
by agreeing to accept no sentences whose deviance evaluation exceeded a
certain level. Extremely formal writing or speech would allow little
deviance; modern poetry would have to permit a high degree of deviance.
Weinreich suggested that more extensive measures of quantitative and
qualitative deviance could be devised.

1.3.4. As stated before, Weinreich's theory has never been fully accepted
or further developed, and he did not necessarily intend that it be (120).
But the importance of his ideas on the further development of linguistic
and semantic theory cannot be denied. He greatly clarified the notion
of semantic feature and demonstrated that a naively combinatorial seman-
tics is inadequate. He devised a workable way of dealing with deviant
utterances (cf. 115-116) which is far superior to earlier proposals
(Katz 1964c, for instance). He realized the importance of the analysis
of idioms (Weinreich 1966: 89-95, and especially Weinreich 1969) in the
formulation and evaluation of semantic theories (cf. Chafe 1968a). And
he showed that the boundary between syntax and semantics is a blurry one
at best (112-115), foreshadowing and helping foster the school of gener-
ative semantics, which denies that such a boundary exists at all.
1.4. Generative Semantics

1.4.1. The initial broad acceptance of the grammatical theory proposed in Aspects of the Theory of Syntax (Chomsky 1965) has led to a number of attempts to apply it in the analysis of particular problems in natural languages, primarily English. Considerable effort has been devoted to the 'discovery' of deep structures for all sorts of surface structure constructions, so that transformations could be devised to map the former into the latter. The theoretical basis for such investigations has been provided by the Katz-Postal hypothesis and its corollaries, the assertions that a sentence has as many deep structures as it has structurally distinct meanings, and that two sentences which have the same meaning but different surface structures must have identical deep structures. The application of these principles to purported cases of structural ambiguity or synonymy has convinced several linguists (Lakoff 1965, 1968, 1970c; Ross 1969, 1970; Lakoff and Ross 1968; Postal 1966; Bach 1967, 1968; McCawley 1968b,c, 1970a; Fillmore 1966a,b, 1967; and others) that it is necessary to postulate deep structures which are more abstract than any which had been previously proposed. Another, independent impetus to the postulation of highly abstract deep structures has been the Universal Base Hypothesis, the belief that all languages have the same underlying structure (cf. Bach 1968). Chomsky's deep structures are clearly inadequate in this respect, since they tend to work better for English than for other languages. As deeper and deeper syntactic structures are proposed, however, they begin to encroach on the realm of semantics and to take on themselves more and more of the competence of the semantic component. The supposed boundary between syntax and semantics had already been attacked (cf. Weinreich 1966), and it has become obvious to these
researchers that their abstract deep structures have become indistinguishable from formal objects that appear to represent the semantic structures of sentences directly, without need for further interpretation. They therefore assert that the deep structure of a sentence is identical to its semantic structure, and that there thus exists no independent level of syntactic deep structure and no boundary between syntax and semantics. Linguists who hold such views call themselves **generative semanticists**.

1.4.2. The term 'generative semantics' does not refer, however, to a unified theory, but rather to a school of thought whose practitioners all accept certain beliefs about the structure of language, even if they differ in their individual formulations and applications of these beliefs. They all hold that Chomsky's division of linguistic theory into the three independent compartments of phonology, syntax, and semantics is inaccurate, and that a better model of grammatical description could be devised in which the distinction between semantics and syntax is eliminated. In this model, semantic structures which represent meaning directly are mapped by transformations into surface structures which serve as input to the phonological component. These semantic representations are phrase-markers, unlike the semantic interpretations of the standard theory, and they can hence serve as input to transformational processes. Semantic representations furthermore bear a strong resemblance to logical expressions. The theoretical development of this identification of semantic structure with logical form is described in McCawley (1970a: 168-172). Ross (1968) proposes treating auxiliaries as main verbs which have complements containing the verb phrase of the surface structure in an embedded sentence (cf. Jacobs and Rosenbaum 1971:
73-82). Bach (1968) shows that nouns, verbs, and adjectives can all be subsumed under one category which he calls "contentives". (Later in the theory, for purposes of simplicity, these are usually called "verbs".) Fillmore (1966a,b; 1968a) demonstrates that the notion of prepositional phrase is superfluous in deep structure, since it is possible to regard all noun phrases as containing prepositions. He also proposes (1968b) deriving verb phrases from deeper categories where the verb is treated as a predicate relating noun phrases to one another. Hence, the only syntactic categories remaining in deep structure are sentence, noun phrase, verb, and conjunction, and these can be shown to be equivalent to the logical notions of proposition, argument (or term), predicate, and connective, respectively. Furthermore, conjunctions have also been treated as verbs, so this category is unnecessary in deep structure (cf. McCawley 1972: 516-528). The establishment of theoretical identity between semantic structure and logical form (even if traditional logic is inadequate in this respect; cf. McCawley 1970a: 171) is one of the most important innovations of generative semantics.

1.4.3.1. The semantic representations which serve as inputs to the transformational process are themselves derived by means of formation rules similar to the "node admissibility conditions" described by McCawley (1968a: 247-248), and not by phrase-structure rules. In this sense, the name 'generative semantics' is a misnomer, since not the generative capacity of a language, but rather its transformations, are of prime concern. Generative semanticists treat human language "not as a class of sentences but as a code which relates messages (semantic representations) to their encoded forms (surface structures)" (McCawley 1968c: 72). In generative semantics, this is achieved by transformations which insert
lexical items, rather than by special lexical insertion rules. "Indeed, each dictionary entry could be regarded as a transformation, namely a transformation which replaces a portion of a tree that terminates in semantic material by a complex of syntactic and phonological material" (ibid.). The question arises as to when these transformations apply in the total ordering of transformational processes which apply to semantic representations. It is a major argument of generative semantics that lexical insertion transformations must follow in order of application certain syntactic transformations which apply to trees that terminate in semantic, not lexical material. This is because "the complex of semantic material which a lexical item corresponds to need not be a constituent of the semantic representation per se but may be a constituent which arises through a transformation" (ibid.).

1.4.3.2. A great deal of research in generative semantics has been devoted to demonstrating that most lexical items are transformationally complex, and to examining the transformations which underlie them (cf. Postal 1970). These prelexical transformations obey all the constraints and transformational rules which are described in Ross (1968b) (cf. McCawley 1971b, Lakoff 1971a, 1972a). They operate on semantic structure phrase-markers (trees) which consist of nodes denoted by categorial symbols (S, NP, V, perhaps Conj.) and terminal elements made up of variables and atomic predicates. The variables are indexed for cross-reference (McCawley 1968c: 71). The atomic predicates are minimal meaning units, one class of which may be finite in number; these are regarded as universals (Lakoff 1972a: 616). For instance, the meaning of kill is said to consist of the atomic predicates CAUSE, BECOME, NOT, and ALIVE (McCawley 1968c: 73). The semantic representation of the sentence x kills y is a
complex tree of the following form:

```
  S
 /\  
CAUSE x
  
S
 /\  
BECOME
  
S
 /\  
NOT
  
S
 /\  
ALIVE
```

Through the important transformational process of *predicate raising* (ibid.), this structure may be changed into the following form:

```
  S
 /\  
CAUSE x
  
S
 /\  
BECOME
  
S
 /\  
NOT
  
S
 /\  
ALIVE
```

The complex predicate \( \text{CAUSE(\text{BECOME (NOT (ALIVE))})} \) can then be replaced by the lexical item *kill*. Similarly, *persuade* can be represented by the predicates \( \text{CAUSE (COME ABOUT (BELIEVE))} \), or, in another meaning, \( \text{CAUSE (COME ABOUT (INTEND))} \) (Lakoff 1970b: 341-342). In addition, *remind* has been interpreted as \( \text{STRIKE (LIKE)} \) (Postal 1970; perhaps a better formulation would be \( \text{PERCEIVE (SIMILAR)} \)), or as \( \text{MAKE (THINK)} \) (Bolinger 1971). Numerous other examples are provided by the literature. (See in this connection particularly the publications of the Chicago Linguistic Society.)

1.4.1. Transformations are regarded in generative semantics as special types of *derivational constraints* which are best understood as
well-formedness conditions on phrase-markers in a derivation (Lakoff 1969, 1971a, 1972a). A derivation is a sequence of phrase-markers beginning with a semantic representation and ending with a surface structure. A phrase-marker in a derivation is well-formed if and only if it is related to other phrase-markers in the same derivation by derivational constraints. Since a transformation relates only two successive phrase-markers, it is a "local derivational constraint" (Lakoff 1971a: 233). "Global derivational constraints" apply to the entire derivation; they are such objects as transformational orderings and the like (234), including the constraints on transformations discussed in Ross (1968b). The term 'derivational constraint' is important, because well-formedness conditions are regarded as constraints on possible derivations; that is, they perform the necessary task of limiting the power of a grammatical theory, so that it will not derive sentences which do not belong to the language being described (cf. Chomsky 1972a: 125-126).

1.4.4.2. In the standard theory, this constraining function is also carried out by syntactic selectional features which constrain the insertion of lexical items, and by semantic selection restrictions which constrain semantic interpretations by prohibiting the combination of incompatible readings by projection rules. In generative semantics, selectional constraints are held to be purely semantic in nature (McCawley 1968a: 264-268 and McCawley 1970a: 167-168), and all purported examples to the contrary are said to rest on misinterpretations. McCawley (1968a) attributes to Fillmore the conception "that selectional restrictions are not restrictions imposed by a lexical item on other syntactic constituents but rather presuppositions about the intended referents of those constituents" (267). That is, selectional restrictions are
determined by the way the speaker or hearer views the world, and not by particularly linguistic phenomena.

1.4.5. The semantic representations of generative semantics are logical objects, but the relations involved appear to go beyond the explanatory capacity of traditional symbolic logic, so that a "natural logic" must be proposed for dealing with problems of human language (Lakoff 1970c, 1972a; McCawley 1972). This "natural logic" differs from traditional logic in numerous respects, such as the treatment of quantifiers (Lakoff 1972a: 554-559), presuppositions (569-588 and Lakoff 1971c), and logical ordering (McCawley 1970b). In particular, the presuppositions of a sentence are treated as elements of its semantic representation (Lakoff 1971a: 234-237; cf. also Fillmore 1971b and McCawley 1973).

1.4.6. One should avoid the mistake of thinking that the only distinction between generative semantics and the standard theory is the assignment of the generative capacity of a language to the semantic rather than to the syntactic component (cf. Chomsky 1971, Katz 1971, and Jackendoff 1972a: 4-5). In generative semantics there is no syntactic component which 'interprets' the outputs of a semantic component in the sense that a standard theory semantic component interprets the outputs of the base of the syntactic component. Rather, semantic representations are related directly to surface structures by means of transformations, some of which insert lexical items. There has been much argumentation and polemicization about where lexical insertion transformations can be placed in the total ordering of transformational processes or whether prelexical transformations are really "projection rules in reverse" (see Chomsky 1971, 1972; Katz 1970, 1971, 1972; Lakoff 1970a,
1971a, 1972b; and others). The differences between the theories actually go much deeper than mere notational disputes; they revolve mainly around divergent views as to the basic nature of human language and concerning the goals of linguistic theory (cf. Fillmore 1972b, Postal 1972, and Peters 1972). No small amount of this misunderstanding is due to the unfortunate name given to the theory of "generative semantics".
1.5. The Extended Standard Theory

1.5.1. Application and detailed examination of the grammatical theory presented in Aspects has led some linguists, including Chomsky himself, to quite different conclusions than those reached by the generative semanticists. (See Chomsky 1970, 1971a, 1972; Jackendoff 1968, 1969, 1971a, 1971b, 1972a, 1972b; Dougherty 1969, 1970, 1971, 1972, 1973; Emonds 1969, 1972). Both groups of linguists agree that the syntactic deep structures of the standard theory contain inadequate semantic information to be the objects of semantic interpretation. The generative semanticists propose eliminating this level of linguistic structure, thereby fusing syntax and semantics. They feel that this is the logical extension of the Katz-Postal hypothesis, which they accept. Chomsky and his followers, on the other hand, prefer to keep the level of syntactic deep structure (and the division of syntax and semantics into two separate components) but to discard the Katz-Postal hypothesis. It appears to them that certain aspects of meaning can only be grasped by semantically interpreting surface structures as well as deep structures. They therefore explicitly allow transformations to change meaning. Since the burden of carrying all of the semantic information of a sentence is thereby removed from the deep structure, it is possible to remove a considerable amount of complexity from this level, and it becomes less abstract. This is exactly the opposite of the development in generative semantics. In particular, much of the complexity of deep structure is transferred to the semantic component, and semantic interpretation rules are allowed to add meaning (cf, Jackendoff 1972a: 8).

1.5.2.1. The empirical observations which have led to the formulation of the "extended standard theory" (Chomsky 1972: 134) are provided by
studies of the distribution of old and new information in a sentence (Chomsky 1971a: 199-207; cf. Chafe 1970: 210-233), the behavior of quantifiers (Jackendoff 1968), negation (Jackendoff 1969), pronouns (Dougherty 1969), and coordinate structures (Dougherty 1970, 1971). Attempts to incorporate these aspects of meaning into the representations of the deep structures of sentences, thereby maintaining the meaning-preservingness of transformations and in the deep structures themselves (cf. Chomsky 1971a: 206-207). It therefore seems simpler to Chomsky and the others to allow surface structures to be semantically interpreted for certain types of meaning. Nevertheless, Chomsky maintains that the grammatical relations which play a role in determining the meaning of a sentence are those of the deep structure alone (Chomsky 1970: 185, and Chomsky 1971a: 210). That is, those aspects of meaning determined by the surface structure do not depend on surface structure grammatical relations.

1.5.2.2. The first of these surface aspects of meaning to be discussed in Chomsky (1971a) is the distinction between the focus and the presupposition of a sentence (199-206). Chomsky points out that every sentence, even under normal intonation, contains a certain word or phrase which denotes the center of attention of the sentence. He calls this word or phrase the focus of the sentence. It is the person, thing, activity, occurrence, etc., about which something is being said. What is said about the focus is called the presupposition. For instance, in the sentence, Is it JOHN who writes poetry?, the word John carries the main stress and is the focus. The presupposition is that someone writes poetry. A possible answer to the question would be, No, it is BILL who writes poetry. The question and answer share the same presupposition
and, indeed, this is a necessary condition for the response to be considered proper (206). An improper response would be _No, John writes only SHORT STORIES_; here the presupposition is that John writes something. Since this does not agree with the presupposition of the original question, this response would not normally occur, unless the purpose of the response is to be explicitly deny the presupposition of the question (201). A sentence may allow several different assignments of focus and presupposition, depending on the context (ibid.), and the focus of a sentence may be shifted by changing the intonation contour, i.e., by using 'expressive' or 'contrastive' stress. But in such cases the conditions for assigning the focus are different and more restrictive than in cases of normal intonation (205). In all cases, however, "the focus is a phrase containing the intonation center; the presupposition, an expression derived by replacing the focus by a variable" (ibid).

The semantic interpretation of a sentence associates it "with a class of pairs (F, P) where F is a focus and P a presupposition, each such pair corresponding to one possible interpretation" (205-206).13

1.5.2.3. Chomsky and Jackendoff also consider the behavior of quantifiers and negatives in surface structure (Chomsky 1971a: 207-209; Jackendoff 1968, 1969). The following two sentences are felt by native speakers of English to have different meanings:

(a) Not many arrows hit the target

(b) Many arrows did not hit the target

The reason is that the negative word _not_ negates the entire first sentence, but only the verb phrase of the second sentence; i.e., it has a broader scope in sentence (a) than in sentence (b). The sentence _The target was not hit by many arrows_ is related to sentence (b) by the
passive transformation, but it is not a paraphrase of it. It is rather a paraphrase of sentence (a), which has the same surface structure ordering of negation and quantifier as the passive sentence. Sentence (b) has no paraphrase in the passive form. To explain such facts within the standard theory would require the postulation of different deep structures for sentences (a) and (b) and considerable complication of the passive transformation. Chomsky and Jackendoff argue that it is easier to explain these facts by allowing the scope of quantifiers and negatives to be determined by their surface structure ordering and by permitting the traditional transformation to change meaning if it switches the ordering of quantifiers and negatives. In this model, sentences (a) and (b) would have the same deep structure. It should be mentioned here that generative semanticists explain the scope of such logical elements as quantifiers and negatives by treating them as 'higher verbs' in a complex tree, so that their scope is determined by the portion of the tree that is embedded under them (Lakoff 1965, 1972a: 554-559). But this solution is rejected by Jackendoff (1972a), who argues that the semantic behavior of such items is different from that of verbs (16), and he proposes a model of surface structure semantic interpretation for them (300-308).

1.5.2.4. The behavior of modals, especially when negated, is also considered as being amenable to surface structure interpretation (Chomsky 1971a: 210). Consider the sentence \textit{John can't seem to get his homework done on time.} The negated modal applies to the embedded sentence, not to \textit{seem}. If a purely deep structure interpretation is attempted, difficulties arise. Dougherty (1969) argues that the interpretation of such words as \textit{each} and corresponding pronouns depends on the surface
structure of such words in a sentence. Thus, Each of the men hates his brothers and The men each hate his brothers have different meanings because the referents of his are different in each case. Dougherty proposes identical deep structures for both sentences, letting the difference in meaning be explained by the surface structure positions of each. Many other examples of the purported efficacy of surface structure interpretation can be found in the literature. Let us now consider some specific proposals which have been made for extensions of the standard theory.

1.5.3.1. First of all, it is necessary to reformulate the theory of Aspects (without changing it essentially) so that the new extensions of could be easily described. Part of this is achieved in Chomskyan works. where Weinreich's (1966) proposals for introducing complex symbols into non-terminal nodes of a phrase-marker are accepted (Chomsky 1970: 207-212). However, only syntactic features are incorporated into these complex nodes, since syntax and semantics are still regarded as separate. Then lexical insertion rules (part of the base in Aspects) are reinterpreted as transformations which replace substructures of phrase-markers by complexes of features representing lexical items (Chomsky 1971a: 184). All lexical insertion transformations are held to precede all non-lexical transformations. The resulting picture is as follows (Chomsky 1971a: 183-184): "The system of grammatical transformations determines an infinite class K of finite sequences of phrase-markers, each such sequence P₁, ..., Pₙ meeting the following conditions:

(1) (i) Pₙ is a surface structure

(ii) each Pᵢ is formed by applying a certain transformation to Pᵢ₋₁ in a way permitted by the conditions on grammatical rules
(iii) there is no $P_0$ such that $P_0, P_1, \ldots, P_n$ meets conditions (1) and (ii)"

$P_1$ is called the $K$-initial phrase-marker in each case, and the members of $K$ are the syntactic structures generated by the grammar. $P_1$ is presumably an output of the categorial component (i.e., phrase-structure rules). Lexical insertion transformations are described in condition (2):

"(2) a lexical transformation associated with the lexical item I maps a phrase-marker $P$ containing a substructure $Q$ into a phrase-marker $P'$ formed by replacing $Q$ by $I$."

Condition (3) asserts that all lexical transformations precede all non-lexical transformations:

"(3) given $(P_1, \ldots, P_n)$ in $K$, there is an $i$ such that for $j<i$, the transformation used to form $P_{j+1}$ from $P_j$ is lexical, and for $j\geq i$, the transformation used to form $P_{j+1}$ from $P_j$ is nonlexical."

$P_1$ is called the post-lexical structure of the sequence $P_1, \ldots, P_n$.

It is equivalent to the deep structure of the Aspects model (185). Any theory of grammar satisfying conditions (1)-(3) is called by Chomsky "a standard theory". Chomsky describes the Aspects model in this fashion:

"Observe that a standard theory specifies, for each sentence, a syntactic structure $\mathcal{E}=(P_1, \ldots, P_i, \ldots, P_n)$ (where $P_1$ is the deep and $P_n$ the surface structure), a semantic representation $S$, and a phonetic representation $P$. It asserts, furthermore, that $S$ is determined by $P_1$ and $P$ by $P_n$ under the rules of semantic and phonological interpretation, respectively. More generally, the theory is 'syntactically based' in the sense that it assumes the sound-meaning relationship $(P, S)$ to be determined by $\mathcal{E}$" (185).
1.5.3.2. Let us compare this formulation with the reconstruction
effected at the end of Chomsky (1971a):

"base: \((P_1, \ldots, P_i)\) (\(P_1\) the K-initial, \(P_i\) the post-lexical
deep structure of the syntactic structure
transformations: \((P_1, \ldots, P_n)\) (\(P_n\) the surface structure;
\(P_1, \ldots, P_n \in K\))

phonology: \(P_n \rightarrow\) phonetic representation

semantics: \((P_i, P_n) \rightarrow\) semantic representation (the grammatical
relations involved being those of \(P_1\), that
is, those represented in \(P_1\))

It is quite possible that other terms in the syntactic structure
\((P_1, \ldots, P_n)\) are also relevant for semantic interpretation. Note,
incidentally, that it is, strictly speaking, not \(P_n\) that is subject to
semantic interpretation but rather the structure determined by phono-
logical interpretation of \(P_n\), with intonation center assigned" (213).
Thus, the "standard model" is extended by permitting phonologically
interpreted surface structures to be semantically interpreted, and by
allowing for the possibility of the semantic interpretation of inter-
mediate structures as well.

1.5.4.1. Jackendoff has recently published a book, _Semantic Inter-
pretation in Generative Grammar_ (Jackendoff 1972a), which presents a
detailed formulation of an extended standard theory incorporating earlier
ideas as well as some new ones. He discusses at length many of the
problems in semantics that have recently come to light, and he proposes
an interpretive framework for dealing with them. He furthermore attempts
to show that an interpretive theory of semantics is not only adequate,
but also necessary (10-13).
1.5.4.2. Jackendoff rejects the Katz-Postal hypothesis (5-10) as well as the theory of generative semantics which is based on it. He retains the three components of the Aspects model (377-378) but he allows semantic interpretation not only of deep structures but also of surface structures and intermediate structures that arise at the end of each transformational cycle (4, 370-376). He distinguishes four different aspects of semantic representation, two of which are hierarchical: functional and modal structures, the table of coreference, and focus and presupposition (3).

Functional structure is essentially the structure of grammatical relations considered by Katz and Fodor (1963) to determine semantic interpretation by specifying the use of certain projection rules. Jackendoff, apparently following developments in generative semantics and case grammar, considers verbs as "semantic functions of one or more variables, the readings of syntactically associated noun phrases providing semantic values for the variables. Under this assumption, each verb in the deep structure of a sentence presumably corresponds to function in the semantic representation. The embedding relations of functions in the semantic representation will presumably mirror the embedding relations of verbs (and other functional words) in the deep structure" (14-15). Problems discussed by proponents of case grammar\(^{14}\) are handled at the level of functional structure by giving verbs a certain degree of internal structure; that is, they are assigned functions like causative, directional, locational, and the like (15, 25-46). Only the grammatical relations of the level of deep structure apply in deriving the functional structure of a semantic reading.

The modal structure of a semantic reading indicates the scope of quantifiers and negation and describes the semantic effects of modal auxiliaries and some aspects of tense and illocutionary force (279-369). Coreferential
relations between noun phrases were handled in the Aspects theory by using referential indices, but Jackendoff develops a table of coreference, a nonhierarchical aspect of semantic representation (108-228). The modal structure and the table of coreference result from semantic interpretation of the intermediate syntactic structures which are the immediate outputs of transformational cycles. Jackendoff also refines the notions of focus and presupposition discussed already (229-278). In particular, he proposes that focus be assigned on the basis of a "syntactic marker F" in the surface structure, and not on the basis of stress patterns, as in Chomsky (1971a). (But according to Jackendoff, the choice of focus is based on a semantic, not a syntactic notion.) This syntactic marker affects the assignment of stress contours by the phonological component. Although there are other reasons for this device (237-242), it serves the very useful purpose in a standard theory of keeping the syntactic and phonological components distinct, and specifying that semantic interpretation need only apply to syntactic objects.

1.5.4.3. Although Jackendoff accepts the base of the Aspects model in its general form, he alters it in three important areas for incorporation into his own theory. Since deep structures no longer need to account for all aspects of meaning, it is possible to admit rules of semantic interpretation which add meaning in the process of determining readings (8). Hence, some of the complexity of the level of deep structure can be transferred to the semantic component. In particular, Jackendoff argues that selectional restrictions should be interpreted as well-formedness conditions on semantic representations and not on lexical insertions in the deep structure. That is, the sentence Colorless green ideas sleep furiously would be "generated by the grammar and receive an
interpretation, but the interpretation it receives would be nonsensical" (18). This represents a return to the position taken in Syntactic Structures. It is necessary that deviant structures be generated, since they can be incorporated into perfectly grammatical sentences, as in It's crazy to talk of rocks eating, etc., and it is further necessary that all generated structures be assigned readings, even if nonsensical ones. In addition, selection restrictions must operate on entire sentences, not just nouns or verbs (19). Therefore, selection restrictions must operate within the semantic component. This conclusion seems to be in perfect agreement with the position taken by generative semanticists that selection restrictions are purely semantic in nature and are tied up with the question of how one perceives the world (cf. McCawley 1968a: 264-268; 1968b: 134).

1.5.4.4. Jackendoff's base component differs from the Aspects base component firstly by eliminating complex symbols from terminal elements of phrase-markers, then allowing free lexical insertion under category symbols (21), without consideration of selectional restrictions. Secondly, in accordance with the lexicalist hypothesis of Chomsky (1970), syntactic nodes are represented as matrices of distinctive features (?1-22). Thirdly, lexical insertion is always optional (179-182, 265-272, 377).

1.5.5. A comparison between the extended standard theory and generative semantics is out of place here. It might only be remarked that the extended standard theory, especially in Jackendoff's formulation, appears to be exceedingly complex when compared with generative semantics. Furthermore, one might think that the extended standard theory was devised as a reaction against the threat to the Aspects model posed by generative semantics. But this cannot be said with certainty; furthermore, any
argument based on the purported "simplicity" of a theory is suspect, since no adequate definition of this term exists for judging linguistic models. To the extent that the complexity of a theoretical proposal results from attempts to incorporate new information into an out-dated model, it is useless. To the extent that this complexity results from efforts to describe complex phenomena (such as human languages), it may be necessary. As far as the dispute between the extended standard model and generative semantics is concerned, the question has not been finally settled.
1.6. Katz Revisited

1.6.1. The model of the semantic component of a generative grammar originally proposed by Katz and Fodor (1963), modified by Katz and Postal (1964), and incorporated into the "standard theory" of Aspects, has been further developed and vigorously defended by Katz himself in a lengthy series of articles and books (Katz 1964a, b, c, 1966, 1967, 1970, 1971, 1972, 1973a, and others). In its general form, however, it has remained the same: sets of readings (taken from a dictionary) for lexical items in the terminal strings of deep structures (and deep structures alone) are combined by projection rules according to the grammatical relations holding between the lexical items in the deep structure to derive sets of readings for syntactic nodes immediately dominating these lexical items, and then these sets of readings are further combined until a set of readings is derived for an entire sentence. Thus the combinatorial hypothesis is maintained in its strongest form.

1.6.2.1. The first modifications of Katz-Fodor semantics are described in Katz and Postal (1964). The elimination of projection rules for interpreting the semantic effects of transformations (type 2 projection rules) and the postulation of the Katz-Postal hypothesis have already been discussed and are even assumed in the above characterization of Katzian semantics in its general form. The notions of dictionary, (type 1) projection rules, selection restrictions, and semantic interpretation are taken over from Katz and Fodor (1963) unchanged, but the concepts of semantic marker and distinguisher are further developed. Distinguishers are now characterized as "semantic markers with maximally limited distribution in the dictionary" (Katz and Postal 1964: 14).
That is, they are unique semantic markers, and they play a role in sense distinction, albeit a very small one. Katz and Fodor (1963) do not explicitly assert that distinguishers are not semantic markers, but they definitely imply it when they say (498) that semantic markers are theoretical constructs and the "distinguishers, on the other hand, do not enter into theoretical relations." The notion of semantic marker is further clarified in Katz and Postal (1964) by the introduction of category inclusion relations between semantic markers. These are essentially redundancy rules which state, for instance, that "the semantic marker (Human) represents a conceptual category that is included in the categories represented by (Animate), (Higher Animal), (Physical Object), etc., but that the category that the semantic marker (Physical Object) represents is not included in any of these other aforementioned categories" (16). The concept of selection restriction is unchanged, but now selection restrictions are explicitly said to be "functions of syntactic or semantic markers" (ibid).

1.6.2.2. In Katz (1964b), a significant development of the concept of semantic marker is proposed. Whereas semantic markers were previously conceived of as unitary features, by analogy with phonological features, it is now suggested that they have internal structure and that they can be contained in other markers (cf. Katz 1967: 154). In particular the notion of evaluation marker is introduced. This allows the subcategorization of semantic information with respect to such concepts as use, function, duty, purpose, etc. For example, the dictionary entry for knife contains the evaluation marker (+ Eval use: ease of dividing substances softer than its blade). (Cf. Katz 1966: 300, where this example is repeated.) Also, dictionary entries are no longer represented
as trees, but as sets of readings which are themselves sets of semantic markers (Katz 1964b: 743).

1.6.2.3. In Katz (1966), evaluation markers are further developed and are allowed now to contain slots where other semantic readings can be inserted by projection rules. For example, the dictionary entry for the verb 'chase' contains the following sequence of syntactic and semantic markers: chase → Verb, Verb Transitive, ...; ((Activity) (Nature: (Physical) of X), ((Movement) (Rate: Fast)) (Character: Following)), (Intention of X: (Trying to catch ((Y) ((Movement) (Rate: (Fast))))); <SR> (Katz 1966: 167). The terms 'Verb', 'Verb Transitive', etc., denote syntactic markers and the abbreviation SR stands for selection restrictions. The terms in parentheses are semantic markers, represented as members of a set, and not as a tree. The semantic markers containing colons are evaluation markers, some with slots and some without. Consider now the sentence Police chase criminals. When the projection rule for the grammatical relation 'verb-direct object' is applied, it will amalgamate the readings for chase and criminals so that the readings for criminals will be inserted into the reading for chase at the point where Y occurs as a slot. Similarly, when the projection rule for the grammatical relation 'subject-verb' applies, it will substitute the lexical readings of police for all occurrences of the slot X in the readings of chase criminals. Thus a reading for Police chase criminals will be derived in which the distinction of 'chaser' and 'chased' is clear. The use of complex markers with slots enables Katz to overcome a serious weakness of the earlier theory, the fact that it is unable to distinguish semantically between Cats chase mice and Mice chase cats (as was pointed out in Weinreich 1966: 33-34).
1.6.2.4. It is interesting to note that Katz (1966) does not mention distinguishers. In earlier representations of dictionary entries, distinguishers are enclosed in brackets (Katz and Fodor 1963: 496; Katz and Postal 1964: 14), and the theoretical distinction between them and semantic markers (enclosed in parentheses) is emphasized, even if Katz and Postal do imply that distinguishers can be regarded as unique semantic markers. In the dictionary entries of Katz (1966), however, semantic information earlier represented by a distinguisher is enclosed in parentheses and is treated as a marker. No distinction is made between such a marker and other markers in the same reading, although these new markers always appear at the end of series of markers (as distinguishers do) and contain almost exactly the same descriptive phrases as earlier distinguishers. Katz appears to have momentarily chosen to disregard any distinction between markers and distinguishers, although the only difference between earlier dictionary entries and the dictionary entries of Katz (1966) is that the latter contain no square brackets—the descriptive terms used are the same in both cases.\textsuperscript{15} Distinguishers return in full force, however, in Katz (1967: 158-162) and Katz (1972: 82-88). Katz (1967), (1970), and (1971) are highly polemical and add nothing to his theory, and they are not relevant to the present discussion. Katz' latest book, \textit{Semantic Theory} (1972), does, however, contain several innovations which should be mentioned.

1.6.3.1. First of all, Katz replaces the negative definition of semantics in Katz and Fodor (1963) by a positive one in the form of an answer to the question, "What is meaning?" (Katz 1972: 1). Katz argues that this question cannot be directly answered, but that one must attempt to answer subquestions of this question (4-5). Such subquestions concern
the phenomena of (i) **synonymy** and **paraphrase**, (ii) **semantic similarity** and **semantic difference**, (iii) **antonymy**, (iv) **superordination** and **sub-ordination**, (v) **meaningfulness** and **semantic anomaly**, (vi) **semantic ambiguity**, (vii) **semantic redundancy**, (viii) **analytic truth**, (ix) **contradictoriness**, (x) **syntheticity**, (xi) **inconsistency**, (xii) **entailment**, (xiii) **presupposition**, (xiv) **possible answer**, (xv) **self-engaged question** and perhaps others (5-6). Katz asserts that his semantic theory can adequately describe and explain such phenomena, and can therefore answer the question, "What is meaning?", in the only possible way, by answering its subquestions.

1.6.3.3. Katz incorporates his earlier ideas of evaluation markers and slots into the new formulation of his theory, but he now calls the latter **categorized variables** and extends and clarifies their role in the theory (104-109). As a matter of fact, he argues that the extended use of categorized variables obviates the need for different types of projection rules: "Categorized variables, on the other hand, do away with the need to have different particular projection rules of this type in order to determine (a) the form of semantic combination required in connection with different grammatical relations, and (b) the point at which one reading will embed in another to form a derived reading: categorized variables determine both. Thus, it is possible to have only one type of projection rule, namely, one that combines readings of constituents in an underlying phrase-marker, working from lowest order constituents to the highest, and taking the readings of subconstituents of a constituent to be the components of the derived reading of that constituent. 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 each other 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 the reading in which it was substituted" (114). Katz argues further (115-116) that this single projection rule is a "linguistic universal, and, as such, it must be stated once in linguistic theory, as part of that theory's formulation of the formal universals at the semantic level. The semantic components of particular grammars will not contain any projection rules but will consist only of a dictionary".

1.6.3.4. Besides the restatements of the goals and scope of a semantic theory and the modifications of the concepts of distinguisher, categorized variable, and projection rule, Katz (1972) accepts all of the other aspects of earlier formulations of Katzian semantics in essentially unchanged form. In addition to a statement of Katz' theory with the above modifications, the book consists of a rehashing of earlier polemics (Katz 1967, 1970, 1971), applications of the theory to problems of logical semantics (presupposition, analyticity, opacity, etc.) and linguistics (time relations, converses, etc.), and a rejection of the arguments of Chomsky and other that non-deep structures must be semantically interpreted.

1.6.4. Katz occupies a peculiar position in modern linguistics. He is probably the only linguist who still accepts the Aspects model of grammatical theory in all of its details. He rejects generative semantics (Katz 1970, 1971), and he considers the extended standard theory to be unnecessary (Katz 1972: 414-452). He holds unusual philosophical views, and his attempts to support them by applying his theory to the solution of
certain philosophical problems (Katz 1966, 1972) has brought him into conflict with philosophers and even other linguists (cf. Lackowski 1968; Bar-Hillel 1967a, b; 1969). Part of the controversy that Katz has caused has been due to his style of argumentation and the way in which he constructs theories, but this is not the place to discuss such issues. Two very apt (and strikingly similar) criticisms of Katz' scholarly methods may be found in Weinreich (1967) and McCawley (1971a). Katz (1973a) has replied to the latter article in a polemical fashion which indicates that he understands very little of the substantive issues involved and that he misses the full brunt of McCawley's criticisms.
1.7. Case Grammar

1.7.1.1. In his discussion of deep structure in *Aspects*, Chomsky emphasizes the important distinction between the notions of *grammatical category* and *grammatical function* (68-74). A grammatical category is a term such as 'noun', 'noun phrase', or 'verb' used to denote the constituents of a sentence. A grammatical function, however, describes a particular relation between two constituents of a sentence. For example, the noun phrase *sincerity* functions as the subject of the sentence *Sincerity may frighten the boy*, and 'subject-of' denotes the particular grammatical relation which holds between this noun phrase and the entire sentence. Chomsky suggested using categorial terms as labels for the nodes of phrase-markers and defining grammatical relations in terms of category symbols and the configurations in which they occur. For example, subject of a sentence is defined as the grammatical relation \([\text{NP}, \text{S}]\) holding between a noun phrase and a sentence if and only if the node NP denoting the noun phrase in question is immediately dominated by the node S in the phrase-marker for that sentence. Grammatical relations are defined in identical fashion for deep and surface structures, although the "deep subject" of a sentence may not be the same as its "surface subject", as in the sentence *The man was bitten by the dog*.

1.7.1.2. Thus, the definition of grammatical relations is restricted to the purely syntactic notions of category symbol and phrase-structure configuration. However, these syntactically defined relations in the deep structure are considered to have semantic relevance, because they alone function in determining how sets of lexical readings should be combined by projection rules in the process of deriving semantic interpretations. Chomsky recognizes the inconsistency of this approach in his discussion
of the sentences John strikes me as pompous and I regard John as pompous: "although the deep structures would show that 'pompous' modifies 'John' in both sentences of the pair, they would not express the relations of the two Nouns to the Verb that are (in some unclear sense) the semantically significant ones. Thus in some sense the relation of 'John' to 'strike' is the same as that of 'regard' to 'I'. We have no mechanism for expressing this fact, hence of accounting for the meaning relation, in terms of lexical features or grammatical relations of the deep structure. Consequently, it seems that beyond the notions of surface structure (such as 'grammatical subject') and deep structure (such as 'logical subject'), there is some still more abstract notion of semantic function still unexplained" (162-163).

1.7.2.1. Fillmore (1966a, b) recognizes the semantic insufficiency of syntactic relations such as 'subject' or 'object' and proposes banning them from deep structure altogether. He considers such sentences as The door will open, The janitor will open the door, The janitor will open the door with this key, and This key will open the door. There is a semantically relevant relation between the door and open which is the same in the first two sentences, although the door is subject of the first and direct object in the second. Similarly, the last two sentences express the same semantic relation between this key and open in each case, although this key is the object of a prepositional phrase in the third sentence and the subject of the fourth sentence. Fillmore says the semantic functions of the janitor, this key, and the door in the above sentences could be called Agentive, Instrumental, and Objective, respectively.¹⁷

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the major constituents of a sentence (S) are Modality (Mod), Auxiliary (Aux), and Proposition (Prop) (Fillmore 1966a: 22; 1966b: 365). The constituent Auxiliary is presumably identical to the Aspects constituent of the same name. The Modality constituent includes "interrogative and negative elements, sentence adverbials, time adverbials, and various other adverbial elements that are understood as modalities on the sentence as a whole rather than subconstituents of the constituent containing the main verb". The Proposition constituent consists of "the verb and all those nominal elements which are relevant to the subclassification of verbs. The rules for rewriting Proposition take it into an obligatory verb followed by the somewhat independently optional elements Objective (Obj), Dative (Dat), Locative (Loc), Comitative (Com), Instrumental (Ins) and Agentive (Ag)" (1966b: 368). Fillmore gives numerous examples for these semantic functions, which are assumed to be universals (ibid.). These elements are all rewritten by the phrase-structure rules as noun phrases, and all noun phrases are assumed to begin with prepositions in the deep structure (369). There is no longer any difference between noun phrases and prepositional phrases at this level of grammatical description. The choice of the preposition is determined by semantic, lexical, or cooccurrence considerations. The subject of a sentence is selected from among the "propositional actants" (i.e., the noun phrases in their above-mentioned roles) according to certain rules, and transformations effect the proper surface structure ordering. All prepositions which are not required in the surface structure are deleted.

1.7.2.3. Fillmore calls his "propositional actants" cases, by analogy with the traditional surface term for forms of nouns in inflected languages and the similarity between case forms like gladiō in Publius eum
gladiō interfācit and prepositional phrases like with a sword in Publius killed him with a sword. He distinguishes, however, between surface uses of the term case and his conception, which belongs to deep structure and refers to semantically perceived relationships between the noun phrases and verb of a simple sentence: "The sentence in its basic structure consists of a verb and one or more noun phrases, each associated with the verb in a particular case relationship" (Fillmore 1968a: 21). Different case frameworks are associated with different sentence types, which may be assumed to have "universal validity", regardless of subject placement, etc. Fillmore asserts that a universal constraint on such case frameworks is provided by the restriction that "each case relationship occurs only once in a simple sentence" (ibid.). Furthermore, "only noun phrases representing the same case may be conjoined" (22). This prevents the occurrence of such sentences as John and a hammer broke the window. Since John is Agentive and hammer Instrumental, they cannot occur as joint subjects. Similarly, A hammer broke the glass with a chisel does not occur because it violates the "one-case-per-simple-sentence" constraint. Fillmore considers some possible counterexamples and shows how they can be interpreted in a fashion consistent with the above-mentioned constraints (22-23).

1.7.2.4. Fillmore proposes the following cases as "universal, presumably innate concepts which identify certain types of judgments human beings are capable of making about the events that are going on around them, judgments about such matters as who did it, who it happened to, and what got changed" (24):

"Agentive (A), the case of the typically animate perceived instigator of the action identified by the verb
Instrumental (I), the case of the inanimate force or object causally involved in the action or state identified by the verb

Dative (D), the case of the animate being affected by the state or action identified by the verb

Factive (F), the case of the object or being resulting from the action or state identified by the verb, or understood as a part of the meaning of the verb

Locative (L), the case which identifies the location or spatial orientation of the state or action identified by the verb

Objective (O), the semantically most neutral case, the case of anything representable by a noun whose role in the action or state identified by the verb is identified by the semantic interpretation of the verb itself; conceivably the concept should be limited to things which are affected by the action or state identified by the verb. The term is not to be confused with the notion of direct object, nor with the name of the surface case synonymous with accusative" (24-25)\(^\text{19}\)

Fillmore believes that additional cases will be necessary for the description of semantic relations other than the ones mentioned above, and much of the theoretical development of case grammar has been concerned with the postulation of new cases or the rearrangement of old ones. It should be remarked that the Objective case as described above is a "wastebasket" case in that it subsumes relations not described by the other cases and those not yet fully understood. This is not an unsatisfactory theoretical arrangement— as new cases are discovered, the Objective case can be expected to shrink somewhat.\(^\text{20}\)
1.7.3.1. One of the most important results of the case grammar approach has been an improved conception of verbs and their representations in the lexicon. In a number of works (1968b, 1969, 1970, 1971b), Fillmore has demonstrated that verbs can be regarded as logical predicates, with their attendant noun phrases as arguments. This view is shared by generative semanticists. Some verbs are one-place predicates, like sleep, some are two-place predicates (hit), and some are three-place predicates (give). Certain verbs, (buy, perhaps) may take four or more arguments (1969: 118). Some verbs are almost identical but for the order of their arguments: buy and sell, for example, or rob and steal. Such pairs are called converses. Some verbs may take varying numbers of arguments, with perhaps different meanings: The window broke, John broke the window, John broke the window with a stick. And some verbs can be shown to be conceptually included in other verbs by the device of embedded predicates. For example, persuade in John persuaded Mary that the moon was made of green cheese is a three-place predicate (the third argument is an embedded sentence). But this sentence means something like John caused Mary to believe that the moon was made of green cheese, in which cause is a two-place predicate with the two-place predicate believe as its second argument. Thus we may write PERSUADE (a, b, c) = CAUSE (a, BELIEVE (b, c)). Likewise, KILL (a, b) = CAUSE (a, DIE (b)). This device of predicate embedding is much used in generative semantics under the name of "lexical decomposition" (cf. Lakoff 1970b).

1.7.3.2. Fillmore proposes a different treatment for these verbs, however. He argues that a lexical entry for a verb must contain information not only about the number of arguments it can take (and possible features that these arguments must have: break requires at least one
argument which denotes a rigid physical object, for example), but also about the possible case frames into which the verb may be inserted (1968a: 27-31; 1968b: 383-387; 1969: 115-118). For example, run, which is a one-place predicate, can occur with an agentive noun phrase, as in John ran. Hence, run can be inserted into the case frame [___A]. Murder requires the case frame [___D+A], give the case frame [___O+D+A], and so on (1968a: 27). One of the advantages of this use of case frames is that the lexicon can be more economically organized. The verb open need now be listed only once in the lexicon, together with an indication of the various case frames into which it may be inserted:

[___O], as in The door opened;
[___O+A], as in John opened the door;
[___O+I], as in The wind opened the door;
[___O+I+A], as in John opened the door with a chisel (ibid.).

In the traditional shorthand, these four frames may be represented by the frame feature + [___O(I)(A)]. In addition, the verbs kill and die now have exactly the same semantic representation in the lexicon, since the difference in their meanings is fully expressed by the different case frames into which they can be inserted. If this single semantic representation is inserted into the case frame [___D], the lexical item chosen is die; if it is inserted into the case frame [___D(I)A], the surface lexical item is kill. Similar pairs, or even groups, of verbs abound in the lexicon:

see (+ [___O+D]) versus show (+ [___O+D+A]);
hear (+ [___O+D]) versus listen (+ [___O+A]);
see, know (+ [___O+D]) versus look, learn (+ [___O+A]) (30-31).

Note that not all of the cases assigned to a verb need be present in
deep structure. For instance, hit has the case feature +[0+I(A)]. That is, the object and instrument are required in deep structure, but the agent is not necessary. In the sentence The rock hit the tree, no agent need be present; the rock could have simply rolled down a mountain. However, in the sentence John hit the tree, an instrument is understood, even if it is not explicitly mentioned. This is shown by the peculiarity of the sentence John hit the tree, but he didn't hit it with anything (1968b: 384).

1.7.4. It should also be pointed out that the predicate structure (number of arguments) of a verb may be different from its case structure (the case frames into which it may be inserted) (cf. Fillmore 1969a: 114-118). This is because one argument may have several case roles. The intransitive verb rise is a one-place predicate; its argument can be either animate or inanimate. In The smoke rose, smoke is in the Objective case. (In Fillmore's later terminology, he uses nouns for case notions instead of adjectives; one would then say smoke is the Object). In the sentence John rose, as it is normally understood, John is both Agent and Object. One might say that he 'causes his body to rise'. The verb arise requires an animate subject which is simultaneously Agent and Object. Lift requires two arguments, one an Agent (or perhaps Instrument), and the other an Object. Both the predicate structure and the case structure of a verb must be specified in the lexicon. Buy and sell differ from one another not primarily in the order of their arguments, but rather in the case roles these arguments are assigned. Consider the sentences He buys eggs very skillfully and He sells eggs very skillfully. In each case the adverbial phrase positively evaluates only the Agent's end of the transaction and not the whole transaction. That is, the evaluation
applies not to a particular argument, but rather to the case role
in which the argument appears.

1.7.5. Little has been said up to this point about how deep struc-
ture representations in case grammar are transformed into surface struc-
tures. The transformations required are not particularly complicated and
the interested reader is referred to Fillmore (1968a: 31-50, 67-86).
The main problems concern the choice of the subject, rearrangement of
the verb and the noun phrases (including lifting of the subject out of
the proposition and fronting it), and possible deletion of prepositions.
Every case role is associated with certain prepositions: "the Agentive
preposition is by; the Instrumental preposition is by if there is no Agent,
otherwise it is with; the Objective and Factive prepositions are typi-
cally zero; the Benefactive preposition is for; the Dative preposition
is typically to; the Locative and Time prepositions are either semantically
nonempty (in which case they are to be introduced as optional choices from
the lexicon), or they are selected by the particular associated noun,
on the street, at the corner (= intersection of two streets), in the
corner (of a room); on Monday, at noon, in the afternoon. Specific
verbs may have associated with them certain requirements for preposition
choice that are exceptions to the above generalization" (1968a: 32).
The choice of the subject is governed by numerous considerations, such
as passivization, etc. The "normal" choice of subject, however, seems
to follow this rule: "If there is an Agent, it becomes the subject;
otherwise, if there is an Instrument, it becomes the subject; otherwise,
the subject is the Object" (33). In this manner, a case hierarchy is
established for "unmarked" subject determination (cf. Fillmore 1971a:
42-43).
1.7.6. The place of case grammar in the dispute between interpretative and generative semantics is not clear. Fillmore has often argued that he is an interpretative semanticist (1971a: 55; 1972a: 22-23), but his case studies are semantically grounded and tend to contribute to the demise of syntactic deep structure (1968a: 88), thereby supporting generative semantics. The more polemical of the interpretativists certainly assign him to the enemy camp (cf. Katz 1972: 109-111, and Dougherty 1972: 15-18). Part of the confusion as to whether case grammar belongs in generative or interpretative semantics may be due to a personal quirk of Fillmore's; other case grammarians who have regarded case notions as purely semantic have had considerable success (cf. esp. Nilsen 1972a, 1973). Case grammar and generative semantics have reached several of the same conclusions about the nature of human language, but they express them differently. The two disciplines also seem to have similar goals, and these are often quite different from those of the interpretative semanticists.
1.8. Chafe's Theory of Meaning

1.8.1.1. Generative semantics, interpretative semantics (Chomskyan and Katzian), and case grammar are all direct offspring of the model of grammatical description proposed in *Aspects of the Theory of Syntax* (Chomsky 1965). That is, they all evolved out of attempts to resolve the inconsistencies and remove the inadequacies of the *Aspects* model. This common origin explains the fact that all these theories make use of much the same general theoretical apparatus (phrase-markers, transformations, etc.), although they differ considerably in their individual conceptions of language structure and the goals of linguistic analysis. A relatively independent approach to semantics which appears to offer a promising alternative to the above theories has been developed by Chafe in a number of papers and a book (1967; 1968a, b; 1970; 1971a, b; 1973).

1.8.1.2. Chafe explains that a "deep and prolonged dissatisfaction... with both past and present theories of the structure of language" (1970: 1) drove him to develop a theory of language based largely on his own ideas and conceptions. In the process of devising his theory, Chafe came to several conclusions about the nature of language which differ strikingly from wide-spread beliefs in modern linguistics. These concern such topics as the directionality of language, the existence of synonymy and paraphrase, the evolution of language and the relation of human language to animal communication, among others.

1.8.2.1. Chafe regards language as a "system which mediates, in a highly complex way, between the universe of meaning and the universe of sound" (1970: 15). This view of language as a link between meaning and sound is fairly uncontroversial, at least in American linguistics. Both interpretativists (Chomsky 1971a: 183) and generativists (McCawley 1970a:
166) hold this view, although Chomsky's early work regarded languages as merely recursively defined sets of sentences (1957: 21). Language is used for human communication, and any communicative process must rely on a system of correspondences between possible messages and the medium which is used to carry the messages. As far as language is concerned, the messages are thoughts or ideas, which are assumed to "have some kind of electro-chemical existence in the nervous systems of individuals" (Chafe 1970: 16), and the transmitting medium is sound (or perhaps light, in the case of written language). Language is an extremely complicated system of correspondences between thoughts and sound patterns, but Chafe argues that it is not unreasonable to suppose that it is based on a much simpler system. This simple system is seen in systems of animal communication, which rely essentially on a one-to-one correspondence between messages and the forms in which these messages are transmitted. Gradation in the content of a message (e.g., direction and distance of a nectar source) may be expressed by gradation in the encoded form of this message (e.g., the direction and intensity of a bee dance), but the relation of message to encoded form is still unique. In particular, various species of non-human primates seem to possess a repertoire of concepts (threats, warnings, etc.) which they are able to encode in symbols (vocal cries, lip-smacking, etc.) in a unique fashion in order to transmit messages. Such one-to-one correspondences of conceptual units and symbols are called by Chafe primitive symbolization systems (22). It may be presumed that our ancestors, before they possessed human language, used symbolization systems of this nature, especially since they are still used by modern man in addition to language. Chafe believes that language could have evolved out of such primitive symbolization systems. He is therefore at
variance with the widely held transformationalist view that human language is totally unrelated to systems of animal communication (except that both are representations of behavior), and that language evolved only as the consequence of certain genetically influenced changes in the structure of the human brain (Chomsky 1966a: 78, and Lenneberg 1967: chap. 6).

1.8.2.2. A primitive symbolization system can only transmit as many messages as there are possible distinctions in the medium between encoded forms, or symbols. Human beings are only able to distinguish a limited number of vocal symbols, so that an essential step in the development of language, according to Chafe, was the introduction of duality (1970: 24-29), i.e., the ability to combine two or more symbols to designate a concept not designated by the individual symbols which are so combined. In this way, the direct correspondence between concepts and symbols was destroyed: "The innovation which permitted a solution of this kind was a shift from the one-to-one symbolization of each semological unit by a distinct phonological unit to the symbolization of each semological unit by a distinct arrangement from a small stock of phonological units. A particular phonological unit could then be used again and again in different arrangements and no longer had a direct tie to any unit of semology" (1967: 61-62). Thus the store of concepts could rise indefinitely while the store of symbols remained relatively constant. Chafe asserts that the development of duality in language cooccurred with the expansion of human conceptual ability, and that the two were interdependent (61). An important consequence of the introduction of duality was the ability to structure concepts in a different fashion from the structuring of symbols, and this is what the term 'duality' refers to:
language mediates between configurations of concepts and configurations of sound, and the two types of configurations are structured differently. For instance, sound symbols are necessarily structured in a linear fashion, whereas concepts are not. Concepts and configurations of concepts are called **semantic structures** by Chafe (1970: 28), and language functions to convert these semantic structures into sound patterns. An important step in this conversion is the rearrangement of semantic structures into linear sequences. The output of this **linearization** process is called by Chafe a **surface structure** (29). A surface structure is converted into a **phonetic structure** by the process of symbolization, which replaces each linearized conceptual unit by an arbitrary configuration of symbolic units.

1.8.2.3. Chafe has thus demonstrated how a primitive symbolization process can still function in a sophisticated communication system like language, if one allows a process like linearization to convert a conceptual structure into a form which corresponds exactly to a symbological structure. According to Chafe, this model of a communication process (semantic structure \(\rightarrow\) **linearization** \(\rightarrow\) surface structure \(\rightarrow\) **symbolization** \(\rightarrow\) phonetic structure) would adequately describe language were it not for the fact that languages change (30). Conceptualizations (semantic structures) can change or develop, and so can phonetic structures. Duality assures that these changes can operate independently. In particular, sound change may operate in such a manner as to obscure the phonetic structure to the right of the symbolization arrow; that is, the symbolization no longer seems to be one-to-one. For example, the concept 'house' may be symbolized by the phonetic structure /haws/ except when it is followed in the surface structure by the concept 'plural', in which case the symbolization is /haws/.\(^{23}\) One can preserve the concept of
one-to-one symbolization, however, if one postulates underlying phonological representations which are not directly manifested in sound. A surface structure can then be symbolized as an abstract phonological structure which must be subjected to certain processes in order to derive an 'actual' phonetic structure (i.e., sequence of sounds). These processes reflect, but only to a limited extent, the processes of sound change which a language has undergone. Thus, the speakers of a language "operate as if they were, in a certain sense, internal reconstruction devices which reconstruct nonphonetic underlying forms and the processes which lead from such forms to an eventual phonetic output" (37). The process of phonetic change, then, functions to make the process of symbolization "more abstract in the sense that it is no longer directly related to sound" (39). Chafe's views on phonology are, of course, virtually identical to those expressed in Halle (1964) or Chomsky and Halle (1968), and everything to the right of his symbolization arrow corresponds exactly to the phonological component of a transformational grammar. His emphasis on the similarity of phonological processes and historical changes is not necessarily shared by everyone working in the field of generative phonology, but such a similarity is often apparent in their formulation of underlying structures (cf. King 1969).

1.8.2.4. Phonetic change causes symbolization to be abstracted from phonetic output, and semantic change affects language in a similar fashion, in that it causes semantic structures to be less directly related to surface structures (Chafe 1970: 40). Since this relation is no longer merely an organizational one (linearization), surface representations lose their semantic nature and can now be called postsemantic structures, just as underlying phonological representations
can be called prefonnetic structures. The general result of language change is to increase the theoretical distance between semantic and phonetic structures, but symbolization remains as the central process relating the two. Semantic change involves primarily the addition of new semantic units (41). Aside from the borrowing of concepts and their symbolizations from other languages (e.g., sauerkraut) and the conscious symbolization of new concepts (Kodak or gas), virtually all new concepts are symbolized by appropriating the symbolizations of already existing semantic units. These symbolizations thus acquire new meanings which coexist with the old ones or drive them out. This particular process of semantic change is called idiometrication by Chafe (40-50). The new semantic structures, or idioms, must be converted into semantic-like representations of the semantic structures whose symbolizations they have appropriated before symbolization itself can take place. This process of conversion is called literalization. For example, the semantic unit designating color in the phrase red hair is not the same as the semantic unit designating color in the phrases red house or red car. Nevertheless, it has the same symbolization as the other concept. Hence, in the phrase red hair the semantic unit designating color must be replaced (literalized) by the semantic unit designating color in red car, although this latter semantic unit no longer carries its original meaning. Similarly, 'to die' (expressed in a whimsical manner) may be literalized by the phrase kick the bucket before symbolization occurs. These two idioms are lexical, but other idioms may be nonlexical; these are the traditional "inflections", such as aspect, case, etc. (49). Thus, 'progressive', which has no direct symbolization, is literalized by be and -ing. Literalization and linearization are called postsemantic
processes. Other postsemantic processes involve redistribution of semantic information (as in agreement transformations) or deletion of semantic units (51-53). Partial deletion of semantic units is called pronominalization by Chafe.

1.8.2.5. Chafe's conception of language is that of a complex system of rules for indirectly relating semantic structures to phonetic structures through the process of symbolization (55-57). First of all, a semantic structure is subjected to a series of postsemantic processes. The output of each postsemantic process is an intermediate postsemantic structure which serves as input to the next postsemantic process. The output of the last postsemantic process is a surface structure. A surface structure is directly symbolized as an underlying phonological structure which is subjected to a series of phonological processes. The output of each phonological (prephonetic) process is an intermediate phonological structure which serves as input to the next phonological process. The output of the final phonological process is a phonetic structure.

1.8.2.6. Most linguists have consistently denied that language has any directionality, because every speaker is also a potential hearer. In particular, generative and interpretative semanticists maintain that there is no intrinsic directionality to the mappings which they describe. Chafe, however, argues that language is unidirectional, from meaning to sound (1971a; 1970: 57-61). One reason, according to Chafe, is that the well-formedness of sentences is determined at the semantic end of language and not at the phonetic end. A well-formed semantic structure gives rise to a well-formed phonetic structure, but not vice-versa (1970: 59; 1971a: 7-8). A hearer interprets a phonetic structure, but it is one which has been derived from a semantic structure in the first
place. Meaning is both at the end and at the beginning of a speech act, while sound is in the middle.

1.8.2.7. Furthermore, whereas homonymy and ambiguity are extremely common in language, Chafe argues that synonymy and paraphrase are rare (1971a: 8-22). Homonymy and ambiguity are usually accidental and unsystematic, but synonymy and paraphrase, when they occur, are predictable. Although it is easy to establish that a word or sentence may have more than one meaning, it is extremely difficult to prove that different words or sentences have identical meanings. Chafe asserts that most traditional examples of synonymy are false and merely reflect the user’s insensitivity to meaning differences. In addition, most criteria for establishing synonymy are inaccurate, in particular equivalence of truth-value and relatedness by optional transformations. Thus, Chafe’s conclusion may be rephrased as follows: the mapping of semantic structures onto phonetic structures is a function, i.e., a many-one relation. Chafe concedes that certain expressions may have convergent or equivalent meanings in certain contexts, as for instance my uncle and my father’s brother, but he argues that the semantic representations underlying these expressions are distinct. Chafe even allows for the representation of identical meanings by different semantic structures. The following is a geometrical analog: the composite figure of □ and × is identical to the composite figure of △ and ◊, although the units that are combined are different in each case (1970: 88).

1.8.2.8. Chafe holds that linguistic evidence can be obtained from both ends of the language relation, from phonetic structure by observation and from semantic structure by introspection (75). As a matter of fact, he believes that evidence gained by introspection is to be preferred
to evidence based on observation (122). In Chafe's view, introspection can be practiced in every bit as "rigorous" a fashion as observation—all that is needed is training and patience (78). Since semantic structure and phonetic structure are both accessible in this sense, neither is more abstract than the other. The most abstract levels in language are surface structure and underlying phonological structure, which are directly related to one another by the process of symbolization.

1.8.3.1. The second part of Chafe's book, *Meaning and the Structure of Language* (1970), is concerned with a description of the level of semantic structure and some postsemantic processes, primarily for English. Semantic structures are generated by rules which first specify verbs and then add nouns to them in special relations similar to Fillmore's cases. The verb is taken to be of central importance (96-98), and nouns are selected according to certain features of the verb. The only distinct categories in semantic structure are noun and verb, which correspond roughly to the concepts of argument and predicate, respectively. Verbs and nouns are specified in terms of semantic units which are arranged in hierarchical fashion, so that lower-level units always indicate greater specification than higher-level units (105). Highest are the all-inclusive units verb and noun. These are followed by selectional units such as state, process, or action for verbs and count, potent, or animate for nouns. The maximally specific semantic units are called lexical units. These are underlined in a hierarchy. Some units may be both selectional and lexical. In the hierarchy for the concept 'bear', for example, animal appears as a selectional unit, although it functions as a lexical unit in the hierarchy corresponding to the concept 'animal'. Units with this dual function are called classificatory (118).
1.8.3.2. Derivational units may be added to verbs or nouns to change their meanings by replacing, eliminating, or adding selectional units. For example, the state verb open (The door is open) may be changed into the process verb open (as in The door is opening) by adding the derivational unit inchoative. A noncount noun like beer may be made into a count noun by adding the derivational unit countizer. Derivational units are written at the same level as lexical units and connected to them with plus signs.

1.8.3.3. Selectional units limit the choice of lexical units, but once lexical units have been finally chosen, selectional units are redundant (167). They are included in the meaning of the lexical unit. This is presumably why Chafe later calls them inherent features (1971b: 58). Such inherent features are not usually overtly reflected in the surface structures of languages—there is no inflectional ending, etc., which indicates whether a noun is count or not in English. The meanings of verbs or nouns may also be affected, however, by semantic units which do not limit the choice of lexical unit. For instance, any verb may be specified as past, and this unit is not inherent in any verb. Such units are called inflectional units (168) and are typically indicated in the surface structure. Inflectional units are placed in the hierarchy under the lexical unit. Some inflectional units for verbs are generic, perfective, progressive, past, etc. Typical inflectional units for nouns are definite, generic, plural, quantifiers, etc. Inflectional units are called contextual features in recent work by Chafe (1971b: 61). An inflectional unit of considerable importance in Chafe’s theory is new, which is attached to that part of a semantic structure which represents new information (1970: 210-233).
1.8.3.4. The relations of the nouns to the verb of a semantic structure are similar in Chafe's formulation to Fillmore's case concepts. They include patient (Fillmore's Object), agent (not necessarily animate), experiencer (Fillmore's Dative, or more exactly, his later Experiencer), beneficiary (also subsumed under Fillmore's Dative, although Benefactive is mentioned as a possibility in Fillmore 1968a: 26, fn 34), instrument, complement (Fillmore's Factive), and location. There may be others (Chafe 1970: 163). All of the relations except for instrument are determined by selectional units within the verb. Thus, an experiential verb (feel, see, etc.) requires an experiencer, an action verb requires an agent, etc. (164). Whereas Fillmore's verbs have frame features which determine possible case frames into which they may be inserted, Chafe's verbs have selectional features which determine the relations of nouns which are associated with the verbs. Chafe recognizes that he is listing the same information twice in his semantic structures (as inherent features of verbs and as case features of nouns), but he feels it is necessary in order to ensure proper selection of nouns to accompany verbs. Chafe mentions in the preface to his book that he has replaced his earlier generative rules by well-formedness conditions in recent work. If well-formedness conditions are accepted, questions of "selection" have little relevance, and one would presume Chafe could dispense with double representation of case notions.

1.8.3.5. Chafe's postsemantic processes are similar to transformations. However, they operate on essentially unordered semantic structures to derive linearly ordered surface structures. The first postsemantic rule Chafe discusses is concerned with subject selection (241-244), which basically depends on the distribution of new and old information in the
sentence. A patient noun not converted into a postsemantic subject becomes a postsemantic object (244-245). Certain semantic information is redistributed by agreement rules (245-246). Idioms are literalized (246-250) and linearization occurs. First, verbs and nouns must be linearized with respect to one another. This is called primary linearization. Then assorted inflectional and most, if not all, selectional units are deleted. Some lexical units are partially deleted, leaving pronominal elements, according to rather complicated rules (260-265). Then secondary linearization, the arrangement of the lexical, derivational, and inflectional units within each noun or verb, takes place (255-257). The output of all these rules is a surface structure. The individual elements of the surface structure are no longer fully semantic, but they are still oriented toward semantic structure. The process of symbolization is very similar to the primitive symbolization systems discussed earlier, although it of course utilizes duality.

1.8.4.1. Chafe's general theoretical framework is attractive as a model for a semantic theory. It certainly seems more intuitively "natural", in a certain sense, than most other theories. It is especially better suited as a theory of language use (or performance) than transformational grammar. But at least one reviewer (Langacker 1972) has warned that naturalness can be deceptive (especially since the term cannot be satisfactorily defined); he also takes Chafe to task for not establishing his theory as a viable alternative to transformational theory. Such a criticism is certainly unfair, considering the vast amount of work done in transformational theory against Chafe's one book and several papers. Langacker also decries Chafe's arguments for the necessity of a new theory in the midst of all the theories presently competing with one another (146),
but he misses the point here. All of the other theories he mentions can be classified into two areas: neo-structuralist and transformationalist, and the total confusion in these camps may well be due to the possibility that some of their basic assumptions are false. What is needed in modern linguistics is not an attempt to bring order to the present chaos (which may be a futile effort), but rather some fresh basic ideas. Chafe’s theory is a much-needed step in that direction.

1.8.4.2. Chafe’s specific proposals, however, offer little that is really new. His selectional units look very much like semantic features in the traditional sense, and his lexical units even bear a strong resemblance to distinguishers (Langacker 1972: 146). The similarity of his case concepts to Fillmore’s has already been mentioned. But Chafe’s discussion of derivation is quite original, and he deals with many processes only slightly discussed, or even ignored, in transformational theory. He points out, for instance, that the process verb open is derived from the state verb open, but that the state verb be broken is derived from the process verb break. Thus, John opened the door and John broke the window do not have parallel semantic structures, as they are purported to have in generative semantics. Chafe’s solution for all problems of derivation and inflection, however, is to add features, and, as is shown in the next chapter, this is no solution at all.

1.8.5.1. Chafe calls his own theory "semanticist" (1970: 64) and transformational-generative theory "syntacticist" (60). He accuses the latter of having inherited the phonetic bias of structuralism, which prevents it from considering meaning on an equal basis with sound. To a certain degree, this neglect of meaning has been rectified in recent transformational work, especially in generative semantics and case grammar,
but these theories still depend to a large degree on arguments from
surface structures and not from meanings. No one espouses introspection
with as much vigor as Chafe. He has recently (1973) even proposed
introspection as a valid tool for psychological research.

1.8.5.2. Now for a final word on terminology. It has been pointed out
earlier in this dissertation that the name "generative semantics" is
highly inappropriate for the theory to which it is applied. However,
it applies very well to Chafe's theory, and he has claimed on occasion
(1968a: 117, and 1971a: 1), but his theory is totally independent of,
and in general contrary to, the theory which is usually called "generative
semantics".
CHAPTER 2: THE DEVELOPMENT OF CERTAIN THEORETICAL
CONCEPTS IN SEMANTIC THEORY

2.1. Introductory Comments

2.1.1. Each of the major directions in semantic theory discussed in
Chapter 1 is based on a set of assumptions regarding the relevance and
importance of certain concepts in the formulation of a theory of meaning.
Some of these concepts are common to a number of theoretical proposals
in semantics, and they have been subjected to a considerable amount of
critical analysis in recent years, both by the original proponents of
various theories and by other researchers. Five such concepts which
have been of particular importance in the development of semantic theory
in the last ten years are critically examined in this chapter. The first
three concepts to be discussed are basic to interpretative theories of
semantics. The last two concepts are basic to generative semantics and
case grammar, respectively.

2.1.2.1. The most important concept in semantic theory since 1963 has
been that of the semantic feature, or marker. It is a very attractive
idea to treat the three areas of phonology, syntax, and semantics in a
similar fashion, by subjecting them all to an analysis in terms of dis-
tinctive features. The application of such an analysis in the represen-
tation of the meanings of individual lexical items, however, is compli-
cated by the complex interrelationships which can hold between semantic
features in a dictionary entry and by the practical difficulty of finding
and justifying an optimal set of features, which should be considered as semantic universals.

2.1.2.2. The concept of selection restriction has undergone considerable development since Katz and Fodor (1963) introduced it. Although selection restrictions play a vital role in the Katz-Fodor theory, they have become less important recently and have even lost their independent status in some theories of semantics. The decline in the importance of selection restrictions has been caused by the recognition of the need to account for interpretation of anomalous sentences. Selection restrictions are best understood in modern semantic theories as presuppositions which are imposed by lexical items on the semantic interpretation of sentences containing these lexical items. Selection restrictions play a necessary role in interpretative theories of semantics, but they are irrelevant as such in generative theories.

2.1.2.3. The combinatorial hypothesis is the belief that the meaning of a sentence is composed of the meanings of its constituents. It presumes that lexical meaning and sentential meaning are similar concepts. The analysis of idioms provides special problems for theories which accept the combinatorial hypothesis.

2.1.2.4. Atomic predicates in generative semantics are minimal meaning units, similar in a certain sense to morphemes in structuralist theories. They fall into two groups, one composed of predicates which may have sentences as arguments, the other composed of predicates which have as arguments only variables or proper names. Predicates belonging to the first group are called sentential operators. They are presumed to be finite in number and to represent semantic universals. Much research in generative semantics has been concerned with the postulation and justification
of atomic predicates (mostly sentential operators).

2.1.2.5. *Deep cases* represent semantic functions of noun phrases in sentences. Research in case grammar has been mainly concerned with proposals for new cases and for reorganization of sets of cases which have already been proposed. The theoretical justification of various constraints on the cooccurrence of cases has also been investigated, as well as possibilities for subjecting deep cases to a distinctive feature analysis.

2.1.3. Every theory is based on a set of assumptions. These assumptions, however, are rarely tested or justified when the theory is first proposed. Since the usefulness of a new theory depends in large part on the validity of its basic assumptions, these should subjected to critical examination, especially as concerns their explanatory capabilities. The five basic concepts discussed above are subjected to such a critical examination in this chapter.
2.2. Semantic Features and Dictionary Entries

2.2.1. The successful application of the technique of feature analysis in phonology (cf. Jakobson, Fant, and Halle 1952) and in the classification of kinship terms (Goodenough 1956) undoubtedly encouraged Katz and Fodor (1963) to apply such an analysis in the formulation of their semantic theory. Katz and Fodor use the term semantic marker (496) instead of feature, and Katz later argues that the two terms denote distinct concepts, since markers may have complex internal structure and may be included in other markers, whereas features (as in phonology) are "single, unanalyzed symbols" (1967: 154, 167-168). Katz asserts that this distinction was recognized by Fodor and himself when they wrote their paper, but that they did not know at the time how to deal with complex markers. That may well have been the case, but Katz and Fodor (1963) never mention the possibility of complex markers, and all of the semantic markers which they do discuss, such as (Human), (Male), (Animal), etc. are single symbols and indistinguishable from features in a formal sense.

2.2.2.1. Katz and Fodor divide the semantic information in a dictionary entry into two parts: that part which is "systematic for the language" (498) is represented by markers; that part which is idiosyncratic is represented by distinguishers.¹ Katz and Fodor propose two criteria for determining where the boundary between systematic and non-systematic information should be placed for each lexical reading (499-500: if fluent speakers use certain semantic information in disambiguating sentences, then this information should be represented by a marker; secondly, the number of markers should be limited by considerations of "systematic economy". Thus, the difference between markers and distinguishers in Katz and Fodor (1963) would appear to be a purely empirical one, and
it seems that the boundary between systematic and idiosyncratic information would have to be fixed individually for each lexical reading of every dictionary entry. This makes the establishment of an optimal set of semantic markers for representing "exactly the systematic features of the semantic structure of a language" (500) a practical impossibility.

2.2.2.2. The empirical nature of the marker-distinguisher dichotomy has led many linguists to believe that it was merely a temporary device introduced by Katz and Fodor so that they would not have to include unwieldy sequences of markers in their dictionary entries. Bolinger (1965) wonders whether a consistent application of Katz and Fodor's first criterion for determining markers would not result in such an increase in the amount of semantic information represented by markers that distinguishers would become unnecessary, or, as he puts it, "whether the distinguisher will not keep receding toward the horizon until it vanishes altogether" (558). He discusses thirteen sentences involving the lexical item bachelor (Katz and Fodor's famous example) which can be disambiguated only if one drastically increases Katz and Fodor's inventory of semantic markers at the expense of their distinguishers until the latter become totally devoid of semantic information (558-561). Bolinger feels that the marker-distinguisher dichotomy might be couched in terms of the distinction between "knowledge of one's language" and "knowledge of the world", respectively (561), but he expresses doubts about the latter dualism (568-569). He concludes (562) that the only possible function for distinguishers would be to list proper names (as in sun ➔ Old Sol, Betelgeuse, Sirius, Alpha Centauri, ...).
However, it is widely accepted among philosophers and linguists that proper names are purely referential and carry no meaning at all (cf. Searle 1963). Thus, this listing function of distinguishers is unnecessary in a dictionary entry, which indicates the possible meanings of a lexical item. It should be noted, of course, that Bolinger's contention that distinguishers can be replaced by strings of markers (558-566) is, as a practical matter, unprovable, since this would require the empirical investigation of all readings of all lexical items. The burden of proof, however, lies on those who argue for the somewhat counter-intuitive marker-distinguisher dichotomy rather than on those who deny it.

2.2.2.3. Weinreich (1966) dismissed Katz and Fodor's distinction of syntactic and semantic markers by showing that both types had exactly the same function, namely, subcategorization (23-27). He then attacked the marker-distinguisher dichotomy on theoretical grounds (27-29). He argued that it had no relevance to the conventional distinction between connotation and denotation, since denotation was not a concern of the theory at all (see above). Furthermore, "there is no motivated way for the describer of a language to decide whether a certain sequence of markers should be followed by a distinguisher or not" (28), or even whether multiple distinguishers might not be necessary at the end of certain sequences of markers. He particularly attacked the inconsistency of Katz's own arguments (1964a) for explaining the contradictoriness of Red is green on the basis of distinguishers, which are not supposed to enter into such theoretical relations at all.

2.2.2.4. Katz replied to such criticisms by omitting any discussion of distinguishers in The Philosophy of Language (1966), and by reintroducing the concept in a completely new form in "Recent Issues in Semantic Theory"
(1967). Whereas distinguishers previously were used to represent supposed non-systematic semantic information and were excluded from theoretical considerations, they are now said to represent "perceptual distinctions" as opposed to the "conceptual" distinctions represented by markers (159, 161) and they now definitely do function in marking semantic relations such as synonymy, ambiguity, etc. (162). Katz also expresses the belief that these new distinguishers are universals:

"Presumably, a psychological theory of the mechanisms of (visual, auditory, tactile, etc.) perception will define the perceptual discretions which distinguishers mark at the linguistic level" (159). He contradicts himself, however, when he reverts to the old method of determining distinguishers on the basis of empirical observations regarding the behavior of selection restrictions, which are not supposed to involve distinguishers (161-162). Bierwisch (1969a) points out that it is conceivable that two languages might differ in their behavior regarding a certain piece of a semantic information, one of them including it in a selection restriction, the other one not. The semantic component of a grammar of the first language would have to represent this information by a marker, whereas the semantic component of a grammar of the second language would have to represent it by a distinguisher. This language-dependence of distinguishers is contrary to their purported universality as representations of perceptual distinctions. It should be mentioned here that no discussion of distinguishers in terms of perception is present in Katz and Fodor (1963), Katz and Postal (1964), or in any of the other early works on the subject. Katz (1967: 159-162) certainly implies that he was thinking of distinguishers in such terms all along, since he never mentions that this conception is in any way new. This
may be true, but Katz (1967) is the first place it appears in print. Katz' curious attitude toward what Weinreich (1967: 287) termed "the chronology of ideas" is aptly reflected in Katz (1972), where he accuses his critics of apparently being unable to read his mind: "Here, however, we shall consider some complaints on the part of linguists who either were misled by inadequacies in the original treatment of the concept of a distinguisher or failed to look beyond them to see what distinction we were trying to draw" (83).

2.2.2.5.1. Bierwisch (1969a) argues that Katz' new description of distinguishers in terms of perception "cannot be taken too seriously, even by Katz," because "nobody can draw a reasonable line between perceptual and conceptual distinctions" (177). Bierwisch refers to his important work on German adjectives (1967), where spatial markers such as 'Vertical' are introduced (13). Such elements are certainly perceptual, but they definitely play a role in conceptual structure and even figure in selection restrictions (22). For instance, one can say Der Wagen ist lang but not *Der Turm ist lang. (Unless, of course, the tower has fallen over.) Hence, Katz' perceptual definition of distinguishers is as difficult to establish as his earlier one involving non-participation in selection restrictions. This earlier definition leads to an ad hoc determination of distinguishers for each individual language (indeed, each individual idiolect), and even each individual stage in the continuing development of a person's idiolect (Bierwisch 1969a: 178-179), since the learning of new lexical items and their dictionary entries implies certainly that new selection restrictions may be learned concurrently. These new selection restrictions may involve semantic information previously represented in the person's idiolect by a distinguisher, and
this information must now be shifted to a marker. Bierwisch’s example of just such a learning process involves color terms, Katz’s favorite examples of distinguishers: "A German child may e.g. learn at a certain time that he cannot correctly say ‘Peters Haar ist gelb’ instead of ‘Peters Haar ist blond’. If the reading of ‘Haar’ did not occur before that time in any selection of the child’s dictionary, then obviously some distinguishers have been turned into markers" (179). Thus, distinguishers are not only not universals, they are not even constant in a single idiolect. Such shifting from one basic linguistic category to another is, in general, uncharacteristic of linguistic development.

2.2.5.2. Bierwisch also discusses an interesting change in the relation between markers and distinguishers from Katz and Fodor (1963) to Katz (1967). In Katz and Fodor (1963), markers were simple features (see the discussion at the beginning of this section), and distinguishers were complex semantic units, as Bolinger (1965) showed by decomposing them. In Katz (1967), however, markers have complex internal structure, and distinguishers, referring to perceptual qualities, are "primitive, non-complex terms" (Bierwisch 1969a: 180, fn 25). There is certainly nothing wrong with such a shift in theoretical viewpoint; Katz should only admit it. But when one considers all the other theoretical and practical difficulties associated with the concept of distinguisher, it is easy to agree with Bierwisch when he says, "I think it is time to give up the distinction between markers and distinguishers which by now has become senseless" (180).

2.2.6. One final comment on the topic must be made, however. Katz (1972) expresses his indebtedness to Bierwisch (xii), but he seems to have learned little from the latter’s criticisms. He still views distin-
guishers in perceptual terms, although he now uses the word sensory (80). The distinction between 'perceptual' and 'sensory' is far from clear in this case, and Bierwisch's criticisms are still valid. Katz does modify his conception of distinguishers somewhat, because he now allows the same distinguisher to be present in different lexical items, such as scarlet and red. Without admitting it, he has himself thereby removed the only remaining possible distinction between markers and distinguishers, the unique distribution of the latter.

2.2.3.1. Katz and Fodor (1963) fail to recognize any interrelationships or interdependence among semantic features, and Katz and Postal (1964) recognize only the trivial relation of semantic inclusion (16-18) or hyponymy (cf. Lyons 1963: 68-71). Weinreich (1963, 1966) pointed out that more complicated semantic relations may hold between features in a dictionary entry. For instance, the word daughter contains the independent features 'female' and 'offspring', but the word chair contains the features 'furniture' and 'sitting' related in a transitive fashion (47). Unrelated features may be placed into unordered sets called by Weinreich clusters, but related features must be placed in ordered sets called configurations (46).² One of Weinreich's most important observations was that "every relation that may hold between components of a sentence also occurs among the components of a meaning of a dictionary entry. This is as much as to say that the semantic part of a dictionary entry is a sentence--more specifically, a deep-structure sentence" (84). Let us illustrate this with the above cited examples. Since both 'offspring' and 'female' can be independently predicated of daughter ('a daughter is an offspring' and 'a daughter is female'), these are to be regarded as independent features and they together form
a cluster. However, while 'furniture' may be predicated of chair ('a chair is (a piece of) furniture'), 'sitting' may not. One might argue that it is possible to say 'a chair is to be sat on', so that the feature 'sitting' could be replaced by the feature 'to be sat on' (cf. Katz 1967: 183). This is a mistake, however, due to the surface structure similarity of 'a chair is furniture' and 'a chair is to be sat on'. The former sentence represents a true deep structure predication, whereas the latter sentence corresponds to the deep structure 'someone sits on a chair' in which chair is the direct object of 'sit' and thus is related transitively to the verb. Weinreich represented this difference by putting the features 'furniture' and 'sitting' into a configuration.  

2.2.3.2. Katz also recognizes that unordered sets of simple features are inadequate for dictionary entries, but instead of trying to discover relations between features, he makes his features internally complex, calling them (as he had earlier) "markers". His evaluation markers (1964b), his evaluation markers with slots (1966, 1967) and his "categorized variables" (1972) were discussed in Chapter 1. At this point some critical comments are in order. Let us consider the dictionary entry for the verb chase in Katz (1967: 169): 'chase': (((Activity of X) (Nature: Physical) ((Motion) (Rate: Fast)) (Character: Following Y)) (Intention: (Trying to catch ((Y) (Motion)))), <SR>. (This entry differs slightly from the dictionary entry for chase in Chapter 1 which was quoted from Katz (1966: 167).) The X's and Y's denote slots (in Katz 1972 called "categorized variables") for the insertion of the lexical readings of the subject and object, respectively, when the projection rules are applied. The introduction of slots is necessary in
necessary in order to overcome a weakness of the earlier theory (Katz and Fodor 1963), which was unable to distinguish between subject and object functions in the readings of whole sentences, as Weinreich pointed out (1966: 33-34). But one should investigate whether Katz' use of complex markers with slots really solves anything. It is apparent that he has attempted to "explain" the meaning of the direct object into slots in complex markers such as (Following Y) or (Trying to catch Y) which themselves contain verb-direct object constructions. Similarly, the readings for the subject are inserted into a slot in the marker (Activity of X), which is simply a nominalization of (X acts) and therefore contains a subject-verb construction itself. Katz has merely transferred the subject and object relations into the theoretical metalanguage, without bothering to analyze them further, and the syntax of the metalanguage is never discussed. It is obvious that such a circular treatment (direct objects are used to explain direct objects, and subjects to explain subjects) clarifies nothing about the semantic relations between constituents of sentences. This method of treatment is further confounded in Katz (1972), where each and every Chomskyan grammatical relation is taken over wholesale into some complex marker with categorized variable, and the single projection rule that remains has the trivial function of replacing categorized variables with lexical readings (104-116). As a result, a Katzian reading for an entire sentence is nothing more than a terribly complex paraphrase which contains only surface syntactic relations and therefore indicates absolutely nothing about the logical or semantic structure of the sentence it is supposed to describe.

2.2.3.3. Bierwisch (1969a, 1971) criticizes the use of surface structure
constructions in Katz' complex markers, arguing strongly for a notation that clearly represents the logical structure of sentences: "The only reasonable way to understand semantic markers is to take them as representing properties (or relations, see below), i.e., as predicates in the sense of modern logic" (1969a: 157). Bierwisch also shows that Katz' complex componential markers, such as ((Activity of X) (Nature: Physical)) (Motion) (Rate: (Fast)), are really complex embeddings of predicates in other predicates, viz., chase denotes an Activity which is Physical and a Motion which is Fast, where 'Physical' and 'Fast' are higher level predications of the predicates 'Activity' and 'Motion', respectively. Thus, the 'evaluation' terms Nature, Rate, Character, Intention actually indicate higher predications and hence "are simply a redundant notation, for what could 'Fast' mean as a predication of 'Motion' if not a qualification with respect to rate, or 'Physical' as a predication of 'Activity' if not a qualification with respect to nature?" (155-156). Bierwisch further accuses Katz of using a notation, as in ((Activity of X) (Character: (Following Y))), which obscures the relational nature of many-place predicates like 'Following' (157-158). This is especially the case in the complex marker (Intention of X: (Trying to catch ((Y) (Motion))))) where Intention is certainly included in Trying to catch, which is itself a complex predicate containing the two-place relation 'Catch' (158-159). Bierwisch thus has demonstrated that Katz' complex marker notation can be replaced by a logical notation in which markers are conceived of as predicates which may be embedded in other predicates, and slots are replaced by variables. For example, Katz' dictionary entry for chase can be expressed by the logical formula
\[ (\text{Activity} \land [\text{Fast} \text{ Motion}] \land [\text{Following}]) \land (\text{Trying} \land ([\text{Catch}] \land [\text{Motion}]) \land (160) \]

where \( \land \) is the symbol for logical conjunction and the number of brackets surrounding a semantic element indicates its level of predication. The predicate Physical can be omitted from the above representation of chase since it would be redundant: an Activity which is a Motion is necessarily Physical (155, fn. 3). It should be noted that none of the predicates in the above formula has a complex internal structure; this is a consequence of Bierwisch's application of a logical notation involving different levels of predication. Therefore, complex markers are no longer necessary and "can now be replaced by well-defined combinations of basic features. These combinations, however, display a highly complex syntax of semantic elements" (182). In Bierwisch (1971) suggestions are made for classifying semantic features (conceived of as predicates) according to the number and types of arguments which they require. For instance, the predicate 'Trying' in the above formula requires two arguments, one a variable, and the other a predication.

2.2.3.4. Bierwisch's treatment of dictionary entries as logical configurations is similar to Weinreich's treatment of them as definitional sentences (see above). Both men realized that the same principles underlie the logically-semantic structures of both complex and simple linguistic elements, and that simple features are perfectly adequate for semantic analysis as long as one is careful to specify their complicated interrelationships. Bierwisch's treatment is preferable to Weinreich's in that it indicates logical structure in a clearer fashion. It is apparent that Katz made the wrong choice back in 1964. Instead of trying to explain complicated meanings by creating ad hoc complex markers and ignoring
important semantic relations, he should have contented himself with
simple features and investigated their interrelationships.

2.2.4.1. Up to this point some very basic questions concerning the
applicability of the technique of feature analysis to semantics have
been disregarded. For instance, features are elements of the theo-
retical metalanguage (see Chapter 3), but we use object language words
to describe them, just as we use ordinary letters of the alphabet to
denote phonemes (metalinguistic contracts) and sound (actual physical
occurrences). How can we be sure that the object language words we use
to denote semantic features really refer to actual elements of meaning?
The justification of phonological features is trivial: one need only
assign a name (such as 'Grave') to a certain aspect of the distribution
of dark bands in particular sound spectra. These names need have nothing
to do with actual configurations of the speech organs (cf. Jakobson, Fant,
and Halle 1952), although names may be chosen which are more or less sug-
gestive of such configurations (cf. Chomsky and Halle 1968). As far as
meanings are concerned, such objectivity is impossible, unless one is
convinced by Chafe's arguments in defense of introspection (1970: 76-77,
122). Even he would surely admit that the science of introspection is
in its infancy and cannot yet be depended on for totally reliable con-
clusions. Purported semantic features must be independently justifiable:
if we use the word 'human' to refer to some semantic feature whose func-
tion in a semantic theory is to indicate that words containing this fea-
ture in their dictionary entries denote human beings, without independently
justifying the existence of such a feature, we are guilty of circularity.
We have allowed the existence of the word 'human' to convince us that it
refers to an actual semantic distinction. This is the phenomenon of

2.2.4.2. Katz and Fodor (1963) propose such semantic features as Animate, Human, Male, etc., calling them "theoretical constructs" (498), without bothering to explain where they come from or what relation they have to the lexical items describing them. In later writings, Katz specifically identifies such semantic features with conceptual elements (1966: 155; 1967: 161; 1972: 88), without ever justifying their existence. For this he has been harshly criticized by Bar-Hillel (1969), who says that Katz' conceptual elements "would be reasonable enough for a philosophy of language of antiquity or the Middle Ages" (5). Compare this quote with Leisi's (1971) comments on hypostatization: "Die Mythologie, der scholastische Realismus und die platonische Ideenlehre sind die größten Beispiele für die Neigung der Sprachgemeinschaften, jede Erscheinung irgendwelcher Art, sofern sie durch ein Wort bezeichnet werden kann, zu vergegenständlichen ... und mit einer selbstständigen, von andern Erscheinungen abgelösten Existenz zu begaben, sie also zur akzidenzlosen Substanz zu heben" (26).

2.2.4.3. It might be possible to justify semantic features in an objective manner by studying semantic fields (Baumgärtnert 1967) and by analyzing definitional sentences (Weinreich 1966: 84-89). Semantic fields indicate by their branching structure possible semantic features (e.g., at the nodes), and definitional sentences, coupled with semantic tests (see Chapter 3), yield candidates for features. Weinreich used the oddity of the sentence This is a chair, but one can sit on it (1966: 88) to indicate that chair must contain in its meaning a reference to the fact that it is something which one can sit on. In any event, the feature candidates which one proposes must be rigorously tested, to see
if they regularly reoccur and whether they cannot be broken down into other features. The difficulties of such an analysis may be illustrated by the term 'Animate', which is often used to denote a semantic feature. If such a feature exists, its behavior is problematical and bears little resemblance to the object word 'animate' which, as T. R. Anderson (1968: 409) points out, is a somewhat technical term which almost certainly does not occur in any internalized definitional sentence for man, if such a thing exists. If one equates 'animate' with 'living', as Anderson does, this causes the sentence The man is dead to be contradictory. Such a feature Animate would have to be applied to things which are capable of life, or which have lived, and the word dead would have to contain a selection restriction involving this feature, so that one could explain the anomaly of *The stone is dead. Describing the purported feature Animate in these terms presupposes that we know what 'capable of having life' means. This is certainly a perceptual distinction which is difficult to establish and almost seems extra-linguistic. In any event, paraphrasing Animate as 'capable of having life' indicates that it is not a basic feature, but rather a complex of features.

2.2.4.4. The paraphrase test is indeed a good method for discovering features, but then "practically any linguistic unit used as a modifier can be turned into a metalinguistic construct and assigned the status of a semantic feature" (Lipka 1972: 42-43). Thus the number of potential semantic features is very large, and one wonders whether it is desirable to have a theory which requires unwieldy dictionary entries. Of course, only so many features need be listed for a particular word as are necessary to fully distinguish it from all other words in meaning. But such a list can nevertheless be quite long. How many basic features does cat
require, for instance? There are also problems concerning meaning and reference which few proponents of semantic features have realized.

2.2.4.5. It should be noted that such a multiplicity of features destroys the advantages which a feature analysis could bring. The complicated interdependence of semantic features indicated above is also an undesirable property for a feature analysis to have. Compare the actual situation in natural language with the following idealized one: assume we had fifteen totally independent features. All fifteen features would be listed for each dictionary entry, and they would be specified as present (+), absent (-), or irrelevant (0). All of the possible combinations of these fifteen features, each taken three ways, is given by the number \(3^{15}\). We would thus be able to indicate 14, 348,907 different meanings. This, then, would be an ideal way to describe the meanings of individual words. The reason why we cannot use such a simple set of features is that features in the meanings of words are complexly interdependent.

2.2.5.1. Many of the difficulties associated with feature analysis in semantics lie with its application to dictionary entries. The Katz-Fodor concept of a dictionary in a semantic theory has been challenged by Bar-Hillel (1967a, 1969), who argues that the notion of dictionary entry should be replaced by that of 'meaning rule'. For example, a Katz-Fodor dictionary is unable to account for the paraphrase relationship of John precedes Mary and Mary follows John (1967a: 409), or that from \(X\) is older than \(Y\) and \(Y\) is older than \(Z\), one is able to conclude that \(X\) is older than \(Z\) (1969: 6-7). Bar-Hillel proposes that a semantic theory should contain meaning rules to explain the above relationships:
For all \( X \) and \( Y \), \( X \) precedes \( Y \) \( \iff \) \( Y \) follows \( X \)

For all \( X \), \( Y \), and \( Z \), \( X \) sells \( Y \) to \( Z \) \( \iff \) \( Z \) buys \( Y \) from \( X \) (1967: 410), and additional meaning rules of the type

father of \( \iff \) older than

grandfather of = father of (father of or mother of) (412),

which indicate relations between relations. The advantage of meaning rules over dictionary entries are considerable. They contain logical symbols which relate object language words, and there is no need for such metalinguistic constructs as features, which delude us into a "hyper-Leibnizian conception of a word of uniquely determined language-independent constructs in terms of which the senses of every expression in every natural language are to be determined" (413). Bar-Hillel points out that in addition to meaning rules which are language specific because they indicate relations between object language words, there must be meaning rules which universal; one such rule says that all quasi-orders expressed in any given language are symmetric and transitive (1969: 7).

The simplicity of Bar-Hillel's meaning rules should be compared to the complexity of Katz' attempts to deal with converses in terms of dictionary entries (1972: 332-346).

2.2.5.2. The usefulness in semantic theory of the notion of a dictionary which pairs lexical items with sets of meanings is questionable. Bar-Hillel has showed that it is impossible to express basic logical relations in terms of dictionary entries without introducing complex and ad hoc notations (1967a: 410), and Katz' attempts in this direction (1972: chap. 7) merely confirm Bar-Hillel's thesis. Furthermore, the very important notion of semantic field is rendered almost totally useless in a treatment based on dictionary entries (Katz 1972: 346-355), because
such a treatment obscures the semantic relations between lexical items in such a field and give no indication of the complex structure of the field itself. Most damagingly, perhaps, the compartmentalization of the senses of a lexical item into separate and independent readings effectively hides the complicated interrelationships which may hold among these senses. Putting aside Bar-Hillel’s criticisms of Katz’ markers for the moment, let us consider the famous word bachelor. This word has four possible senses:

1) A young knight serving under the standard of another knight
2) One who possesses the first or lowest academic degree
3) A man who has never married
4) A young fur seal when without a mate during the breeding time (Katz and Fodor 1963: 495).

Katz and Fodor structured these senses in the following fashion (496):

```
        bachelor
          | noun
         /   \
(Human) /     (Animal)
         /       /
[who has the first or lowest academic degree] [male]
         /               /
[who has never married] [young knight serving under the standard of another knight]
```

Katz later replaces representation in tree form by sets of semantic markers (1966: 155), but the division into four separate readings remains, whether indicated by separate paths in a tree or by separate sets of markers.
2.2.5.3. That such a representation of the senses of bachelor is, to say the least, counterintuitive, is obvious. The word has at most two relatively independent meanings, one subsuming senses 1) and 2), the other subsuming sense 3) and 4). Sense 4) is clearly a metaphorical use of sense 3): bachelor fur seals are mateless males of their species, just as human bachelors are. The term is only applied to seals during the mating season because it would be irrelevant at other times; humans, however, are always in the mating season. Sense 2) results from a metaphorical application of sense 1) and is a historical development of it: a term denoting a certain level in chivalric hierarchy was applied to a similar level in academic hierarchy. One might argue that such diachronic facts are irrelevant; but the interrelationships of these senses are synchronically perceived, and a representation of them as separate readings in a dictionary entry does not show this. It might be mentioned further that only senses 2) and 3) are known to most speakers of English, and sense 2) furthermore only to those who live in English-speaking countries where bachelor's degrees are awarded (cf. Bar-Hillel 1969: 5).

2.2.5.4. Other difficulties associated with the meaning of the word bachelor are so manifold that listing them in a dictionary entry is impractical or even impossible. For instance, one would have to explain that 'bachelorhood' is a state like 'tallness': one cannot say "John is being a bachelor or "John is being tall; but one can cease being a bachelor by personal volition, whereas it is difficult to see how one could cause oneself to be no longer tall. Also, bachelor is a "positive" word as opposed to spinster, which has negative connotations: the happy bachelor is a normal expression in our society, but the happy spinster at least sounds rather unusual, whereas presumably the only difference
in their dictionary entries concern the semantic markers for sex. This explains the modern expression bachelor girl or even bachelorette. Since it is no longer considered somehow immoral for a woman to enjoy being unmarried, a positive term had to be found to describe such a state, and the already existing positive word bachelor was borrowed and adapted for this purpose.

2.2.5.5. Excluding the notion of dictionary from a semantic theory does not mean that one must dispense with the concept of lexicon. A lexicon is a necessary part of any linguistic theory, since there must be some way of specifying the phonological, syntactic, and semantic behavior of individual lexical items (cf. Fillmore 1969a). But a specification of the meanings of a lexical item in the form of a dictionary entry is undesirable. Weinreich demonstrated that dictionary entries could be replaced by definitional sentences (1966: 84); this is a very good idea, if we supplement Weinreich's definitional sentences with Bar-Hillel's meaning rules. But Weinreich showed that definitional sentences are not uniquely characterized by their form and that the distinction between definitional and non-definitional sentences is not the same as the distinction between analytic and synthetic sentences (85-87). Weinreich attempted to define a definitional sentence as "an analytic sentence containing an element $x_1$ (the definiendum) such that the sentence would be false if $x_1$ were replaced by any other element of the language" (85), but this definition is circular, because it assumes that the element $x_1$ is being defined, and that the sentence containing it is therefore a definition (cf. Lipka 1972: 43).

2.2.5.6. It is perhaps neither possible nor desirable to distinguish definitional sentences from non-definitional sentences which have the
same structure. Both types of sentences reflect certain beliefs (presuppositions) concerning the use of the words they contain. If a speaker of a language is able to use a word of that language to convey a certain meaning, he is able to do so not because he has some internal representation of the meaning of that word (in the form of a dictionary entry), but because he has a complex set of beliefs governing the way in which he uses that word. These beliefs are both "linguistic" and "extralinguistic". The degree to which this word is understood correctly by a person who hears it is directly proportional to the degree of overlap between the speaker's and the hearer's sets of beliefs concerning the word (cf. Green 1973). The expression set of beliefs (presuppositions) concerning the use of a word is used here exactly in the sense of Leisi's (1971) notion of Gebrauchsbedingungen. The similarity between this notion and modern uses of the presupposition in linguistics has been pointed out by Lipka (forthcoming).

2.2.6. The technique of feature analysis is very useful in linguistics. It has revolutionized phonology and can be applied very effectively in syntax and in the description of semantic relations. But it is misguided to try to apply it in the description of the meanings of individual words, because it causes too many unnecessary problems. It would be convenient to have a symmetrical theory of language which describes meanings and sounds in a similar fashion. But, thanks to duality, semantic structure and phonetic structure need have no formal similarity whatever. Indeed, they may be organized along quite different lines.
2.3. Selection(al) Restrictions

2.3.1. The concept of selection restriction is introduced in Katz and Fodor (1963: 500-501) in order to effectively limit the combinatorial power of projection rules without altering their form. A selection restriction is represented by a "Boolean function of syntactic or semantic markers" (ibid.) and is affixed to the terminal element of a path in a dictionary entry. A projection rule is allowed to combine pairs of readings if and only if the markers contained in the selection restriction of each reading of the pair occur in the path of the other reading in the pair (507-513). Thus the combination of semantically incompatible readings is prevented.

2.3.2. Chomsky (1965) introduces the notion of syntactic selectional rule (113-120) to prevent the insertion of lexical items into phrase-markers containing lexical items which are incompatible with the items to be inserted. Nouns are said to select the verbs with which they appeared in construction (114-115). Syntactic selectional rules and semantic selection restrictions thus have different purposes: the former prevent the generation of sentences containing incompatible lexical items, whereas the latter prevent amalgamation of incompatible lexical readings in the process of semantic interpretation of strings which have already been generated by the syntactic component of a grammar. Whether a certain type of incompatibility is regarded as syntactic or semantic is determined by the needs of the theory (153-154), but Chomsky finds it necessary to use certain previously semantic markers (such as Animate or Human) as syntactic markers in the statement of syntactic selectional rules, to explain, for instance, the proper choice of relative pronouns. But these features can also still be used as semantic markers at the same
time. The boundary between syntactic and semantic selection corresponds to the distinction between syntactic and semantic markers.

2.3.3.1. Weinreich (1966: 23-27) regarded such a distinction as unjustified and untenable. He proposed that all features in a dictionary entry be regarded as fully semantic, including even the names of major morpheme classes, such as 'Noun', 'Adjective', etc. (66). The only exceptions were the names of minor morpheme classes, such as 'Preposition', which he called syntactic markers, considering them devoid of semantic significance. Weinreich's proposals for lexical insertion are considerably more liberal than Chomsky's, allowing for the insertion of minor class morphemes into major class slots, etc. (68). (See Section 1.3.3.2.) Thus Weinreich's grammar generates sentences which are prohibited by Chomskyan selectional rules and which receive no interpretation by a Katzian semantic component. Nevertheless, such sentences are possible and do receive interpretations by fluent speakers. Weinreich suggested that this interpretation is achieved through the transferral of semantic features from morpheme to morpheme according to certain rules (29-30, 100-101). He proposed replacing the notion of selection restriction by that of transfer feature (61-65). Transfer features explain, for instance, why the phrase during the wall is understood as meaning during the period in which the wall stood: the feature [+ Time] is transferred from during to wall. A very good example of the usefulness of transfer features is provided by Hundsnurscher (1971: 80): Der ganze Bus trank das schiefliche Zeug. An Aspects grammar would not generate such a sentence, and a Katzian semantic component could not interpret it, because trinken would have a double selection restriction, that its subject have the feature [+ Human] and that its object have the feature
[+ Liquid]. But **Bus** has the feature [- Human] and **Zeug** has neither the feature [+ Liquid] nor the feature [- Liquid]. Weinreich's theory would allow for the generation of such a sentence and would be able to explain its interpretation. If the selection restrictions of *trinken* are reinterpreted as transfer features, then the subject NP **der ganze Bus** acquires the feature [+ Human] (which overrides the inherent feature [- Human]; cf. Weinreich 1966: 106), the object NP **das schreckliche Zeug** acquires the feature [+ Liquid]. The sentence thus attains its normal interpretation: Everyone on the bus drank the horrible liquid substance.

2.3.3.2. Katz and Postal (1964: 83) propose something like a transfer feature, and this is probably where Weinreich got his basic idea (cf. Weinreich 1966: 30). But Katz and Postal's proposal only explains the interpretation of pronominal forms. They introduce a feature Selector to be included in the readings of all pro-forms. In the application of projection rules, Selector is replaced by the markers contained in the selection restrictions of nouns or verbs with which the pro-form containing it is constructed. Their proposal would explain the interpretation of **das schreckliche Zeug** as being a liquid, but it would be unable to explain **der ganze Bus** as referring to the people on the bus. Weinreich's proposal goes much further than theirs does, and, coupled with his powerful grammatical apparatus, explains the interpretation of sentences which other researchers had previously simply rejected or ignored.

2.3.3.3. Analysis in terms of transfer features may not be universally applicable, however. Let us consider some German examples. German abounds with pairs of words such as *essen/fressen, trinken/saufen, schwanger/trächtig, Mund/Maul, Nase/Schnauze, Fuß/Pfote*, etc., in which the first word is applied to human beings and the second to animals,
although both words in a pair have similar if not identical meanings. English does not normally make such a distinction (words like snout or pad are used only with specialized meanings), and it is usually a difficult one for native English speakers to learn. In a description of these words in an Aspects-type grammar, the first word of each pair would be assigned the selection restriction <+ Human> and the second word the selection restriction <+ Animal>. But the second word in each pair above can be applied to human beings, normally with a rather uncomplimentary meaning: der Mann frißt und säuft (meaning he has bad table manners); Schnauze or Halt's Maul (meaning 'Shut up'); nimm die Pfote weg ('Take your hands off'); even die Dame ist trächtings (presumably a not-so-subtle insult). One could explain such collocations with transfer features: in each case the human referred to acquires the feature [+ Animal]. One would also have to explain the uncomplimentary effect which this feature has, imputing animal-like qualities to the human so described or addressed. However, the first word in each pair above cannot be applied to animals with any special meaning: one cannot say Der Hund ist und trinkt to mean that the dog has human-like qualities and uses silverware and a glass. A native German speaker regards such a sentence as, at worst, a mistake produced by a foreigner, or, at best, a stylistic variant of Der Hund frißt und säuft without any difference in meaning (cf. Hundsnuerscher 1971: 81). This is obviously a case where analysis in terms of transfer features is not applicable. If we go back to selection restrictions, however, we can explain the non-occurrence of a sentence like Der Hund ist schwanger as a violation of a selectional rule. We can even explain a sentence like Der Mann frißt in terms of selection restrictions if we say that fressen
is polysemous; that is, that it denotes two different activities, one attributed to humans (meaning 'eat in a crude manner'), the other to animals (simply meaning 'eat'). This is an attractive solution, since 
*fressen* and *essen* do seem to have different meanings if applied to humans. But it is difficult to see how *trächtig* could mean something different from *schwanger* if applied to a woman. *Die Dame ist trächtig* describes exactly the same state as *Die Dame ist schwanger*, but the former sentence is decidedly uncomplimentary.

2.3.4.1. The grammatical theory presented in *Syntactic Structures* (Chomsky 1957) clearly distinguishes between syntactic and semantic deviation. Strings which violate some syntactic rule (such as *John compelled*) would not be generated by a grammar based on this theory, but strings such as *Colorless green ideas sleep furiously*, which are syntactically well-formed but carry no meaning, would be freely produced. Such strings would, of course, receive null sets of readings in a Katz-Fodor semantic interpretation. However, neither type of string would be generated by grammar based on *Aspects of the Theory of Syntax* (Chomsky 1965). Strings exhibiting the former type of non-well-formedness would be prevented by strict subcategorization rules (the counterpart of the context-sensitive phrase structure rules of *Syntactic Structures*), and strings of the latter type would be prevented by syntactic selectional rules. In this manner it is assured that the semantic component of a grammar would never be presented with a string to which no reading could be assigned. Thus this component can be considerably simplified.

2.3.4.2. The selectional rules discussed in *Aspects* and similar works involve only a small number of very general features, such as 'Human', 'Animate', etc. McCawley (1968a: 264-268) argues that this is "misleading",
since the selectional violations inherent in such strings as *That electron is green, My hair is bleeding, That unicorn’s left horn is black*, etc., would require the postulation of selection restrictions (McCawley’s term) involving vast numbers of features. Furthermore, he asserts that many purported examples of selectional restrictions involving only a few features were incorrectly formulated. McCawley concludes that "selectional restrictions are actually semantic rather than syntactic in nature, that the full range of properties which figure in semantic representations can figure in selectional restrictions and that only semantic properties figure in selectional restrictions" (265). He argues further that "the selectional restrictions imposed by a lexical item can be predicted from its meaning" (266), and he discusses supposed counterexamples to this claim. In McCawley (1970a), for instance, he asserts that *kick* and *slap* denote not the same activity with different instruments (feet and hands, respectively), but rather different activities. McCawley (1968a: 267) attributes to Fillmore the suggestion that selectional restrictions be viewed as "presuppositions about intended referents." For example, the verb *diagonalize* need not be burdened with extensive selectional restrictions to specify that its only possible direct object is the single word *matrix*; rather, one could say that the meaning of the word *diagonalize* imposes the presupposition that the intended referent of the noun which functions as its direct object be a *\^4\* matrix.*

2.3.4.3. Let us consider some of the implications of Fillmore’s suggestion. It compares very well with Weinreich’s use of transfer features: the *wall* in the prepositional phrase *during the wall* is understood to mean ‘the period in which the wall stood’ because *during* imposes the presup-
position that its object noun phrase refer to a period of time. Similarly, the verb \textit{trinken} carries the presuppositions that its subject noun phrase denote a human being or a group of human beings and that its object noun phrase denote something which is liquid. Fillmore's proposal differs from Weinreich's in its intent, however; Weinreich was still concerned with semantic interpretation, whereas Fillmore is already tending toward the view that lexical items are used in ways describable by the beliefs of the user concerning their meanings.\footnote{McCawley (1970a) mentions that someone who says \textit{My toothbrush is alive and is trying to kill me} is not violating a grammatical rule of English; rather, his statement of such a sentence reflects the fact that his beliefs concerning certain inanimate objects differ from those of normal people. He should be "referred to a psychiatric clinic, not to a remedial English course" (168). Also, in reporting dreams or the beliefs of other persons, one is able to use words in a manner which would conflict with one's own normal beliefs concerning their meanings: \textit{I dreamed that I poured my mother into an inkwell}, or \textit{John thinks that electrons are red with green stripes}, for example.\footnote{This view of selectional restrictions as representing sets of beliefs enables McCawley (1971a) to modify his claim that semantic properties alone figure in selectional restrictions: he concedes that some selectional restrictions may be lexical in nature (see the above discussion of \textit{essen/fressen}, etc.), but he still maintains that "a selectional restriction imposed by an item (whether by a lexical item) is a presupposition about what item in semantic structure purports to denote" (290).}}

2.3.5.1. Katz (1972) retains the notion of selection restriction, saying that it "gives rise to the distinction between semantically anomalous
sentences and false or contradictory ones" (90). Sentences like That
truth is strawberry-flavored and That triangle is in love are semantically
anomalous, but That truth is known to be false and That triangle is square
are sentences which are internally contradictory. Semantically anomalous
sentences result from the violation of one or more selection restrictions;
they would be assigned no readings by a Katzian semantic component, and
they would not even be generated by an Aspects-style grammar. Contra-
dictory sentences would, however, be assigned readings by a Katzian se-
matic component; such readings would themselves be internally contra-
dictory. An Aspects-style grammar would also freely generate such sen-
tences, since they break no selectional rules. In addition, semantically
anomalous sentences have no truth-value, whereas contradictory sentences
are false.

2.3.5.2. The above distinction is doubtless a valid one. But the
existence of such a distinction does not necessarily imply that it can
only be dealt with by using selection restrictions. As a matter of fact,
selection restrictions are inadequate in this regard, since they cannot
account for the fact that semantically anomalous sentences are, in some
way, interpretable, whereas contradictory sentences are not. That triangle
is in love would be a perfectly normal and meaningful sentence in a con-
text in which geometrical figures are personified, as in Flatland: A
Romance of Many Dimensions, by Edwin Abbott Abbott (Oxford: Basil Blackwell,
1932). However, no context whatsoever can be found in which That triangle
is square can be assigned an interpretation. Of course, if one is allowed
to interpret geometrical terms in a loose fashion, it would be possible
to interpret some ordinarily contradictory expressions: a round square
can be conceived of as a square with rounded corners, for instance.
2.3.5.3. Weinreich (1966) dealt very effectively with the distinction between anomalous and contradictory sentences by showing how it could be expressed in terms of the distinction between transferred and inherent features. If a transfer feature is linked with an inherent feature which contradicts it, the transfer feature is dominant (106), and a constituent containing these features is understood as if the transferred feature had replaced the contradictory inherent feature. The Construal Rule, however, assigns a deviance marker to the constituent to indicate the degree of incompatibility between the transferred and inherent features (107-108), so that the latter does not disappear entirely. If two mutually contradictory inherent features are linked, on the other hand, neither is dominant, and a valid contradiction results. No construal or interpretation is allowed to take place (110).

2.3.5.4. Katz (1972: 92) mentions the fact that semantic anomaly is a graded concept, whereas contradictoriness is an absolute. Weinreich's treatment demonstrates this difference very clearly: an anomalous sentence contains one or more constituents which are assigned deviance markers by the Construal Rule, and the Semantic Evaluator computes from these deviance markers a numerical deviance index for the entire sentence. The size of this deviance index corresponds exactly to the degree of semantic anomaly of the sentence. Contradictory sentences are either not construed or they are assigned a deviance index so high that they would never be accepted in any context.

2.3.5.5. Fillmore's conception of selection restrictions as "presuppositions about intended referents" also deals well with the distinction between anomaly and contradictoriness. The presuppositions imposed by a lexical item on other lexical items cause the latter to be understood
as if their referents actually were those that are presupposed. That is, anomalous sentences can be contextualized: a 'world' (set of beliefs) can be devised in which the presuppositions which are imposed on lexical items are contained in the meanings of these lexical items. In a world in which geometrical figures can move and feel, saying that a triangle is in love would not be at all unusual. The degree of difference between the constructed world and the "normal" world corresponds to the degree of anomaly. But no world can be constructed in which contradictions are construable.

2.3.5.6. The anomaly-contradictoriness distinction cannot be used to justify the postulation of selection restrictions, since it can be (and has been) more adequately explained in other ways. If one carefully distinguishes between the transfer features of a lexical item and its inherent features (cf. Weinreich 1966: 63), or, equivalently, between the presuppositions imposed by a lexical item (cf. Fillmore 1971b), the distinction between semantic anomaly and contradictoriness will follow as a matter of course.

2.3.6.1. The meanings of lexical items and their presuppositions have not always been kept apart. McCawley (1968a: 267-268) attributes to Fillmore the suggestion that bachelor has the meaning unmarried (preferably, 'unmated') and the presuppositions 'human', 'male', 'adult'. X is a bachelor can be used to assert that X, a male adult human, is unmarried, but not to assert that X, an unmarried adult human, is a male. The terms bachelor girl and bachelorette differ from bachelor not in their meanings but in their "intended referents". The intended referent of bachelor seal is nonhuman, but the state which is asserted is the same as for human bachelors. It is apparent that these metaphorical uses of
bachelor differ from it only in their presuppositions and not in their meanings. It would be interesting to discover if this is a general property of metaphorical usage. That is, does metaphorical usage of a lexical item alter only its presuppositions about intended referents (i.e., its range of applicability) and never its meaning? A detailed examination of this question is out of place here, but it can be said that preliminary investigations appear to support an answer in the affirmative.

2.3.6.2. Katz (1972: 149-150) has harshly attacked Fillmore's suggestion for viewing selection restrictions as presuppositions and McCawley's arguments in favor of this suggestion. He writes, "This proposal is a medley of confusions and mistakes. A presupposition of a sentence is a condition whose satisfaction is both necessary and sufficient for the sentence to be capable of making a statement, issuing a request, etc., whereas a selection restriction is a condition whose satisfaction is necessary and sufficient for a constituent of a sentence to be meaningful." Katz has, however, jumped to some very wrong conclusions. He confuses presuppositions of lexical items with presuppositions of sentences. Fillmore's suggestion concerns only lexical presuppositions, and hence Katz' attack is misdirected. Furthermore, Katz' use of the term 'presupposition', which he allegedly derives from Frege (Katz 1973b), differs from the usages of other linguists and philosophers (cf. Garner 1971), and Katz is not justified in thinking his is the only correct one. Lipka (forthcoming) has pointed out that presupposition is a relational term and a theoretical construct, the meaning of which is dependent on the theory in which it is used.7

2.3.7. Jackendoff (1972: 17-20) views selection restrictions as "well-formedness conditions on semantic interpretations". He appears to
accept McCawley's arguments that selection restrictions are purely semantic. He notes that anomalous sentences must be given interpretations, and that selection restrictions are dependent on readings of whole sentences, and not just on readings of individual lexical items. He also mentions that selectional violations can result from "extra-linguistic" knowledge. McCawley had discussed all of these points somewhat earlier (1968a: 265-266; 1968b: 128-230; 1970a: 167-168), and Jackendoff's treatment of them contains nothing that is really new. He and McCawley differ, however, in their views concerning the place of selection restrictions in a linguistic theory. Jackendoff proposes a model in which syntactically generated structures are semantically interpreted. Selection restrictions are necessary in such a model in order to ensure that semantically anomalous structures (which may be freely generated in Jackendoff's model, as opposed to Aspects) are not assigned well-formed semantic interpretations. McCawley, on the other hand, is interested in the question of whether selection restrictions constitute "constraints on possible messages" (1970: 168) in a generative semantic model. He concludes that, in general, they do not, since most sentences which are semantically anomalous may nevertheless correspond to possible messages under appropriate circumstances. He feels that some selection restrictions are valid constraints, however, such as "the constraint that the complement of the progressive be must be headed by a nonstative verb" (ibid.), which applies in all possible contexts. For instance, the sentence John is knowing the answer can never be contextualized.

2.3.8. The study of selection restrictions has always been tied up with the study of semantic anomaly. Semantic anomaly, however, cannot be defined absolutely; it is always dependent on contextual considerations
(in the broadest sense). A sentence is felt to be anomalous in a certain context if the words in it are used in ways which conflict with the speaker's (or hearer's) momentary beliefs and presuppositions concerning their meanings in that particular context. For instance, *The chair laughed* is perceived as anomalous in "normal" contexts because an activity regarded as limited to humans (and some higher primates perhaps) is attributed to an object "normally" regarded as inanimate. But if we understand the chair referred to as being personified, the sentence is not at all unusual. It is misleading, however, to think that the notion "normal context" is definable in any practical manner (cf. McCawley 1970a: 183, fn. 3).

239. It is somewhat doubtful whether the study of semantic anomaly (and hence, of selection restrictions) is directly relevant to the study of language. It is definitely relevant to a study of human conceptual ability: the ways in which anomalous sentences are contextualized might indicate the ways in which conceptual knowledge is organized, for instance. However, the fact that the sentence *The tree knows the answer* is perhaps pragmatically more difficult to contextualize than *John knows the answer* is of little interest in a theory of language, which should be concerned with explicating how meanings and meaning relationships are symbolized in speech and how such symbolizations are interpreted.
2.4. The Combinatorial Hypothesis

2.4.1.1. Katz and Fodor (1963) base their semantic theory on the assumption that a fluent speaker determines the meaning of a sentence of his language by combining the meanings of its constituent lexical items in a manner dictated by the grammatical structure of the sentence (493-494; see also Section 2.1.2.3. of this dissertation). This assumption may be called the combinatorial hypothesis. It presupposes that the semantic information used in interpreting a sentence is of two types: lexical and structural. In Katz and Fodor’s theory the lexical information is provided by dictionary entries for the constituent lexical items of a sentence, and the structural information is provided by the system of grammatical relations holding between the constituents of the sentence. These grammatical relations specify the nature of the combinatorial machinery (the projection rules) used in determining the meaning of a sentence as a function of the meaning of its parts.

2.4.1.2. Katz and Fodor concentrate mainly on the nature of dictionary entries, and the projection rules which they propose are rather primitive. They operate like phrase-structure rules in reverse, by successively amalgamating sets of readings for sister nodes to give sets of readings for their parent nodes until a single set of readings is derived for an entire sentence. In this fashion the phrase structure of the sentence is effectively destroyed, but the projection rules fail to create a structured semantic representation to replace it. As Weinreich (1966) pointed out, Katz and Fodor’s projection rules “destroy the semantic structure and reduce the words of a sentence to a heap” (34). Katz reacts to such criticisms not by refining his and Fodor’s conception of projection rule, but rather by introducing complex markers into dictionary entries (1966:
167; 1967: 169). These complex markers contain within themselves complicated grammatical structures, and when they are combined by projection rules the result is a structured semantic representation. However, the structure is within the markers and not between them. Katz attempts to introduce structure into his semantic representations by complicating his dictionary entries instead of by complicating his combinatorial apparatus. This theoretical development culminates in Katz (1972), where only one projection rule is necessary, since every structural complication has been taken over by a complex marker. But Katz' complex markers are expressed in a metalanguage containing Chomskyan grammatical relations, and no attempt is made to explain these relations semantically. No "projection rules" are proposed to indicate how the meaning of (Trying to catch Y) is derived from the meanings of its constituents. As is pointed out in Section 2.2., Katz' approach is futilely circular. One cannot explain the semantic effect of object language grammatical relations by means of "semantic representations" which are expressed in a metalanguage containing these very relations.

2.4.1.3. Weinreich (1966) realized that the inadequacy of Katz and Fodor's semantic theory lay mainly in the nature of its combinatorial machinery. He carefully emphasized the difference between linking and non-linking constructions (48-61), showing that the semantic representations of both simple and complex linguistic elements were more complicated than Katz and Fodor had envisioned, and that the complication lay in the semantic relationships between constituents and not somehow in their inner structures. Weinreich's semantic apparatus (the Calculator and the Evaluator) operates not by destroying phrase structures, but rather by redistributing features and creating new clusters and configu-
rations. Thus the output of Weinreich's semantic rules is a highly structured semantic representation and not a mere "heap of features".

2.4.1.4. Bierwisch (1969a, 1971) also recognizes the primitive character of Katz and Fodor's projection rules, and he proposes replacing them by sophisticated logical rules for combining semantic features. He also shows how semantic features may be classified according to their logical structure and combinatorial potentials (1971: 413-432), and he demonstrates the importance of referentially indexed variables in semantic representations (412-416). Bierwisch's semantic representations clearly show the logical structure of sentences in a way that Katz cannot. 9

2.4.2.1. The combinatorial hypothesis presupposes that it is possible to derive the meaning of a syntactically complex expression from the meanings of its constituents and their structural relationships. Idioms, however, are expressions whose meanings cannot be derived in this fashion. An idiom can be defined as a "grammatical form the meaning of which is not deducible from its structure" (Hockett 1958: 172), or, equivalently, as a "constituent or series of constituents for which the semantic interpretation is not a compositional function of the formatives of which it is composed" (Fraser 1970: 22). Hockett's and Fraser's definitions are very broad, and they necessarily imply that even simple morphemes must be regarded as idioms, "since a morpheme has no structure from which its meaning could be deduced" (Hockett: ibid.). The usefulness of such a broad definition of idiom can be questioned, since "it puts monomorphemic items on the same level with partly analysable or unanalysable complex forms" (Lipka 1972: 77). As a practical matter, one could perhaps explicitly exclude single morphemes from classification as idioms, speci-
fying that an idiom be "defined as a grammatically complex expression
A+B whose designatum is not completely expressible in terms of the des-
ignata of A and B, respectively" (Weinreich 1963: 181). Even with the
exception of single morphemes, however, the number of idioms in any lan-
guage is enormous (cf. Weinreich 1969: 23), so much so, in fact, that
the general applicability of the combinatorial hypothesis may be placed
in doubt. For instance, virtually any normally non-idiomatic expression
may acquire idiomatic status in the proper context (cf. Hockett 1958:
303-309), and if the context is a common one, the idiomatic meaning of
the expression may entirely displace its 'structural' meaning as a com-
posite of the meanings of its constituents (e.g., The coast is clear).
This is such a frequent occurrence in the historical development of lan-
guages that the process of idiomaticization has been considered to be
the prime vehicle of semantic change (Chafe 1970: 40-50).

2.4.2.2. The analysis of idioms affords many problems for a theory
of language, especially one which insists that the semantic interpre-
tation of sentences is a compositional process. Chafe (1968a) has ar-
gued that transformational generative grammar ("the Chomskyan paradigm")
is incapable of dealing with the phenomenon of idiomaticity in a satis-
factory manner, and that it therefore should be replaced by a linguistic
theory which attaches central importance to the treatment of idioms.
Weinreich (1969) and Fraser (1970) have attempted to analyze idioms
within the general framework of an Aspects-oriented theory, but they
have been able to do so only by drastically revising some of the basic
assumptions of transformation grammar. Weinreich proposed a consid-
erable complication of the notion of dictionary, calling for a "simplex
dictionary" and a "complex dictionary", the latter including an "idiom
list" (57-59, 68-70, 72-75). He also set up an elaborate apparatus ("matching rules" or "idiom comparison rules") for replacing the literal meanings of idioms with their idiomatic interpretations and for assigning to complex expressions a "familiarity rating" (59-60, 71-75). Fraser argues for giving each idiom "the same deep structure analysis as its literal counterpart" (27). This entails, of course, that deep structures no longer uniquely determine meanings. Fraser attempts to avoid this conclusion by treating idioms as complex lexical entries, as "strings of complex symbols" (ibid.) and by asserting that lexical insertion of idioms takes place in exactly the same manner as lexical insertion of single formatives. He thus contends that the ambiguity of a sentence such as They hit the sack is not structural in nature (which would require the postulation of different deep structures for its literal and idiomatic meanings), but rather lexical. A lexical entry for an idiom in Fraser's treatment carries indications of the idiom's susceptibility to various types of transformations. (They hit the sack in it idiomatic meaning cannot be passivized, for instance). Fraser even establishes a "frozenness hierarchy" for classifying idioms according to the transformations which they permit (36-42).¹⁰

2.4.2.3. The idiomatic meaning of an idiom in general results from a metaphorical interpretation of its literal meaning (provided it still has one). For instance, the literal meaning of the phrase hit the sack may be metaphorically interpreted as meaning go to bed if this activity is regarded as falling on (hitting) a mattress (a sack). Similarly, shoot the breeze can be metaphorically interpreted as chat idly if one imagines idle chatter as consisting of the expulsion of puffs of air by the persons chatting.¹¹ Many other examples could be discussed: put on weight, lay
down the law, etc. In all cases the idiomatic meaning of the expression is a metaphorical interpretation of its literal meaning.

2.4.2.4. Of course it may be difficult at times to imagine how the literal meaning of an idiom and its idiomatic meaning are metaphorically related. How can 'to die' be visualized as to kick the bucket, for instance? But the metaphorical usage of a word can also often be quite distant from its normal usage, and the relation between the two is not always apparent. The German verb funken (lit., 'to spark') can be used in the sense of 'to broadcast (a radio signal)'; the relation between the two usages is evident only to those who know that the first radio transmitters operated by producing sparks. Metaphorical usage is the main method by which words acquire new meanings (actually, ne ranges of applicability: cf. the discussion of metaphorical usage in Section 2.3.). Similarly, idiomaticization is the main method by which phrases acquire new interpretations. After a metaphor or an idiom is widely used and accepted, of course, its new meaning may become more common than its old one, and the metaphorical nature of idioms is not always consciously recognized. However, it is almost always possible to imagine it, since the literal interpretation of an idiom lurks in the background whenever its idiomatic meaning is intended or understood. For this reason any theory which interprets idioms by suppressing their literal meanings (Weinreich 1966: 101; 1969: 58), or which sets up special lexical entries for idioms (Fraser 1970: 29), is inadequate. Consider kick the bucket. Virtually every fluent speaker of English is aware that this phrase has an idiomatic interpretation, 'to die', although there is certainly no natural connection between kicking buckets and dying. However, the existence of this idiom establishes just such
a connection for English speakers. Consider the following anecdote: an American film comedy was being shown in a German movie theater. In one scene of the film, a soldier lay dying on a hospital bed. As he died, his leg jerked and he kicked over a pail of water at the foot of the bed. The English-speakers in the audience roared with laughter; the German-speakers failed to see the humor. No language was used in the scene, but its humorous interpretation by English-speakers was due entirely to the existence of the idiom *kick the bucket* in English (but not in German). If no connection were felt between the literal meaning of an idiom and its idiomatic meaning, no jokes based on idioms would be possible. This connection may for many idioms be retrospective (cf. Weinreich 1969: 76) because the original connection has been forgotten or is no longer recognizable, but this is irrelevant. The fact that such a connection is generally perceived argues against the rigid separation of idiomatic and literal interpretations of idioms.

2.4.2.5. The above discussion of course does not apply to "idioms" such as *by and large*, *trip the light fantastic*, etc., which have no literal interpretation because they are not grammatically well-formed. Such expressions, however, should not be regarded as idioms at all (cf. Weinreich 1969: 68), but rather as unanalyzable complex expressions in principle indistinguishable from single words. They certainly do not arise as metaphors; instead they are totally frozen expressions, relics of earlier phrases which have survived only because they have been frequently used. Their status is similar to that of proverbs, which are likewise not regarded as idioms. Proverbs and frozen expressions often show archaic inflections or word order ("Aller Anfang ist schwer"), but proper idioms (i.e., those with literal counterparts) obey the same
grammatical rules as non-idiomatic expressions.

2.4.3.1. The preceding discussion of idioms has demonstrated several practical reasons for not accepting the combinatorial hypothesis as the basis of a semantic theory. This hypothesis is also objectionable on theoretical grounds. It presupposes, for instance, that lexical meaning and sentential meaning are similar concepts, since the latter is held to be composed of the former. The two types of meaning are, however, totally different in nature. A sentence constitutes a message in a speech act (cf. Searle 1969, 1971), and it represents a thought or idea. In logical terms, a sentence corresponds to a proposition (cf. Copi 1973). The individual words in a sentence do not represent individual thoughts, however, nor do they constitute messages or correspond to propositions. Individual verbs, adjectives, and common nouns correspond to logical predicates (cf. Bach 1968), and many minor-class morphemes represent underlying semantic relations (see Chapters 4 and 6). By themselves, the individual words in a sentence contribute nothing to its meaning. It is only when they are placed into a system of structural relations that a message is derived. This system of relations constitutes the logical framework of the sentence, and hence determines the semantic interpretation of the constituent lexical items of the sentence to a large degree. Words in a sentence do of course contribute to the meaning of the sentence, but they do so only because they occur in context. Words may have definitional meanings, of course, but these definitions tell us only how to use these words to represent certain concepts in relation to other concepts in a semantic structure. It is the entire structure itself which carries meaning and transmits it in the form of a sentence.
2.4.3.2. The semantic relations between concepts in a semantic structure contribute most to the meaning of a sentence, and the semantic contribution of words or concepts themselves is largely dependent on the structural relationships in which they occur. These structural relationships are indicated by word order and by "grammatical morphemes". The semantic structure of "Jabberwocky" (cf. Kufner 1962: 51), for instance, is perfectly clear, since its grammatical morphemes are all present in an acceptable arrangement, and it constitutes a "message"; we can infer from it that "slithy toves" are "gyning" and "gimbling" in the "wabe", and not "mimsying" in the "borogoves". We have a definite structural impression of what is being described; all that we need is a definitional sentence for each of the lexical morphemes, so that we will know what they refer to. We could even do without definitional sentences entirely if we had a large set of sentences containing these words. It is rare, perhaps, that we learn the meaning of a word by hearing or reading a definition for it; rather, we deduce what it means by seeing how it is used in numerous contexts. A word does not contribute meaning to a context so much as it derives meaning from the context.

2.4.4. A combinatorial semantic theory which composes the meaning of a sentence from the "meanings" of its constituent lexical items cannot be considered as an adequate model of human linguistic performance, since it ignores important semantic relationships within the sentence. Such a model might be necessary for an interpretative theory, but the combinatorial hypothesis is irrelevant for a theory of semantics that is concerned with examining the structure of linguistic messages and how such messages are encoded and decoded by the processes of language.
2.5. Atomic Predicates

2.5.1. In generative semantics, "contentives" (verbs, common nouns, and adjectives) and conjunctions are represented semantically as logical predicates. Many of these predicates are held to be "decomposable" into configurations of other predicates (cf. Lakoff 1970b, Fillmore 1968b). The main criterion for lexical decomposition seems to be paraphrasability: since kill may be paraphrased as cause to become not alive, the predicate KILL is said to be representable by the complex predicate CAUSE (BECOME (NOT (ALIVE))). Contentives which are not paraphrasable correspond to predicates which cannot be decomposed; these are called atomic predicates.

2.5.2.1. Predicates may be classified into two groups: those whose arguments (i.e., noun phrases) may contain embedded propositions (i.e., sentences); and those whose arguments may not. The former are called sentential operators (Lakoff 1970b: 352). For example, consider the sentence John kills Harry: this is representable semantically by the proposition KILL(John, Harry). But the predicate KILL is decomposable, so we can rewrite this proposition as CAUSE (John, BECOME (NOT (ALIVE (Harry)))). CAUSE, BECOME, NOT and ALIVE are all atomic predicates, but only the first three are sentential operators.

2.5.2.2. Since the number of potential contentives in any language is unlimited, and since lexical decomposition is held to be a finite process (otherwise it would not be very useful), the number of atomic predicates must also be infinite. It is possible, however, that the number of atomic sentential operators in any language is finite (Lakoff: ibid.), since the same operators keep recurring in semantic analyses of complex predicates. These operators may be considered to be universals. The distinction between (atomic) sentential and non-sentential operators appears
to correspond to the logical distinction between formators and designators (cf. Weinreich 1963: 149; see also Lipka 1972: 69-71), and, to a certain extent, to the structuralist distinction between grammatical and lexical morphemes (cf. Hockett 1958: 262). Lakoff supports this conclusion when he writes that "there is a correspondence between possible derivational endings and the finite number of sentential operators" (1970b: 352). However, many sentential operators discussed in generative semantics (such as BELIEVE, INTEND, etc.) cannot be regarded as formators; it would be difficult to imagine a derivational ending in some language with the meaning intend, for instance. But such predicates are perhaps not really atomic—it may be possible to decompose them further. In this way their sentential arguments could be taken over by genuine formators, leaving certain aspects of their meanings to designators. A similar analysis must also be applied to such "evaluative" predicates as GOOD or BAD, since these are without a doubt semantically complex. Henceforth only sentential operators which may be reasonably assumed to be atomic will be discussed.

2.5.3.1. Probably the most widely discussed sentential operator is CAUSE. It occurs as the highest predicate in the semantic representations of all "causative" verbs, both morphologically derived causatives (e.g., legalize), and semantically derived causatives (e.g., kill). (See the discussion of DO below.) BECOME occurs frequently in semantic analyses; it corresponds to Chafe's derivational unit inchoative (1970: 122-123). It denotes a change of state: Bill died may be paraphrased as Bill became not alive, implying that Bill changed from the state of being alive to the state of not being alive. BECOME also denotes the changing of a state into a process, as in The door is opening, which is paraphrasable as
The door is becoming open. In Lakoff's work, BECOME is written as COME ABOUT. The same predicate is meant, however. The choice of labels for atomic predicates is in any event immaterial: see below. The lexical items become and come about are in complementary distribution in surface structure—only the latter may occur with a clause complement and only the former with a non-clause complement. One says John became ill but It came about that John was ill and not †John came about to be ill or †It became that John was ill. Following an old principle used in phonemic analysis, one can assume that become and come about are identical in meaning, and either can be used to represent the inchoative predicate without confusion. An important atomic predicate is NOT (in Lakoff's works represented by '¬'). Its logical function is straightforward (negation), but its behavior under transformations is complex. The interaction of NOT with quantifiers is particularly complicated (Lakoff 1971a: 247-252), and for this reason most interpretativists prefer surface structure semantic interpretation of negatives and quantifiers. Quantifiers are treated as atomic predicates in generative semantics; McCawley (1972) argues for identifying them with conjunctions (516-539).

2.5.3.2. BE and HAVE have been proposed as atomic predicates in generative semantics by Ross (1968a), Bendix (1966), and others, although many researchers doubt their existence in semantic structure (Bach 1967, Lyons 1968: 323, 395). It is difficult to establish them as universals, since many languages entirely lack verbs corresponding to them in surface structure. One is left with the choice of either introducing them transformationally for languages that exhibit such verbs in surface structure or deleting them transformationally for languages that do not. The English verbs be and have are semantically empty and their only syn-
tactic function is to link other constituents in sentences: "their contribution to the meaning of the sentence is determined completely by the items that they link" (Bach 1967: 477). Nevertheless, Lipka (1972) prefers to keep BE and HAVE as elements in semantic structure "in their function as connectives" (68), because he wishes to "establish a relation between semantic structures and surface structures" (69). BECOME is said to differ from BE only in including the "very general feature Dynamic" (66), and kill is thus treated as containing "the features 'Cause, Be, Dynamic, Not, Alive,'" (71), where 'Be' and 'Dynamic' entirely replace BECOME in other analyses. The final choice whether or not to include BE and HAVE as atomic predicates in semantic representations is a pragmatic one. If they function in such a way as to clarify semantic or logical structure, their use is justified. However, if their functions can be more clearly expressed in other ways, they are unnecessary. For instance, why propose the semantic formula $BE + STATE$ (70), when one could regard STATE as a predicate itself? Also, deriving BECOME from $BE + Dynamic$ is pointless, since $BE$ is semantically empty; hence $BECOME$ equals the feature Dynamic. Lipka's only theoretical justification for HAVE is in the analysis of certain denominal verbs, such as grease (a car) or hem (a dress) (107-109). All of his examples, however, can be handled by partitive (Bierwisch 1965), possessive (Fillmore 1968a: 61-81) or locative (Anderson 1971a: 110-117) constructions. No compelling reasons have been proposed for introducing semantically empty predicates or features, such as BE or HAVE, into semantic structures.

2.5.3.3. There are cases, of course, where new sentential operators must be introduced to represent aspects of semantic structure which had previously been overlooked or ignored. Both McCawley (1971b) and Ross
(1972a) have recently argued that all surface activity verbs are decomposable into configurations of atomic predicates containing DO as the highest sentential operator. Thus, the sentence *John kills Harry* would now be represented as the proposition \( \text{DO}(\text{John, CAUSE (John, BECOME (NOT (ALIVE (Harry))))}) \) (cf. Dowty 1972: 62). McCawley (1971b) has also written propositions containing CAUSE in such a manner that the first argument of CAUSE is equal to the second argument of DO (20). In this way he attempts to show "that the notion of causing ... is a relation between two events" (33, n. 1). Fillmore (1971a: 45), Bierwisch (1971: 423), and others have reached the same conclusion. However, McCawley's treatment does not show exactly what is intended. It would be clearer, as Dowty (1972: 62-63) and Kastovsky (1973: 279ff.) independently suggest, to regard both arguments of CAUSE as containing embedded sentences. The first argument would contain an atomic predicate DO with two arguments, the first being the subject of the sentence and the second an embedded sentence indicating what the subject did. The second argument of CAUSE would contain an embedded sentence indicating what was caused. Thus *John kills Harry* may now be represented as \( \text{CAUSE (DO (John, something), BECOME (NOT (ALIVE (Harry))))} \). The word *something* refers to a sentence indicating what John did in order to kill Harry. In this treatment, the sentential operator DO is no longer the highest predicate. But Ross (1972a) has argued that DO must be the highest predicate in order to express the intentionality inherent in the meaning of activity verbs (105) and to correspond to Fillmore's notion of Agent as the "instigator of the action identified by the verb" (1968a: 24). Dowty (1972) attempts to solve this conflict by using two atomic predicates DO, one to indicate intentionality, the other to indicate a causal
event (66). In this treatment, our now-familiar sentence John kills Harry would be represented by DO (John, CAUSE (DO (John, something), BECOME (NOT (ALIVE (Harry))))). For cases in which causation is not intentional (as in John’s walking out caused a disturbance), Dowty argues for representation without a highest DO (ibid.). Dowty even allows for non-causative actions, as in John opened his eyes (i.e., without thinking about it). This sentence would be represented as DO (John, COME ABOUT (OPEN (eyes))).

2.5.3.4. Dowty’s and Kastovsky’s points are all well taken. However, it is arguable whether an intentional DO is necessary. Dowty says that John caused a disturbance by walking out "is ambiguous between the non-intentional and intentional readings" (66). This could be a matter of vagueness, however, instead of ambiguity (cf. Lakoff 1970d and Weydt 1973). If we apply Lakoff’s test for distinguishing ambiguity and vagueness, the above sentence must be regarded as vague with respect to intentionality. That is, the sentence John caused a disturbance by walking out and so did Harry can be interpreted as meaning that John intended to cause a disturbance, but that Harry did not. If intentionality is a matter of vagueness in sentences involving causation, there is no need to represent it in any way in semantic structure.

2.5.4.1. Now let us consider some general problems with atomic predicates. It should be apparent from the preceding discussion that atomic predicates are very similar to the semantic features of interpretative theories. They are determined in much the same way (primarily by paraphrase tests) and much of the discussion concerning the properties of semantic features (esp. Bierwisch 1971) applies equally well to atomic predicates. The difference between the two has been said to be "notational"
(Katz 1971, Chomsky 1972). Thus it is not surprising that many of the same difficulties arise in dealing with atomic predicates as in dealing with semantic features. As with features, the justification of atomic predicates is problematical. In arguments in generative semantics, virtually only surface structure phenomena are called on to indicate and defend possible predicates (cf. Dougherty 1972). Ross (1972a) is replete with surface structure arguments in defense of intentional DO. Such arguments are pointless, since it is not inconceivable to imagine an equal number of surface structure arguments against DO. It is particularly ironic for a theory which prides itself on its preoccupation with semantics to rely almost solely on surface syntactic arguments as justifications for underlying structures.

2.5.4.2. Another point often ignored in generative semantic arguments is the important distinction between object language and metalanguage. (See Section 3.1.) Atomic predicates are metalinguistic constructs—they are not lexical items or surface morphemes. For this reason they are usually written in capital letters, to distinguish, for instance, the atomic predicate CAUSE from the lexical item cause. The distinction is vital. Fodor (1970) argues against deriving the verb kill from the phrase cause to die because they are not synonymous. This is certainly true, but it does not prove that the predicate KILL is not the semantic causative of the predicate DIE, or that DIE is not the semantic inchoative negative of ALIVE.

2.5.4.3. Postulated atomic predicates should be genuinely atomic; that is, it must be demonstrated that they are not decomposable. This is certainly easier said than done, but it does no service to the theory of generative semantics to propose blatantly complex 'atomic predicates'
because it may be a tiresome process to decompose them and irrelevant to the arguments at hand. There can be no objection to using a certain amount of shorthand in semantic representation, by not decomposing uninteresting predicates. But it should always clearly be stated that these are not atomic.

2.5.5.1. Atomic predicates appear to be a modern version of structuralist morphemes. They are minimal meaning units, like morphemes, and they are subject to morphophonemic alternation when they are combined and replaced by lexical items. For example, BECOME (THICK) is realized as thicken, with derivational ending -en, but BECOME (WARM) is realized by warm, without derivational ending. These alternations are exactly analogous to those described for structuralist morphemes:

\{dog\} + \{\text{Pl}\} \rightarrow \text{/dogz/}, but \{deer\} + \{\text{Pl}\} \rightarrow \text{/diyr/}. Similarly, the realization of CAUSE (DIE) by kill is analogous to suppletion in morphophonemics: \{go\} + \{\text{Fast}\} \rightarrow \text{/went/}. Atomic predicates are, of course, an improvement over traditional morphemes, because semantic representations are clearly separated from lexical forms, and it is meaningful to say, for example, that persuade consists of the minimal meaning units CAUSE, COME ABOUT, and BELIEVE (the last one of which may be further decomposable.)\(^{15}\)

2.5.5.2. Kastovsky (1973) and Lipka (forthcoming) have realized the similarity of atomic predicates and morphemes, and they have suggested replacing the notion of lexical insertion by that of morphemic insertion. Kastovsky (288-292) argues that demilitarize is represented semantically by the complex predicate CAUSE (DO, BECOME (NEG (MILITARY))). Instead of replacing the entire complex predicate by the lexical item demilitarize in the derivation of a sentence containing this word, Kastovsky suggests
inserting the morphemes military for MILITARY, -ize for CAUSE DO, and de- for BECOME NEG. Morphophonemic rules then give demilitarize. Kastovsky's and Lipka's idea is a very promising one, and it should be further investigated.
2.6. Deep Cases

2.6.1.1. The semantic relations which can hold between the noun phrases and the verb of a sentence (Fillmore's cases; see Section 2.6.) have been extensively investigated in recent research. New cases have been proposed, old ones have been combined or reanalyzed, and some of Fillmore's basic assumptions have been questioned. Fillmore himself (1969: 116) has suggested the following realignment of case notions:

Agent (A), the instigator of the event

Counter-Agent (C), the force or resistance against which the action is carried out

Object (O), the entity that moves or changes or whose position or existence is in consideration

Result (R), the entity that comes into existence as a result of the action

Instrument (I), the stimulus or immediate physical cause of an event

Source (S), the place from which something moves

Goal (G), the place to which something moves

Experiencer (E), the entity which receives or accepts or experiences or undergoes the effect of an action (earlier called 'Dative').

Let us compare these cases to those in Fillmore (1968a: 24-25):

Agent is relatively unchanged, but no reference is made to its "typically animate" character (notice that Fillmore now uses nouns as case names instead of adjectives); Counter-Agent is entirely new; Object is more precisely defined than before, although it still could be used as a 'wastebasket'; Result is the earlier Factitive, the
"effiziertes Objekt"; Instrument is essentially unchanged; Source and Goal are new—they derive from the earlier Locative, which is not mentioned (but see Fillmore 1971a: 42); Experiencer is more clearly specified than the earlier Dative, which it replaces.

2.6.1.2. Huddleston (1970) proposes the case Force to indicate the semantic function of the wind in The wind opened the door (503-504). Fillmore had put this noun phrase into the Instrumental case (1968a: 27) in this sentence because he perceived it relation to open as being the same as between the key and open in The key opened the door. But the latter sentence presupposes an Agent, whereas the former does not. Huddleston points out that Agent and Force "cannot cooccur in the same proposition", and for this reason he suggests regarding them as "complementary variants of a simple case, say Causer" (505). However, this does not explain the purported ambiguity of such sentences as John cut himself, in which John could be either Agent or Force, depending upon whether he intended to cut himself or not. But if intentionality is a matter of vagueness, and not of ambiguity (cf. Weydt 1973), there can be no objections to lumping Agent and Force together. This would of course require giving up the animateness of the Agent, but this criterion for identifying cases is questionable anyway (cf. Poldauf 1970: 126-127).

2.6.1.3. Zoeppritz (1971) regards "the feature [+ animate] as irrelevant for the assignment of case" (74). She treats both John and the leaves in the sentences John runs and The leaves rustle as "agents", and Mary and the car in John believes Mary and John gives the car a new coat of paint as "datives", but in John kills Mary and John wrecks the car as "objectives". She introduces a new case, "medial", 
to appear "with verbs that take agents optionally and have a causative interpretation when agents are present" (73). Thus John and the window are medial in the sentences John dies and The window breaks. Objective is different from medial in that it is "reserved to cases that require the presence of an agent which may be deleted in surface structure" (73). Walmsley (1971) argues that Instrumental and Comitative are indistinguishable, but he is refuted by Buckingham (1973).

2.6.2.1. Fillmore (1968a) states that "each case relationship occurs only once in a simple sentence" (21). This "one-instance-per-clause principle" (1971a: 38) has been accepted by most case grammarians and has been used as a criterion for determining case assignment: if two cases cooccur in the same simple sentence, they must be distinct (cf. Babcock 1972: 31, n. 3). Huddleston (1970: 510) and Nilsen (1972: 12-16; 1973: 23-29) have questioned this restriction, however. Huddleston feels that John and Peter both belong to the same case in John is similar to Peter, and Nilsen argues that John and his student wrote the book contains two Agents (1972: 14). But Fillmore (1971a: 41) has effectively disputed Huddleston's belief, and Nilsen's argument rests on a misinterpretation of the one-instance-per-clause principle--John and his student is a compound NP and constitutes a single occurrence of Agent. Case roles are assigned to noun phrases, and not to nouns, and there is no restriction which states that these noun phrases cannot be compound. Would Nilsen assert that the sentence Fifty thousand students rioted contains fifty thousand Agents? Nilsen's other purported examples of multiple occurrences of the same case in a simple sentence are also incorrectly interpreted. One might think that He sat on a bench under a tree in a park (1973: 26) contains three Locatives, but actually only
one location in space is referred to (the subject cannot be sitting in two places at once), so there is only a single occurrence of the Locative case in this sentence. The phrases on a bench, under a tree, and in a park only serve to specify this one location more perfectly. Nilsen further asserts that two Instruments are present in the sentence Kruschev [sic] hammered the table top with his shoe (1972: 13-14). Only one Instrument is present, however: the shoe, which is used as a hammer. Nilsen's and Huddleston's arguments against the one-instance-per-clause restriction result from a failure to semantically examine their examples more carefully.

2.6.2.2. Although the same case may not occur twice in a simple sentence, there is nothing to prevent a single noun phrase from being assigned several case roles simultaneously. For instance, in the sentence John rose, John is both Agent and Object (Fillmore 1969a: 116-117). Of course, if cases are regarded as labels for nodes in a constituent structure diagram (as in Fillmore 1966a and 1968a) John would have to appear in two places in the deep structure of John rose. But Fillmore has abandoned representation of cases as categories (1971a: 54), so this minor complication of the theory no longer arises. If complex non-terminal nodes are allowed in a constituent structure (cf. Weinreich 1966 and Chomsky 1970), however, cases could be assigned to these nodes as features (cf. Kastovsky 1973: 280), and it would be possible to indicate that John in John rose has two distinct case functions without having to introduce it at two positions in the deep structure. (See also Robinson (1969) and Anderson (1969, 1971b).) Jackendoff (1972a) fails to consider that single noun phrases can have multiple case functions, and he therefore feels that so-called 'thematic relations' are superior to cases (29-36).
Actually, the thematic relations he discusses are indistinguishable from cases; his Theme, for instance, is exactly Fillmore's Object. Jackendoff must not have been aware of Fillmore (1969a) when he wrote his book—otherwise he could not have reached such false conclusions about the capabilities of case grammar.

2.6.3.1. Fillmore's latest version of case grammar (1971a) is considerably different from his earlier formulations. He now accepts the following cases: Agent, Experiencer, Instrument, Object, Source, Goal, Location, and Time (42). (He also mentions Benefactive, but with reservations (52-53).) Experiencer occurs with "psychological event or mental state" verbs, and the Object is the case of "the entity which moves or undergoes change". Goal denotes the "end result of some action or change" and it thus absorbs Factitive (called Result in Fillmore 1969a). The cases are hierarchically arranged (in the above sequence) in order to facilitate subject selection.

2.6.3.2. One of Fillmore's most important innovations is the recognition of causation as a "consequence relation between two events" (1971: 45). The same conclusion has been reached by McCawley (1971b) and others. It forces Fillmore to give up his earlier views on verbs like hit and strike (cf. Fillmore 1970), and to reanalyze them. For instance, the sentence I hit the ball over the fence must now be treated as complex: the first clause is I hit the ball and the second clause is The ball went over the fence. The two clauses are embedded into a higher predicate with the meaning cause. The first clause has the case function Instrument, and the second clause is Goal. Within the first clause, the ball is Goal; within the second clause, it is Object. Thus Fillmore has allowed other cases besides Objective (cf. Fillmore 1968a: 28) to contain
embedded sentences.

2.6.4. Cases are not totally independent of one another; some cases appear to be more closely related than others. Agent and Instrument both share the notions of causality, for instance. Observations such as these have prompted attempts to analyze cases in terms of features. Nilsen (1972) proposes the following "case feature pairs" (35): Controller-Controlled, Cause-Effect, and Source-Goal. These feature pairs are related by inclusion: "the Controller-Controlled relationship is a subset of the Source-Goal relationship". Six cases are distinguished: Agent [+ Controller, + Cause, + Source], Instrument [+ Controlled, + Cause, + Effect, + Source, + Goal], Causative [+ Cause, + Source], Patient [+ Effect, + Goal], Source [+ Source], and Goal [+ Goal] (37). The agent and Instrumental cases are as in other treatments; Causative denotes a causer uncontrolled by the Agent (cf. Babcock 1972: 31); Patient includes Experiencer, Objective, Factive (and Destructive, and Dative (Nilsen 1972: 38); Source and Goal contain Locative, Temporal, and Material. Nilsen feels that these six cases are sufficient, since he believes that many cases which had been held to be distinct (such as Experiencer and Object, or Location and Time) actually differ not in case relations but in lexical features.

2.6.5. Deep cases can represent semantic relations in a clearer fashion than predicates or features. Lee (1971) has argued that a case analysis is preferable to an analysis in terms of causatives for this reason. The authors of the USEP Grammar (Stockwell-Schachter-Partee 1968) adopt a deep case analysis as one of the bases of their treatment of English syntax because it appears to them to offer significant generalizations that other analyses do not. Case grammar is probably one
of the most promising present approaches to semantic theory, although it is of course problematical.
2.7. Conclusion

2.7.1. The five basic concepts discussed in this chapter may be divided into two groups: the first three (semantic features, selection restrictions, and the combinatorial hypothesis) require considerable theoretical modification before they can be incorporated into a new theoretical model in semantics. The last two (atomic predicates and deep cases) can be taken over into new theoretical models without extensive change. Since the first three concepts are necessary in interpretative theories, such theories are held to be basically incorrect. The essential validity of the concepts of atomic predicates and deep cases supports "generative" theories of semantics. Such theories are, however, not generative in the true Chomskyan sense; rather, they are primarily concerned with the investigation of semantic structures of sentences and the ways in which semantic structures can be converted into surface representations.

2.7.2.1. A simple feature analysis is inadequate for problems of semantic representation, because the semantic features in the "meaning" of a lexical item are generally complexly interrelated. If this complexity is represented by semantic markers with complex internal structure (as Katz proposes), no real explanation is possible (cf. Section 3.1). Rather, features should be regarded as logical predicates (as Bierwisch proposes) which may be arranged to form propositional functions in logical representations. If features are treated as logical predicates, they are theoretically indistinguishable from atomic predicates in generative semantic theories. (See below.) Configurations of atomic predicates (or features) should not be regarded as "readings" of lexical items, since such configurations must generally be rearranged by transformations before lexical insertion (or symbolization, in the sense
of Chafe 1967 and 1970) can take place.

2.7.2.2. Selection restrictions as such are inappropriate in a semantic theory, since the goal of such a theory should be to explain how meanings are represented. Since anomalous sentences do have meanings, it is incorrect to refuse to generate or to interpret them or even to assign them "nonsense" interpretations. So-called "selection violations" really involve beliefs or perceptions which are held by the speaker or hearer to be inappropriate for the context (both linguistic and extra-linguistic) in which the utterance containing such violations is produced. Hence, the best suggestion for modifying the notion of selection restriction is Fillmore's proposal concerning "presuppositions about intended referents" (cf. McCawley 1968a: 267). These are lexical presuppositions, not to be confused with presuppositions of sentences. (See Section 3.4.3.2.).

2.7.2.3. The combinatorial hypothesis is incorrect, since sentential meaning and lexical meaning are two entirely different concepts, and the former can in no way be conceived of as composed of the latter. The meaning of a sentence corresponds to a logical proposition, whereas the meaning of a lexical item corresponds to a logical predicate. (See Section 4.3.). The combinatorial hypothesis effectively ignores the fact that the logical structure of a sentence determines to a large degree the interpretation of the constituents of the sentence.

2.7.2.4. Semantic analysis in terms of atomic predicates can be useful, as long as one is careful to show that proposed atomic predicates are theoretically justifiable. They should be examined for actual atomicity and classified according to the number and type of arguments which they may have. Semantically empty predicates, such as BE and HAVE,
should not be postulated. "Meaning postulates" (see Section 3.4.2.) should be proposed in order to express logical relations between atomic predicates.

2.7.2.5. Deep cases are best regarded as semantic relations. (See Section 4.2.). Fillmore displays cases as syntactic categories in early work (1966a, b; 1968a), but he has since abandoned such representations (1971a). Nevertheless, he still speaks of cases as if they were actual categories of some sort, as do most other workers in case grammar. The constraints on case cooccurrence which Fillmore proposes (1968a) are of general validity, and attempts to disprove them result from a false interpretation of case grammar. Representation of cases as bundles of distinctive features must await further research, to determine if this is feasible or desirable. Postulation of large numbers of cases should be avoided if possible. A good general rule in case analysis is the following: always assign different noun phrases to the same case unless there is reason for assignment to distinct cases. In this way, the number of cases proposed in a semantic analysis may be kept minimal. An extremely large set of cases possesses little explanatory power.

2.7.3. The best prospect for a semantic theory at the present time lies in an attempt to merge generative semantics and case grammar. Cases may be regarded as special types of predicates in a logical analysis more or less along the lines proposed in generative semantics. (See Chapter 4.)
CHAPTER 3: METATHEORETICAL CONSIDERATIONS

3.1. Object Language and Metalanguage

3.1.1.1. Every theoretical investigation must clearly distinguish between the object which is being investigated and the representation of this object in the discussion concerning it. For instance, the element carbon is represented in chemical notation by the symbol C. The object and its representation are rarely, if ever, confused. The situation in investigations of language is different: here the object which is being investigated (some aspect of language) is represented by an expression derived from language. The describing language is often taken from the same natural language as the one being described. Therefore it is very easy in linguistic studies to confuse the object with its representation. A terminological distinction is necessary: the language being investigated is called the object language; the language being used to describe some aspect or aspects of the object language is called the metalanguage. In any linguistic study, the metalanguage must be clearly separated from the object language. This is particularly difficult if both are the same natural language. Hence it is perhaps better to speak of object language expressions and metalinguistic expressions: if an expression from a language is being described, it is an object language expression; if an expression from a language is being used to describe some aspect of that language, it is a metalinguistic expression.

3.1.1.2. Let us consider some examples. If we say, "The sentence
John runs describes an activity"; the entire quotation minus the underlined portion is a metalinguistic expression, and the underlined portion is an object language expression. In particular, the terms 'sentence' and 'activity' are used metalinguistically here. Other common metalinguistic terms are 'phoneme', 'morpheme', 'feature', 'noun', 'verb', etc. In the present study, all expressions used to denote semantic features, atomic predicates, deep cases, and the like, are to be regarded as metalinguistic.

3.1.2. Object language expressions and metalinguistic expressions are unfortunately often confused in studies of language, particularly of semantics. For instance, the mere existence of the English qualifier human is deemed sufficient evidence for the postulation of a semantic feature (Human) (Katz and Fodor 1963, etc.).¹ No attempt is normally made to discover whether proposed semantic features actually represent cognitive distinctions. (See Section 2.2.⁴.) Another example of the confusion of metalinguistic and object language expressions is provided by Fodor (1970), who argues that kill cannot be represented as 'cause to die', since the two expressions are not synonymous in any accepted sense. It is indeed true that the object language expressions kill and cause to die are not synonymous. The logical predicate KILL, however, as a metalinguistic expression is equivalent to the predicate configuration CAUSE (BECOME (NOT (ALIVE))).² It is perfectly correct to say that kill is the semantic causative of die; this by no means implies that kill and cause to die are synonymous. Certain arguments in generative semantics, however, also fail properly to distinguish object language and metalanguage. Ross (1972) presents numerous arguments in support of an underlying predicate 'do', all based on occurrences of the object language word do in
certain types of sentences. There may be convincing arguments for postulating a special atomic predicate to be present in the semantic representations of all activity sentences (cf. McGawley 1971b, Dowty 1972), but the existence of the object language word do is not among them. In order to establish a connection between the object language expression do and the metalinguistic expression DO (an atomic predicate), one must show that all (and only) sentences expressing activities are paraphrasable with sentences containing do. Then, occurrence of do would be a valid test for determining the underlying presence of DO. But it is impossible to justify DO by presenting sentences which are paraphrasable with do.

3.1.3. It is a common fallacy in semantic research that one can "explain" certain constructions in particular object language expressions merely by translating the latter into metalinguistic expressions which contain the very constructions one is attempting to explain. Katz and his followers (esp. Mellema 1974) often fall prey to this fallacy. (See Section 2.2.3.2.) For instance, Mellema argues that case grammar is unnecessary, since every semantic relation discussed by Fillmore and others can be explained by Katzian complex markers. According to Mellema, there is no need for an Experiencer case since verbs which have Experiencers as grammatical subjects (such as see) can be said to contain a set of complex features indicating that these subjects are engaged in an act of perceiving something. But expressing the object language subject of see as the metalinguistic subject of 'perceive' explains nothing whatsoever concerning the actual semantic function of the 'subject-of' relation in a construction containing see as the main verb. Saying that the grammatical subject of see has the same semantic function as the
grammatical subject of 'perceive' tells us only that the English verbs see and perceive are somehow similar in some aspects of their meanings. The only way to achieve explanatory adequacy with the use of semantic markers is to regard them as logical predicates (Bierwisch 1969 and 1971) and to indicate how object language constructions correspond to logical relations. As long as metalinguistic expressions contain constructions which are identical to the object language constructions which are being discussed, no explanation or clarification of these constructions is possible.

3.1.4. The distinction between the notions of object language and metalanguage should not be confused with the distinction between the notions of theory and metatheory. A theory makes use of metalinguistic expressions, in that it discusses and attempts to explain some facts about an object language (or about human language in general). A metatheory is a theory of theories, and metatheoretical expressions concern the properties of theories. Let us consider the following classification: a theory of a language describes some aspect or aspects of a natural language (e.g., English or German). It may be a general theory, a phonological theory, a semantic theory, etc. A metatheory of languages describes what properties a theory of a language should have. A theory of language describes general aspects of human linguistic behavior, applicable (in principle) to all human languages. A metatheory of language describes the necessary properties of such a theory. For example: a phonological theory of English may describe English phonotactics, whereas a phonological metatheory of languages describes the way in which an individual theory should explain phonotactic restrictions. A phonological theory of language attempts to explain the existence of phonotactic rules in
human language and the place which these rules take in a general picture of language. A metatheory of language describes the methods and terminology used to describe particular aspects of language, such as phonology. There is obviously considerable overlap between a "metatheory of languages" and a "theory of language". Whether the two are, in fact, identical or not is a question which has not been settled.

It is nevertheless important to make the four-way distinction discussed here, if only because various theoretical proposals in linguistic research have failed to recognize at least some aspects of it. Katz in particular has consistently confused the notions of semantic theory of English, semantic theory (of language), and semantic metatheory.³

3.1.5. In the present study, an attempt is made throughout to specify clearly which expressions are to be regarded as belonging to the object language or to the metalanguage, and which general statements are held to be theoretical or metatheoretical. Features, predicates, semantic relations, etc., are all treated as metalinguistic expressions. They are theoretical constructs and are not supposed to have objective existence other than as a model for explaining certain aspects of linguistic behavior.
3.2. Linguistic Intuitions, Semantic Tests, and Introspection

3.2.1.1. In recent linguistic research, in particular in semantics, there has been little metatheoretical discussion of procedures for testing and justifying theoretical proposals. Whereas "objective" tests had been a major concern in structuralist linguistics and early generative grammar, interest in them has seemingly fallen off in the past few years. This decrease of interest in testing procedures parallels the recent trend away from formalization in linguistic treatments. As theoretical proposals become more complicated and involved, it becomes more difficult to express them as formal rules. Hence, many linguists today prefer not to propose formal rules, with all their complicated notations, but rather to "state in ordinary language what rules are supposed to do" (Reibel and Schane 1969: ix). Such informal treatments are especially common in articles dealing with generative semantics (e.g., McCawley 1973) or case grammar (e.g., Fillmore 1971a). This tendency toward a neglect of formalization has been criticized by Dougherty (1973) and Lipka (forthcoming). Dougherty argues that failure by a linguist to formalize a linguistic description may reflect the fact that the linguist's assumptions are internally contradictory or that his system "has little in common with the actual processes in language" (427).

3.2.1.2. Linguists who propose unformalized rules generally rely on intuitions (normally their own) for linguistic evidence. Such intuitions concern the "grammaticality" or "ungrammaticality" of example strings. Many articles in recent research have a standard form: 1) the linguist lists some strings which he regards as grammatical; 2) he
then lists some strings which he regards as ungrammatical; 3) he discusses possible reasons for the grammaticality or ungrammaticality of the cited strings; 4) he chooses what to him is the most plausible explanation for the data, and he defends this explanation against rival proposals; 5) on the basis of the explanation which he prefers, he formulates a new theory, or he argues that his explanation supports one of a number of currently prevalent competing theories. Often a rather massive edifice (cf. Postal 1970) is built entirely on one person's intuitive judgements. Hence acceptance of the theory or explanation proposed in such work depends not on the theoretical merits or attractiveness of the explanation itself but rather on the somewhat mundane question of whether or not one accepts the writer's initial intuitive judgments concerning the acceptability of sample strings used as data. If a reader finds himself disagreeing with an author's judgments at the very beginning of a linguistic article, there is little point in his reading further, since even a theory which is developed in a thoroughly consistent and even elegant manner may be considered to be false if it is based on premises considered to be false, such as incorrect judgments concerning acceptability. (Of course, it may also be true; in fact, no judgment concerning the truth or falsity of a theory is possible if one believes that the premises of the theory are false.)

3.2.2.1. It is apparent that clarification is required concerning the notions of "linguistic intuition" and "grammaticality". The latter, of course, is said to be a competence concept (cf. Chomsky 1965), only distantly related to the performance concept of acceptability. Acceptability is what is always overtly tested when questionable strings are examined. A judgment on the grammaticality of a string (i.e., whether it would be
generated by an internalized grammar) depends entirely on the informant's concept of what this internalized grammar allows. Hence, judgements on grammaticality can only be made if one has a preconceived notion of the rules contained in one's grammar--i.e., if one is a trained linguist who accepts the competence-performance dichotomy in the broad interpretation which Chomsky and others give it. Thus, grammaticality determinations cannot be intuitional--as a matter of fact, they are biased. In the present context, we will be only concerned with acceptability judgments.

3.2.2.2. Such judgments have often been made in a rather haphazard manner, as Householder (1973) has pointed out. In general, there has been little clarification of the factors involved in individual determinations of acceptability, and few suggestions have been made toward formalizing the process. (But cf. Lipka 1971.) Ross (1968b) suggests that acceptability is a graded concept, but he never explains the significance of the notations ?, #, ??, or ?*. Acceptability judgments usually depend only on one person's intuitions, although there are instances when several informants are queried. Rarely are the precise grounds for acceptability judgments mentioned. Strings are also normally judged in isolation, with no attempt at contextualization (cf. Bolinger 1968, 1971). As we have seen in Section 2.3.4, contexts can always be found in which semantically anomalous sentences are acceptable. Sometimes sentences are held to be semantically unacceptable simply because they are tautologous and hence so patently obvious that it seems rather pointless to say them. Discussing Postal's (1970) rejected sentence *Harry reminds me of himself*, Bar-Hillel (1971) wonders, "Under what circumstances would anyone want to say such a thing?" (404). Tautologies are certainly helpful in semantic investigations, but it is
questionable that they are truly "deviant utterances" which result only when some rule is broken. The unacceptability of an example string may be due in some cases to factors other than those examined by the investigating linguist. (See the criticisms of Cruse below.)

3.2.2.3. Let us consider some ways in which acceptability determinations might be made more systematic (cf. Householder 1973: 1) The intuitions of a single person should be relied on only in totally clear-cut-cases—otherwise opinions should be sought from others, and examples of acceptable sentences should be taken from texts if possible; 2) All possible factors contributing to the rejection of example strings should be weighed, and strings exhibiting some type of ill-formedness which is irrelevant to the discussion at hand should be left out of consideration; 3) Attempts should be made to contextualize all rejected strings; 4) If it is asserted that acceptability is a graded concept, the precise nature of this gradation, and the causes for it, should be clearly described, and a consistent notation should be found to indicate it; 5) All "distractors" (cf. Bolinger 1971: 524) should be recognized—i.e., elements which detract from the point being investigated; 6) Rejected strings should be classified according to the type of unacceptability involved. Strings which are rejected in a semantic analysis fall into basically four types, depending on whether they have interpretations which are anomalous, absurd, tautologous, or contradictory. Anomalous strings have no intrinsic truth-value, and they can always be contextualized. Absurd strings are ridiculously false, such as My father has four legs. Tautologous strings are intrinsically true, and contradictory strings are intrinsically false. Anomalous sentences are useful in determining presuppositions (see Section 3.4). Absurd sentences should
probably not be rejected for semantic reasons at all. Tautologous and contradictory sentences have proved useful in various semantic tests.

3.2.2.4. Semantic tests depend, of course, on intuitional judgments. For instance, a test for a semantic feature is deemed apt if it confirms our notions about the presence of that feature. Tests are normally devised to correspond to our intuitions in clear-cut cases. Then they can be applied to less easily determinable instances, to aid us in our judgments. Let us consider some examples. The conjunction but means something like 'and ... unexpectedly' (Weinreich 1966: 87) and it can be used to determine the presence or absence of semantic features. The contradictoriness of This is a chair, but one can sit on it indicates that chairs are intended for sitting, and that somehow the notion of 'sitting' must be included in the meaning of chair. Similarly, She giggled but did not laugh is contradictory and shows that "giggling is a kind of laughing" (Lipka 1972: 60). And has been used to show different senses of a word: since He practiced medicine and piano is semantically odd, practice must have at least two senses; She ate soup and spaghetti is acceptable, however, and hence the sense of eat must be the same with both soup and spaghetti. And has also been applied in the determination of case roles: Since John and a hammer broke the window is anomalous in "normal contexts", John and a hammer must occupy different case roles when they occur in subject position with break. So as a conjunction means something like 'and ... consequently' and it can be used to determine the presence or absence of features, reinforcing the but-test. She zipped up the dress, so it is not closed is contradictory and indicates that being 'closed' is a necessary result of being 'zipped up' (Lipka 1972: 60-61). Paraphrase tests have also
been applied in the determination of semantic features and atomic predicates. (See Sections 2.2.4.4 and 2.5.4.) Paraphrasibility with do has been discussed by Cruse (1973). The inconclusiveness of such tests has been pointed out in Section 3.1.2.

3.2.3.1. **Introspection** as an analytic technique opposed to acceptability judgments and semantic tests has recently been defended by Chafe (1970). We must clearly distinguish at this point between intuition and introspection. The term 'intuition', properly applied, refers to a judgment made without conscious or rational consideration, 'Introspection', however, refers to conscious, rational analysis of thoughts and mental processes.7 Intuition is naturally highly individualistic and, except when carefully controlled, useless as a scientific technique. Introspection, on the other hand, can be extremely useful and accurate. The aversion with which introspection has been viewed seems to be due largely to a totally unwarranted confusion of this concept with that of intuition. Many "intuitional" judgments are largely introspective; these are the more accurate ones. Intuitive judgments which are less introspective tend to be faulty. For example, the validity of the but-test rests on an introspective recognition of contradiction (vs. anomaly or absurdity). Hence, it has proved useful in determining semantic features and atomic predicates. The do-test for agentivity is largely intuitional and thus invalid.

3.2.3.2. Let us consider now the nature of "objective" tests based on so-called "empirical" data in semantic investigations. Such tests, as stated above, are generally devised in order to reinforce intuitions (or introspections) about clear-cut cases and to help in the determination of less clear-cut cases. They depend mainly on intuitional judgments
about acceptability. Such judgments are not particularly objective or reliable. The "empirical" data considered are surface structure sentences, and conclusions about semantic structure are derived from surface structure observations. Surface structure constructions in language can, however, be highly deceptive. For example, the adjective tired is morphologically derived from the verb to tire. On the basis of this surface structure evidence, one would conclude that the state verb be tired is semantically derived from the process verb to tire. Introspection, however, easily establishes that the process verb to tire is actually semantically derived from the morphologically more complex state verb be tired. 'Being tired' is a state, the result of the process of 'becoming tired', just as 'being dead' is a state, the result of the process of 'dying' ('becoming dead'). In both cases, the process represents the semantic inchoative of the state and thus the process verbs are semantically derived from the state verbs (cf. Chafe 1970: 122-123). Similarly, introspection can be used to establish that the semantic roles of the subjects in the sentences The dog is barking and The dog is suffering are distinct, in spite of the surface structure similarity of the sentences: The first sentence represents an activity, hence its subject is an agent; the second represents a process, hence its subject cannot be an agent. The recognition of actions and processes introspectively may be aided by "rules of thumb" (Chafe 1970: 98-99), but these are not totally reliable (ibid.). Nevertheless, introspection, once it is learned (Chafe 1970: 78), is more or less independent of object language tests, and is to be preferred to them; consider, for instance, the equivocation of the do-test with respect to the two sentences mentioned above.
3.2.3.3. A very good example of the theoretical pitfalls and mistakes to which an overreliance on the "objective" nature of "empirical" (i.e., surface structure) data can lead is provided by Cruse (1973). This article discusses numerous tests for determining agentivity and concludes that four independent features are involved. The feature 'Volitive' "is present when an act of will is stated or implied" (18), as in What John did was not eat anything for two days. 'Effective' "is present in a sentence which refers to something that exerts a force (literally or metaphorically), not by virtue of an internal energy source, but because of its position, motion, etc." (19), as in These columns support the weight of the pediment or The flying stone broke the window. 'Initiative' appears in sentences which describe "initiation of an action by giving a command" (20). An example is the sentence The warder marched the prisoners across the yard. The feature 'Agentive' "is present in any sentence referring to an action performed by an object which is regarded as using its own energy in carrying out the action. Included amongst these objects are living things, certain types of machine, and natural agents" (21). An example is John moved to avoid the falling stones. These features may be combined, but Cruse argues that they can all occur separately. His arguments are not totally convincing, however, because his examples have not been closely enough examined semantically. For instance, the feature Initiative is totally unnecessary, since a sentence like John ran the dogs is semantically complex: The form ran in this sentence represents the semantic causative of the one-place predicate RUN; the underlying structure of this sentence may be expressed as 'John caused the dogs to run'. Since this sentence contains two simple sentences, one embedded in the other, it is not unreasonable
to say that both have Agentive subjects. Cruse’s feature Effective includes both Instruments and Forces (see Section 2.6); some Forces are, however, said to be Agentives. In general, it is extremely difficult to imagine a case in which an "act of will" does not necessarily lead to an action. Cruse pleads elegantly for "empirical" and "analytic" techniques in semantic analysis (15, 23), but he forgets that adequate controls are necessary in any empirical investigation. Thus he neglects to consider the possibility that the acceptability or unacceptability of the examples he discusses may be due to other factors than those which he is proposing. For instance, he is confused by the semantic oddity of John vigorously looked at Mary into thinking that John might not be an Agent in this sentence. But vigorously implies a physical activity, as is clear from the way in which this sentence is interpreted. The fact that the sentence is semantically odd thus only implies that look does not normally denote a physical activity; it says nothing about the possibility that look denotes a mental activity.

3.2.4. Acceptability determinations and semantic tests are based largely on intuitional judgments (i.e., "gut reactions") concerning surface structures. As such, they are less reliable in semantic analyses than introspection, which can be pursued systematically and consistently. If acceptability determinations and semantic tests are formalized, they can be useful in certain cases. Any examination of surface structures in semantics must, however, consider underlying structures. It is ironic that most arguments in generative semantics are based on surface structure phenomena; this is odd for a theory supposedly based in semantics. Surface forms of sentences and their underlying semantic representations need have no formal structural similarities
(see Sections 1.8.2.1. and 2.2.6), and it is unreasonable to assume that structural investigation of the former will yield any information concerning the structural organization of the latter. Rather, a system of symbolic logic should be devised for semantic representation, and rules established for the mapping of semantic structures into surface structures. (See Chapter 4.) Since the publication of Aspects, it has been widely accepted among linguists that all sentences have both surface and underlying structures, and that the deepest underlying structure of a sentence is closest to its semantic interpretation. Therefore, it is somewhat paradoxical that today many arguments in semantics are based exclusively on surface structures and not on introspective examination of semantic representations.
3.3. Language and Cognition

3.3.1.1. Since there is little prospect at present of measuring and analyzing the immensely complex electrochemical configurations of the brain directly, it is useful to construct models of mental states and processes based on external observations of behavior; hence, the study of language provides important information in the construction of such models. Language is regarded in the present treatment as a complex system for relating cognitive structures (thoughts) to phonetic structures (sequences of sounds). Symbolic logic, properly modified, is held to provide an adequate system for representation of cognitive structures in a theoretical model. This model of language is not generative in any sense; it is, however, transformational. The only "generative rules" considered are well-formedness conditions on logical representations used to model cognitive structures. These structures are not considered to be generated by the well-formedness conditions.

3.3.1.2. Cognitive structures may be said to be "prelinguistic" (Slobin 1971: 100). They come into being through the process of the formation of thoughts. They function as input to linguistic processes which convert them eventually into spoken utterances. This formation of thoughts and conversion of them into speech occur concurrently, the latter dragging somewhat behind the former but influencing it continually. That is, when we are speaking, what we say is being constantly monitored, and this feedback is essential for the production of speech. The words we use and the configurations in which they occur also influence the train of thought and the production of cognitive structures. Nevertheless, cognitive structures can be considered to precede speech (Slobin 1971: 98-102; Vygotsky 1962: 150). The postulation of cog-
nitive structures is nonbehavioristic, but it is perfectly scientific. It is reasonable to assume that complex electrochemical configurations in the brain, through a long chain of development, give rise to neural impulses to the speech organs. A model of human linguistic behavior must provide an appropriate system for representing underlying structures which correspond to these electrochemical configurations.

3.3.1.3. Linguistic rules operate to map cognitive structures into phonetic structures. Whereas it is conceivable that universal rules for the organization of cognitive structures exist (cf. the Universal Base Hypothesis), mapping rules are highly language-specific. They concern the linearization of semantic material (cf. Chafe 1970), complex rearrangement, and symbolization. (See Section 4.6.) Lexical insertion occurs late in the mapping process and involves the introduction of phonological information. Lexical items are held in the present study to be nonexistent as such in cognitive representations.

3.3.2. It has been stated above that language functions to relate cognitive (semantic) structures and phonetic structures. It has proved useful, however, to remove phonetics from linguistics proper by postulating a phonemic level. In this level the continuum of sound in speech is segmented, according to the way in which it is perceived linguistically. Similarly, it has been proposed (Philip Davis, personal communication—also in stratificational theory, see Lockwood 1972) that one establish a sememic level, in which cognitive structures are represented in a fashion amenable to linguistic analysis. The proposal is attractive, since it to a certain extent abstracts language from its two poles, semantics and phonetics, which can be studied independently of language itself. Whether the proposal should be accepted
depends on its usefulness in the formulation of linguistic models. The phonemic level has, of course, been attacked by generative grammarians, who deny its independent existence (cf. Halle 1964). If the phonemic level is discarded, the semantic level is no longer justified for reasons of symmetry. Also, whereas we know that speech sounds are continuous as opposed to phonological representations, which are segmented, we know little about cognitive organization directly, and hence we cannot compare it to linguistic representations of it. Thus, it is futile to postulate a priori a semantic level distinct from semantic structure. Rather, we can propose linguistic representations for cognitive structures, and for the purposes of our model, assume that these representations are indistinguishable from the cognitive structures to which they correspond.

3.3.3. It is often argued that it is necessary to distinguish between linguistic and extra-linguistic knowledge. The term knowledge, as used here, refers to sets of memory patterns in the brain. Linguistic knowledge is supposedly directly involved in the use of language, whereas extra-linguistic knowledge is not. There are at least two possible types of linguistic knowledge: one type consists of the mental representation of grammatical and phonological rules—that is, the mechanisms for transforming cognitive structures into neural impulses to the speech organs; the other type of linguistic knowledge is concerned with the meanings of lexical items. Only the second type of linguistic knowledge is normally discussed in contrast with extra-linguistic knowledge. It is generally accepted that knowledge of grammatical and phonological rules is a distinct type of knowledge. It is debatable, however whether a consistent and reasonable distinction can be drawn
between linguistic and extra-linguistic knowledge concerning the meanings or uses of lexical items. The distinction, if it exists, is identical to the analytic-synthetic distinction in philosophy. For instance, a definitional sentence should represent only linguistic knowledge, since such sentences are supposed to be analytic (cf. Weinreich 1966: 84ff.), e.g., A bachelor is an unmarried man. How is lion then to be defined? The sentence A lion is a feline is analytic but it is insufficient as a definition. Lions happen to be large carnivorous felines "having a tawny coat and a heavy mane in the adult male" (cf. American Heritage Dictionary). All of the information in this accepted definition of lion, except for the noun feline, would be regarded as extra-linguistic, since the sentences A lion is large, A lion is carnivorous, A lion has a tawny coat, and An adult male lion has a heavy mane are all synthetic. The distinction between "linguistic" and "extra-linguistic" knowledge is of little value in explaining what a speaker of a language "knows" about the meaning of a word. No evidence has been adduced to show that speakers of a language make any natural distinction whatever between analytic and synthetic sentences, or between linguistic and extra-linguistic knowledge, in their use of language. (Cf. Section 2.2.5.6.)

3.3.4. A necessary distinction must be made at this point between lexical items and concepts. Lexical items are held (in the present study) not to exist as such at the level of cognitive representation. Individual cognitive structures are structures of concepts which are related to one another in a fashion describable with the help of symbolic logic. Lexical items are introduced very late in the derivation of a sentence, at the stage of symbolization (cf. Chafe 1970) where conceptual structures are realized as phonological structures. Lexical
insertion necessarily occurs late in a derivation, because lexical items are in general conceptually and transformationally complex. The concepts which an individual lexical item represents must be brought together by transformational processes before lexical realization can take place.

3.5. Linguistic structures and rules are regarded in this treatment as models of cognitive structures and mental processes. It has been asserted that there need be no natural connection between theories of language and actual cognitive processes (cf. Chomsky 1965). A theory of language which is inapplicable as a model of cognitive processes is, however, an exercise as useless as spinning out Ptolemaic or Tychoean epicycles. All theories of language should seriously try to model cognitive processes as closely as possible. Proposed theories of language should be judged not only for their observational and explanatory adequacy, but also for their fitness as models for actual cognitive processes.
3.4. Meaning Rules and Presuppositions

3.4.1. A semantic theory which uses dictionary entries to express the meanings of lexical items is incapable of indicating any logical relations between these items other than simple hyponymy, or semantic inclusion. For example, dictionary entries for father and old cannot clearly show that the sentence John is older than Harry is a necessary condition for the sentence John is the father of Harry. Therefore, it is necessary to postulate a meaning rule (see Section 2.2.5.1) which indicates this logical relation explicitly, viz. father of → older than. A semantic theory of a natural language must contain a meaning rule for every logical relation that holds between lexical items of the language. Meaning rules, in fact, can replace dictionary entries entirely, since the assignment of a semantic feature to a lexical item can be expressed as a logical rule containing a conditional expression: asserting that the lexical item cat contains the semantic feature (Animate) corresponds to the meaning rule cat → animate. Meaning rules are logical relations between object language words. Hence the confusion often involved in the postulation of semantic features (which are metalinguistic expressions) can be avoided. That is to say, there is nothing problematical about asserting If X is a cat, then X is animate (a statement in the object language), whereas the assertion that the lexical item cat somehow contains a semantic feature (Animate) presupposes that such a semantic feature actually exists. The problems involved with such an assertion are discussed in Section 2.2.4. A semantic theory of a natural language which utilizes meaning rules can express all paradigmatic relations between lexical items of that language, and not just those that are captured in dictionary entries, without the necessity of postulating such potentially
dubious items as the "semantic feature" (Animate).

3.4.2. Meaning rules which indicate how object language words are logically related are, of course, language-specific, since they are stated in a particular language and since they concern specific words of that language. A general theory of semantics requires meaning rules which show how logical predicates are related, and a semantic metatheory must contain meaning rules which express properties of logical relations. That is, a semantic theory must contain the meaning rules NECESSARY (x) \rightarrow \text{POSSIBLE} (x) \text{ and } \text{REQUIRE} (x,y,S) \rightarrow \text{PERMIT} (x,y,S), among others (cf. Lakoff 1972a: 607). \footnote{The terms written in capital letters denote logical predicates.} Meaning rules which relate logical predicates are often called "meaning postulates". Meaning postulates are semantic universals; e.g., the postulate NECESSARY \rightarrow \text{POSSIBLE} is valid for all natural languages. Metatheoretical meaning rules correspond to logical rules of inference, such as transitivity of implication. Notice that by clearly distinguishing the notions of 'semantic theory of a language', 'semantic theory', and 'semantic metatheory', we are able to illustrate clearly the distinction of '(lexical) meaning rule', 'meaning postulate', and 'metatheoretical meaning rule'. Metatheoretical meaning rules are not of concern here, since they are discussed in standard texts on symbolic logic (e.g., Copi 1973). Meaning postulates and lexical meaning rules are applied in Chapters 4 and 6, respectively.

3.4.3.1. Meaning rules and meaning postulates can be used to express lexical presuppositions. Before we can see how this is done, we must first formalize the expression of meaning rules. All meaning rules are written as conditional statements containing variables (i.e., as conditional statement forms). Any lexical item of the language being
described can replace a variable in a meaning rule, and the resulting statement is always true, no matter what lexical item is inserted. For example, the conditional statement form If X is older than Y and Y is older than Z, then X is older than Z is a meaning rule of the English language. Hence, If John is older than Harry and Harry is older than Dick, then John is older than Dick is a true statement. Similarly, If X is a cat, then X is animate is a meaning rule in English. "Presuppositions about intended referents" (cf. McCawley 1968a: 268) can also be written as conditional statement forms: e.g., the presupposition that the subject of the verb read must denote a human being can be expressed as If X reads, the X is human. For all possible values of X, this is a true statement in English--hence it is a meaning rule of English, expressing a fact about the word read. Consider another example: the presupposition that the object of the verb diagonalize denotes a matrix can be expressed as the meaning rule If X diagonalizes Y, then Y is a matrix. (One could add the phrase and X has studied mathematics, which would express the presupposition that the subject of diagonalize must be someone who has studied mathematics.) Expressing lexical presuppositions as meaning rules makes it possible to explain the interpretation of anomalous sentences: The chair laughs is interpreted as meaning that the chair referred to has human qualities--i.e., it is a cartoon chair or the like. The interpretation follows directly from the insertion of the noun phrase into the meaning rule If X laughs, then X is human.

3.4.3.2. Lexical presuppositions must be distinguished from sentential presuppositions. Lexical presuppositions are imposed by a lexical item on its intended referents, asserting what they denote; sentential pre-
suppositions derive from syntactic structures, normally embedded or underlying sentences. For example, the sentence All Jack's children are bald presupposes the sentence Jack has children, which is the underlying structure of the phrase Jack's children. Similarly, John stopped beating his wife presupposes John beat his wife; the second sentence is embedded in the first. Not all embedded sentences, however, give rise to presuppositions; Bill said the sun was shining does not presuppose The sun was shining. The embedding verb say blocks the presupposition. Karttunen (1973) has studied presuppositions of compound sentences in some detail, and he distinguishes between three types of embedding predicates: those which block all presuppositions are called plugs; those which pass all presuppositions are called holes; and those which selectively pass some, but not all, presuppositions are called filters.

3.4.4. The use of meaning rules enables a semantic theory of a language to express all of the logical relations between lexical items of that language, including lexical presuppositions, in the same standard form, without the need for dictionary entries. Neither are definitional sentences required, since meaning rules can be devised which indicate all of the information normally contained in definitional sentences. If meaning rules are used, it is not necessary to postulate questionable metalinguistic expressions such as features, and the problem of defining the notion of definition in a satisfactory manner becomes vacuous (cf. Section 2.2.5.6). The use of meaning postulates to express logical relations between predicates in a general semantic theory provides the possibility of indicating semantic universals in a clear and succinct manner.
CHAPTER 4: RELATIONAL SEMANTICS

4.1. Introductory Comments

4.1.1. The purposes of the present investigation are to devise a method of semantic representation based on the techniques and notations of symbolic logic and to apply this method in the study of German prepositional expressions (Chapter 6). Primary emphasis is devoted to the representation of semantic relations in logical structures. Hence several matters normally of concern in semantic studies are not discussed, since they do not bear directly on the study of semantic relations. These include tense, mood, aspect, adverbial representation, sentential presuppositions, performatives, etc.

4.1.2. A primary goal of the theoretical model presented here is an attempt at a synthesis of generative semantics and case grammar (with a bit of Chafe 1970 and Brekle 1970 added). Cases are treated as higher-order predicates in logical representations which can be displayed in a fashion similar to the trees of generative semantics. Lexical insertion is achieved by symbolization (in the sense of Chafe) after transformational processes have rearranged predicates, etc., in semantic representations.

4.1.3. The semantic representations proposed here result from introspective consideration of the meanings of the sentences considered as examples (cf. Section 3.2.3). The reader is encouraged to apply his own logical reasoning to determine whether he agrees with
the proposed analyses (cf. Chafe 1970: 11-12). Atomic predicates
and deep cases which have been widely mentioned in the literature
are taken over in the present treatment relatively unchanged, except
where certain suggestions for modifying particular case concepts have
been made (cf. Section 4.4).
4.2. Deep Cases as Semantic Relations

4.2.1.1. There is considerable disagreement in modern linguistic theory concerning whether the notion of 'activity' inherent in the meaning of a sentence like John ran or John opened the window should be ascribed to the presence of an "action verb", an "agentive noun phrase", or to both. The analysis in terms of "action verbs" is the most common one: Katz assigns a feature "(Activity)" to such verbs (1966: 167; 1967: 169; 1972: 112); Gruber (1967) states that look is an "Agentive verb" (943); and recent treatments in generative semantics (McCawley 1971b, Dowty 1972, Ross 1972) postulate a "highest predicate DO" in the semantic representations of sentences like the above. Fillmore, however, places certain noun phrases in such sentences (usually the grammatical subjects) into an "Agentive case" (1968a: 24), and Jackendoff (1972a) discusses an "Agent NP" (32), although he assigns causativity to verbs (15). Lyons (1968) also writes of "agentive nouns" (296). Finally, Chafe (1970) classifies some verbs semantically as "actions" (99-101) and specifies that they be accompanied by "agent nouns" (102-103).

4.2.1.2. Analysis in terms of action verbs is supported by surface structure evidence from English and languages related to English, but some languages (e.g., Eskimo) morphologically mark certain nouns as agents (cf. Lyons 1968: 341-342) in sentences which describe activities. If we postulate that all languages have identical (or nearly identical) systems of semantic representation, we must decide whether to regard the presumably universal notion of activity as an inherent semantic feature of certain verbs (in all contexts) or as an external syntactic category (agentive) for noun phrases. (Accepting both alternatives simultaneously,
as Chafe does, seems to result in a certain amount of redundancy in semantic descriptions.) Since the surface structure evidence is inconclusive, the decision has to be made on the basis of practical considerations.¹

4.2.1.3. There is a third choice for the treatment of activity (or agentivity), however. One can regard it as a semantic relation between verbs and noun phrases, and not contained in, or assigned to, either one. This conception is implicit in Fillmore’s work, since he repeatedly speaks of "case relationships" (1968a: 21; 1969a: 116), but he has never pursued it to its logical conclusion. He still refers to certain noun phrases as being Agents, and not as being in the "agentive relation" to certain verbs. Cruse (1973) recognizes that agentivity is a relational concept "between a verb and a noun" (14), but in his discussion of it he ascribes it to nouns.

4.2.2. All of the "cases" discussed by Fillmore and others can be regarded as semantic relations between verbs and noun phrases. Semantic relations should be indicated as such in underlying representations, and not as categories of nouns or as features of verbs. The most practicable way of achieving such a representation is to treat semantic relations as logical predicates. It might be argued that this treatment is a "notational variant" of Fillmore’s, but this is not the case. The semantic relations between the constituents of a sentence constitute its semantic structure, and this fact is more clearly reflected in the representations proposed here than in Fillmore’s case configurations.

4.2.3. This conception of semantic structure as a system of relations corresponds closely to Chafe’s general model of a system of semantic axes extending different dimensions and constituting a mobile rather than
a tree (1970: 5). The present treatment, however, differs from Chafe's theory very strongly on certain specifics of semantic representation. Brekle (1970) explicitly treats cases as semantic relations in the analysis of nominal compounds in English. His work has been of considerable influence on the development and formulation of the theoretical model presented here.
4.3. The Logical Structure of Semantic Relations

4.3.1. It is a major contention of this dissertation that sentences have underlying semantic representations which are describable with the techniques of symbolic logic. There is considerable dispute concerning the 'logical nature' of language, but this is largely a phony issue resulting from incomplete understanding of the nature of logical systems and scientific pursuits (cf. Brekle 1970: 11-13). Any system of rules for describing language must be logically based—otherwise it is no coherent system at all. Much of the confusion concerning the relation of logic and language is based on an identification of logic with traditional propositional and predicate logics. The latter are incapable of dealing with natural language except on a very limited scale, but this by no means implies that language cannot be described with logical means. What is needed is a logic that is more powerful than traditional predicate logic, but which still is a logical system. Such a system has been called a "natural logic" (cf. McCauley 1972, Lakoff 1972a). This term is not used to describe the system proposed in this chapter, however, in order to avoid having it identified with McCauley's or Lakoff's approaches.

4.3.2. Many theories of language obscure its most important function—that of human communication. As a communication system, language is describable from three aspects: firstly, the nature of possible messages may be investigated; secondly, the nature of the encoded forms of these messages may be examined; thirdly, the encoding system itself may be postulated on the basis of information regarding the nature of messages and their encoded forms. Since human language possesses the feature of duality, there is no need for assuming that the structuring of possible messages has anything at all in common with the structure of their encoded
forms. These two structures, *semantic structure* and *phonetic structure*, are related to one another by the grammatical rules of a language. The failure to separate clearly the three areas of semantic structure, grammatical rules, and phonetic structure has led to much confusion in linguistic theorizing and description. Structuralists try to base their analyses of language mainly on the analysis of phonetic structures, and generative grammarians regard the grammatical rules of a language as a system for generating sentences. Both schools neglect to a large extent the study of semantic structures as such. In early studies of semantics in generative grammar, semantic structures are treated as poor cousins ('interpretations') of independently generated syntactic structures. Semantic structures are, however, the messages which are to be encoded, and they do not derive from unrelated operation of grammatical rules. Rather, semantic structures serve as inputs to sets of grammatical rules whose outputs are phonetic structures. (Obviously, phonological rules are included here under 'grammatical rules'.) A modern semantic theory should be concerned with analyzing semantic structures, using techniques which, almost by definition, must be based on logical systems of some sort. The theory must also indicate how the semantic structures which it proposes are transformed into corresponding phonetic structures (which are assumed to be more or less well understood). The only prevailing theories which accept this method of linguistic analysis are generative semantics, case grammar, and Chafe's theory,\(^2\) which cannot be regarded as belonging to either of the first two. A possible merger of these theories provides the best prospect for a new semantic theory at the moment. (See Section 2.7.3.)

4.3.3.1. The present analysis is concerned primarily with applying the
techniques of symbolic logic to the examination of semantic structures. The system of logic employed here is a modified form of the advanced predicate calculus described in Reichenbach (1947), Carnap (1960), and other works.³ Sentences are represented semantically as logical propositions, composed of configurations of quantifiers, predicates, variables, and constants.

4.3.3.2. As in generative semantics and case grammar, common nouns, verbs, and adjectives are represented in semantic structures by logical predicates. These predicates can be classified according to the number and type of arguments which they take (cf. Fillmore 1969, Bierwisch 1969). For instance, the noun man is represented as a one-place predicate, the verb love as a two-place predicate, etc. The arguments of these predicates correspond to noun phrases; they may be variables (x, y, etc.), proper nouns (John, Mary, etc.), or sentences. No claims are made as to the atomicity of the predicates used; predicates which are commonly accepted as atomic in various analyses, however, are employed in most cases. Predicates representing common nouns, verbs, and adjectives are called simple predicates; as a notational convention, they are written in small letters, capitalized, and underlined.⁴

4.3.3.3. Semantic relations are represented as higher-order predicates (see Brekle 1970: 72-74; Reichenbach 1947: 122f.). For purposes of illustration, consider the sentence John is a man. This sentence may be represented semantically by the proposition Man (John), where Man is a one-place predicate, and John is its argument. This representation does not, however, indicate the semantic relation which holds between the predicate and its argument in the above sentence. This particular relation will be called Objective (OBJ). (Relations are written in abbreviated form,
in capitals.) To indicate this relation in semantic structure, it is written as a higher-order predicate containing two arguments, one of them being the simple predicate itself; the other one being the argument of this simple predicate: OBJ (Man, John). (The order of the arguments in unimportant; the simple predicate will always be underlined.) This representation goes beyond the rather simple representation Man, (John), which would be employed in generative semantics; and OBJ is treated not as a category for the noun phrase John, but as a relation between the predicate Man and its argument.

4.3.3.4. As another example, consider the sentence John loves Mary. The simple predicate structure of this sentence is Love (John, Mary). This representation does not show that John is in an Experiential (EXP) relation to the verb in this sentence, nor that Mary is in the Objective relation. The semantic structure of this sentence is based on these two relations, and we could write it in the following form: EXP (John, Love) & OBJ (Love, Mary). However, simple concatenation of these relations is unsatisfactory, since the predicate Love occurs twice and we cannot be sure it will be regarded as having the same arguments in each case. Also, the concatenation does not express the fact that John experiences not just love, but love for Mary. Thus, it seems intuitively satisfying to embed the second predicate in the first, giving EXP (John, OBJ (Love, Mary)).

4.3.3.5. To describe other semantic structures, some special predicates must be introduced. NEG is a one-place predicate whose argument is another predicate, as for instance, NEG (Alive), which is a complex predicate whose surface realization is the adjective dead. INCHO is also a one-place predicate whose argument is another predicate; it corresponds to BECOME, COME ABOUT, and Lipka's feature 'Dynamic' (1972: 66). (See also Lee 1973.)
As an example, INCHO (NEG (Alive)) is the semantic representation of the verb die. A third important special predicate is CAUS. CAUS is a higher-order predicate which has two arguments, each of which is a proposition or propositional function consisting of a relational predicate and its arguments. One of the relational predicates must be Agentive (AGT) and the other must be Objective. Causation is thus treated as a relation between two events (cf. McCawley 1971b: 33, n. 1; Fillmore 1971a: 45; Dowty 1972: 62ff.). It is now possible to formulate a semantic representation for John kills Harry (cf. Section 2.5.3.3.). The acceptance of event causation necessitates the postulation of a dummy verb to describe what John does in order to kill Harry (i.e., he could stab him, shoot him, etc.). A dummy verb is needed because the actual nature of John’s activity is left vague in the above sentence. This dummy verb will be represented by the one-place predicate DS (for Do Something). This dummy predicate has one argument, John, which stands in the Agentive relation to the predicate. John’s activity causes Harry to die. Die is represented as above, and Harry stands in the Objective relation to this predicate. The final semantic representation for John kills Harry is then CAUS (AGT (John, DS), OBJ (Harry, INCHO (NEG (Alive)))).

4.3.3.6. The analysis of sentences containing common nouns is somewhat more complicated. Common nouns, like adjectives and verbs, are represented as predicates. Thus, they do not occur as simple arguments in the above semantic formulas in the same manner as do proper nouns. When common nouns occur in a surface structure in construction with adjectives or verbs, they are replaced by variables in semantic representations. For example, the sentence The dog bites the man
may be first paraphrased as 'The x which is a dog bites the y which is a man' (cf. Bach 1968). The variables x and y must be bound (in this case with the definite description operator (ι)), and the semantic relations which hold between them and the predicates Dog and Man, respectively, must be specified. (In both cases this is the Objective relation.) Thus, 'the x which is a dog' is represented by the semantic formula (ιx) OBJ (Dog, x), and 'the y which is a man' is represented by the formula (ιy) OBJ (Man, y). The second of these formulas stands in the Patient (PAT) relation to the two-place predicate Bite (which, though undoubtedly complex, is not further analyzed here). The representation of 'bites the y which is a man' is then PAT (Bite, (ιy) OBJ (Man, y)). The first of the above formulas stands in the Agentive relation to this complex predicate. Hence, the semantic representation of 'The x which is a dog bites the y which is a man', or The dog bites the man, is given by AGT ( (ιx) OBJ (Dog, x), PAT (Bite, (ιy) OBJ (Man, y)))). Since sentences correspond to propositions, and not to propositional functions, all variables in representations of sentences must be bound. This is accomplished by the use of quantifiers. In general, several quantifiers are required for semantic representations of sentences: the existential quantifier (∃), the universal quantifier (∀), the definite description operator (ι), the indefinite description operator (η), and perhaps others.⁵
4.4. Description of Relations

4.4.1. An optimal set of relations to be used in semantic descriptions has not yet been established. As with cases, new semantic relations may have to be proposed as research progresses, and already existing relations may have to be rearranged somewhat. In the present analysis, the following relations are postulated: Objective (OBJ), Patient (PAT), Agentive (AGT), Experiential (EXP), Instrumental (INST), Locative (LOC), and Benefactive (BEN).

4.4.2. The Objective relation is the most neutral relation. It holds between a predicate and one of its arguments if this argument is in general unaffected by the predicate, except when a change of state is indicated (as with INCHO). The Objective relation occurs in the following examples: between 'John' and 'is a man' in John is a man (attribution); between 'Mary' and 'loves' in John loves Mary (but cf. Fillmore 1971a: 53); between 'Venus' and 'revolves around the sun' in Venus revolves around the sun (motion); between 'Harry' and 'die' in Harry is dying (change of state). The Objective relation approximately corresponds to Fillmore's Object in its latest version (Fillmore 1971a: 42).

4.4.3. The Patient relation holds between a predicate and one of its arguments if this argument is 'affected' or 'effected' by the predicate (cf. Brekle 1970: 71). It occurs in the following examples: between 'Harry' and 'hit' in John hit Harry; between 'food' and 'eat' in John eats food; between 'house' (actually, 'some x which is a house') and 'built' in John built a house. The Patient relation corresponds to Fillmore's Goal (Fillmore 1971a: 42).

4.4.4. The Agentive relation occurs in a sentence which describes an
activity; it relates the main predicate of the sentence to the argument which is thought of as the source of the activity. Normally, such arguments are animate, but so-called 'natural agents' may also stand in the Agentive relation to a predicate (cf. Huddleston 1970, Cruse 1973). The Agentive relation holds between 'John' and 'hit Bill' in John hit Bill, between 'John' and 'ran' in John ran, and between the wind ('the x which was a wind') and 'pushed against the door' in The wind pushed against the door. The Agentive relation subsumes Fillmore's Agent and Huddleston's Force.

4.4.5. The Experiential relation holds between a predicate and an argument which represents the psychological perceiver of a mental event or state. It occurs in the following examples: between 'John' and 'loves Mary' in John loves Mary; between 'John' and 'knows the answer' in John knows the answer; between 'John' and 'is sad' in John is sad.

4.4.6. The Instrumental relation holds between a predicate and an argument which indicates the means by which a process or action is carried out. It is only present when embedded in an Agentive relation. The Instrumental relation holds between a key ('some x which was a key') and 'used' in John used a key to open the door. In the surface form of sentences with an Instrumental relation, the argument in the Agentive relation may be deleted. Such an argument is always understood, however. That is, The key opened the door is always understood to mean 'someone used the key to open the door', unless the key is personified.

4.4.7. The Locative relation occurs in sentences which indicate spatial or temporal relations. Many prepositions are represented
semantically as predicates in a locative relation to one of their arguments (cf. Chafe 1970: 69ff.). Thus, the relation between 'the box' ('the x which is a box') and 'in' in the sentence *The cake is in the box* is Locative.

4.4.8. The Benefactive relation holds between a predicate and one of its arguments which represents the recipient or beneficiary of an action, process, or state. This relation is the most problematical of the ones which are considered here. It holds between the possessor of something and the predicate representing what is possessed, and is thus a representation of one of the meanings of *have*. It also can represent the preposition *for*. *John has the book* is representable as BEN (John, (1x) OBJ (Book, x)), and *John did something for Mary* corresponds to BEN (Mary, AGT (John, DS)). The Benefactive relation may require revision in subsequent work.
4.5. Examples of Analyses

4.5.1. Consider the sentence John killed Harry with a knife. This sentence may be paraphrased as 'John did something with something which was a knife; this activity caused Harry to change from the state of being alive to the state of not being alive'. This paraphrase represents in rough form the semantic content of the above sentence. John's activity is left vague to a certain extent, but it involved a knife; John's activity was the cause of Harry's death. The following is a semantic representation of this sentence (ignoring problems of tense, etc.):

CAUS (AGT (John, INST (DS, (\(\exists x\)) OBJ (Knife, x))), OBJ (Harry, INCHO (NEG (Alive)))). (The \(\exists\)-quantifier is used to represent the indefinite article.) It might be argued that Harry is in the Patient relationship and not in the Objective relationship to the complex predicate, INCHO (NEG (Alive)), since 'Harry' is surely an affected object of 'kill'. This is not the case, since INCHO (NEG (Alive)) indicates merely a change of state, and 'Harry' is not affected by this predicate. There is an affected argument in the above formula, however; it is OBJ (Harry, INCHO (NEG (Alive))), the second argument of CAUS. We may say, then, that this argument stands in the Patient relation to the special predicate CAUS.

The relation between the first argument of CAUS and this special predicate may be called Instrumental, if we broaden our definition of the Instrumental relation somewhat. We are thus in agreement with Fillmore (1971a), who states that "Instrument" is "the case of the immediate cause of an event" and that "Goal" (the Patient relation) "identifies the resulting state or event in a causative construction" (42). Hence, in this treatment, the argument of CAUS which has AGT as its highest predicate is said to be in the Instrumental relation to the predicate CAUS,
and the argument which has OBJ as its highest predicate is said to be in the Patient relation to the predicate CAUS. It is unnecessary to indicate these relations explicitly, however, because they are completely predictable from this rule. It is possible to restrict the predicate CAUS in this fashion, by specifying the nature and relations of its two arguments, because it is a theoretical construct. Ordinary predicates are in general not restrictable with respect to the relations they may have with their arguments (see Chapter 5).

4.5.2. Now let us consider a more complicated sentence: John’s love for Mary blinded him to her faults. The analysis of this sentence (again ignoring tense, etc.) is somewhat complex, since it is metaphorical. First we have an experience, ‘John’s love for Mary’; this experience causes ‘John not to be able to see Mary’s faults’. If we accept event causation, however, we cannot have an experience directly as a causer; we must actually imagine this experience as doing something to cause its effect. Thus, it must be in the Agentive relation to the dummy predicate Do something (DS). (Admittedly, this conception of an experience carrying out an activity seems counter-intuitive. Perhaps the hypothesis of event causation is not correct for metaphorical cases. However, we will leave things as they are for the moment.) Thus, the first argument of CAUS in the semantic representation of the above sentence will be AGT (EXP (John, OBJ (Love, Mary)), DS). The second argument is best constructed from inside outwards. The phrase ‘her faults’ means ‘Mary’s faults’, or ‘the faults which Mary has’. The common noun fault is treated here as a simple one-place predicate, although it is undoubtedly further analyzable. Hence, ‘the faults which Mary has’ will be paraphrased as ‘the x which are faults which Mary has’, which has the semantic
representation: $(\forall x) \text{BEN}(\text{Mary, OBJ} (\text{Fault, x})).$ The universal quantifier is used here as the definite plural quantifier. John's love for Mary causes him not to be able to see her faults. 'See' is treated here as a simple two-place predicate; 'John' is in the Experiential relation to this predicate 'see her faults'. 'Her faults' is in the Objective relation to 'see'. We then have the partial representation $\text{EXP}(\text{John, OBJ} (\text{See}, (\forall x) \text{BEN}(\text{Mary, OBJ} (\text{Fault, x}))))$. This corresponds to the embedded sentence 'John sees Mary's faults'. This embedded sentence is in the Patient relation to the predicate 'is able' (as an 'effected object'). 'John' is in the Objective relation to 'is not able to see Mary's faults'. This Objective relation with its arguments constitutes the second argument of the predicate CAUS. We thus have the final representation of John's love for Mary blinded him to her faults:

$\text{CAUS}(\text{AGT}(\text{EXP}(\text{John, OBJ} (\text{Love, Mary})), \text{DS}), \text{OBJ}(\text{John, NEG}(\text{PAT}(\text{Able, EXP}(\text{John, OBJ} (\text{See}, (\forall x) \text{BEN}(\text{Mary, OBJ} (\text{Fault, x})))))))).$
4.6. Surface Realization of Semantic Structures

4.6.1. Semantic structure and phonetic structure are assumed in the present treatment to possess no organizational similarity whatever. Phonetic structure is linearly organized, whereas semantic structure is not. Hence there must be considerable rearrangement of semantic material before semantic "messages" can be encoded as phonetic "signals". Following Chafe (1970), two principal structural levels are proposed: semantic structure is the level of cognitive representation. Various linguistic processes operate on cognitive representations, changing them eventually into surface structures. Surface structures are symbolized as "prephonetic" structures, as in Chafe (1970). (See Section 1.8.)

4.6.2. The reorganizational processes necessary to convert semantic structures into surface structures involve primarily linearization; that is, predicates and arguments must be placed into an appropriate order. As in generative semantics, atomic predicates must be combined into one node (if tree representations are used; see Section 5.1.) or into one complex predicate (if logical expressions are used.) Surface structure conventions, etc., follow accepted principles of surface structure organization in generative theories. Operations of linearization, transformation, and topicalization are similar in the present model to proposals in Chafe (1970), generative semantics, and Fillmore (1968a).

4.6.3. Although semantic material is reorganized into a surface structure, it still remains semantically oriented. That is, there are no "lexical items" in surface structures, but rather conceptual configurations. The symbolization process converts conceptual configurations into phonetic-like structures. Lexical insertion in the present model is conceived of as lexical realization. That is, conceptual structures are realized as
lexical structures containing phonological information. The lexicon in the present theory contains thus not representations of meanings, but rather correlations of phonological information with conceptual configurations.
CHAPTER 5: EVALUATION OF PRESENT TREATMENT

5.1. Comparison with Generative Semantics, Case Grammar, and Other Theoretical Proposals

5.1.1. The theoretical analysis proposed in Chapter 4 is based on an extension of the notions and terminology of symbolic predicate logic. The theory is definitely "semantically based" in that it is concerned with representation of semantic structures and in that it accepts the view of language as a system for translating meaning patterns into sound patterns and not as a mathematical object for "generating" sentences semantically. Hence, the present treatment has much in common with generative semantics, case grammar, and "Chafean" semantics. Many of the results are similar in principle to those achieved in stratificational theory -- although this theory is not applied or discussed here, primarily for reasons of notational complexity. The present model emphatically rejects interpretative theories of semantics.

5.1.2.1. The main distinctions between the theoretical model presented in Chapter 4 (which may be called relational semantics) concern notation and complexity of semantic representation. Although a system of semantic relations is best visualized as a multi-dimensional mobile, it is possible to translate the logical expressions of Chapter 4 into tree diagrams similar to those used in generative semantics, albeit somewhat more involved. Consider the semantic representation in Chapter 4 of John kills Harry: CAUS (AGT (John, DS), OBJ (Harry, INCHO (NEG (Alive)))). As a tree diagram, this representation has the following form:
('PRED' is the node symbol for 'predicate expression'.) The similarity of this tree diagram to tree diagrams in generative semantics should be apparent (cf. esp. Dowty 1972: 63). Of course, there are important differences: the non-terminal node 'PRED' is not the same as a generative semantic node 'S', for instance. A node PRED represents an expression which is understood as a logical predicate whose argument is a sister node with PRED; another sister node is a relational predicate. The generative semantic node S represents an embedded sentence which is an argument of a sentential operator. Also, the argument 'Harry' occurs at a higher place in the above tree diagram than in a generative semantic tree (e.g., Dowty's), since 'Harry' is an argument of the complex predicate INCHO (NEG (Alive)), and not just of Alive. The highest node in the above diagram, 'S', is identical to the highest node 'S' in a generative semantic diagram. Both represent a logical proposition (i.e., a sentence).

5.1.2.2. Relational semantics shares with case grammar a concern for indicating semantic relations explicitly in a theoretical analysis. The relations proposed in Chapter 4 are, of course, derived from case notions already developed by Fillmore and others. Case grammar treatments, however,
have recently suffered from a lack of formalization. Fillmore's early
tree diagrams, with cases as non-terminal nodes, have been justifiably
abandoned, since cases are not properly categorial concepts, but no
better method of representation has been proposed. The present treatment,
which treats cases as higher-order relational predicates in a notation
derived from symbolic logic, represents a much-needed formalization of
case notions.

5.1.2.3. The present treatment bears a definite relation to Chafe's
work, although his methods of semantic representation differ considerably
from those proposed here. His suggestions for treating semantically non-
empty prepositions as logical predicates have been applied in Chapter 6.
The semantic relations proposed here correspond to Chafe's semantic axes
--whereas both ends of his axes are labeled, so to speak (since he dis-
cusses both "action" verbs and "agent" nouns), the axes themselves are
labeled in the present treatment (as the "Agentive" relation, for example.)
Brekle (1970) has influenced the method of logical representation adopted
here, although individual methods of representation in the present treat-
ment differ from Brekle's: the hypothesis of event causation is accepted,
necessitating a complication in the representation of causative expressions;
also, semantically nonempty prepositions are indicated as predicates.

5.1.3. Relational semantics represents an attempt at a merger of gen-
erative semantics and case grammar. The formalized logical notions of
generative semantics are accepted, although they are displayed somewhat
differently here. Cases are treated as relational predicates. There are
signs of other attempts at a merger of generative semantics and case gram-
mar: the "highest predicate DO" postulated for activity sentences by
McCawley (1971b), Dowty (1972), and Ross (1972), corresponds very closely
to the Agentive relation; Ross (1972: 105-106) also hints that he and Lakoff are considering ways of treating other case notions as atomic predicates.
5.2. Advantages of Semantic Analysis Based on Relational Structures

5.2.1. An important point of the theoretical treatment of semantic relations in Chapter 4 is that any simple predicates (i.e., one representing a common noun, a verb, or an adjective) may stand in basically any relation to any one of its arguments. That is, there are no "selection restrictions" as such in the present proposals. For instance, there is no rule prohibiting a structure like AGT (Laugh, (1x) OBJ (Chair, x)). This structure corresponds to the sentence The chair laughs (tense not considered). The oddity of this sentence in "normal" contexts results from the perception of an Agentive relation (signaled by the surface structure word order of the sentence) between a predicate and an argument which is not considered capable of being in such a relation. The perception of the Agentive relation in this sentence causes one to view the chair as the source of the laughing. This is possible only if the chair is perceived as animate. Many combinations of arguments, predicates, and relations may seem strange, but in exactly the same sense as ordinary "selectional violations".

5.2.2. A characteristic of the present treatment is its flexibility. Since there are no restrictions on cooccurrence of relations, predicates, and arguments, many expressions which are complex in surface structure can be represented simply in semantic structure. Consider the sentence John acts (or behaves) like a man. Analysis of this sentence in generative grammar would be somewhat complicated; a satisfactory underlying structure for like has not yet been proposed. For instance, it might be argued that the underlying semantic structure should possess a predicate SIMILAR relating two sentences: John acts and A man acts. An analysis
in terms of relations structures is far simpler: the above sentence is the surface realization between the proper name 'John' and the predicate \textit{Man}: \textit{AGT} (John, Man). This relational structure expresses John's agentivity with respect to the predicate \textit{Man}. Consider now the sentence \underline{John felt like a man}. The representation of this sentence in relational semantics is \textit{EXP} (John, Man). In general, relational semantics captures the structural and lexical economy of early versions of case grammar, while at the same time utilizing the advances in methods of logical representation made possible by generative semantics.
CHAPTER 6: A SEMANTIC ANALYSIS OF GERMAN PREPOSITIONS

6.1. Limits and Goals of the Present Analysis

6.1.1. The present study does not constitute a complete semantic analysis of all German prepositions, nor does it attempt to clarify all aspects of German prepositional usage. For instance, prepositions which take objects in the genitive case are not investigated. These prepositions are semantically complex, as they are mostly denominal derivatives. A study of these prepositions would thus require an excursion into the areas of word-formation and derivation; such an excursion would considerably increase the size of this dissertation and would distract from its primary subject, the study of semantic relations. For similar reasons, phrasal verbs, or verb-particle constructions (cf. Lipka 1972), will not be examined; these have also been extensively elsewhere. (See the bibliography of Lipka 1972.) Finally, verbs with prepositional objects (such as warten auf, neidisch sein auf, etc.) are not discussed here, since these are perhaps best regarded as periphrastic variants of 'simple' verbs without prepositions, (erwarten, beneiden, etc.). The role of the prepositions in verbs with prepositional objects is thus unclear at present, and their usage is furthermore highly idiomatic and language-specific.

6.1.2. Thus, the present analysis is concerned only with German prepositions which govern the dative and/or accusative case and which play a relatively independent role in sentence structure. The prepositions
may be divided into two classes: those which carry only structural meaning, in that they serve to indicate underlying semantic relations; and those which are semantically nonempty. The latter are represented semantically as predicates which stand in the Locative relation to their arguments. The former are represented semantically as higher-order predicates indicating semantic relations. Of course, many prepositions are polysemous; some of their meanings may be locative, and some may be structural. For instance, von in *Die Blätter fallen von den Bäumen* is locative, but von in *Cäsar wurde von Brutus ermordet* is the surface realization of an underlying Agentive relation.
6.2. Locative and Directional Expressions

6.2.1.1. The basic meaning of all semantically nonempty prepositions is locative. These prepositions are thus best represented in semantic structure by logical predicates standing in the Locative relation to their arguments. This Locative relation is often construed in a metaphorical sense: unter diesen Umständen, auf keinen Fall, etc.; such usages generally correspond to adverbs of modality. Since metaphorical and idiomatic senses of words or phrases are dependent on their literal senses (see Sections 2.3.6.1. and 2.4.2.4.), such phrases as the above do not present particular problems at the moment. Thus, we can content ourselves here with literal interpretations of locative phrases.

6.2.1.2. Locative phrases occur both in sentences which indicate states or actions and sentences which indicate processes (i.e., changes of state) or action-processes. Let us first consider the former case. The sentence Der Hut ist in dem Karton expresses a state, the location of the hat. The phrase Der Hut is in the Objective relation to the predicate ist in dem Karton, and dem Karton is in the Locative relation to the predicate In. Thus, the semantic representation of this sentence is given by the following proposition:

\[
\text{OBJ (\(\forall x\) OBJ (Hut, \(x,\)) \text{Loc (In, (\(\exists y\) OBJ (Karton, \(y)))))}.}
\]

(Recall the discussion of common nouns in Section 4.3.3.6.) The predicate In expresses the precise location of the hat with reference to the box. The semantic treatment of the prepositions an, auf, hinter, neben, über, unter, vor, and zwischen is similar to the above treatment of in (except that zwischen is represented by a predicate which takes two arguments). For instance, Der Hut ist hinter dem Karton is represented semantically as:

\[
\text{OBJ (\(\forall x\) OBJ (Hut, \(x,\)) \text{LOC (Hinter, (\(\exists y\) OBJ (Karton, \(y)))))}.}
\]
6.2.1.3. A sentence which describes an action taking place in a single location is represented semantically by an Agentive expression in an Objective relation to a Locative expression. The sentence *Der Hund springt auf den Tisch* has the following representation:

\[\text{OBJ ( AGT (Spring, (7x) OBJ (Hund, x)), LOC (Auf, (7y) OBJ (Tisch, y)))}.\]

(The predicate Spring represents the surface verb *springen*.)

6.2.1.4. The semantic representation of a sentence which depicts a process differs from the semantic representation of a sentence describing a state mainly in that the former contains the predicate INCHO. (See Section 4.3.3.5.) INCHO indicates a change of state: INCHO (NEG (Alive)) ('to die') denotes a change from the state represented by the predicate Alive to the state represented by the state NEG (Alive). Prepositions such as auf, in, hinter, etc., depict changes of state when followed by the accusative case: the phrase auf den Tisch denotes a change from the state 'nicht auf dem Tisch' to the state 'auf dem Tisch'. Thus, the semantic representation of auf den Tisch is obtained by embedding the semantic representation of auf den Tisch into the predicate INCHO. Hence, the sentence *Das Buch fällt auf den Tisch* has the following semantic representation:

\[\text{OBJ ( (7x) OBJ (Fall, OBJ (Buch, x)), INCHO (LOC (Auf, (7y) OBJ (Tisch, y)))}.\]

6.2.1.5. The sentence *Der Hund springt auf den Tisch* describes both an action and a change of state; the action is the cause of the change of state. Hence, this sentence is represented semantically by a causative construction:

\[\text{CAUS ( AGT (Spring, (7x) OBJ (Hund, x)), OBJ ( (7x) OBJ (Hund, x), INCHO (LOC (Auf, (7y) OBJ (Tisch, y)))).}\]

That is, the dog's jumping causes the dog to change from the state of not
being on the table to the state of being on the table. Sentences such as Der Mann läuft hinter das Haus, Das Flugzeug fliegt über die Wolken, etc., are treated exactly in the same manner as Der Hund springt auf den Tisch. The difference between constructions with the dative case and constructions with the accusative lies in the presence of INCHO in the semantic representations of the latter.

6.2.2.1. The previous discussion has dealt with prepositions which may govern either the dative or accusative case, depending on whether a change of state is indicated or not. Most prepositions which may govern only the accusative case or only the dative case are also semantically nonempty and indicate location. Durch occurs with the verbs of motion (process or action). Der Zug fährt durch den Tunnel has the representation:

OBJ (OBJ (Fahr, (x OBJ (Zug, x), LOC (Durch, (y OBJ (Tunnel, y))))).

(Compare this representation to the representation above of Das Buch fällt auf den Tisch.) Gegen is treated in a similar fashion to an. It occurs both with verbs describing states and verbs describing motions. It is distinguished semantically from an in that its object denotes a resisting or supporting force. Gegen is frequently used in a metaphorical sense. Um has a basic locative sense, and it is also used metaphorically. Aus denotes either a change of state or the result of such a change: the phrase aus dem Haus in the sentence Hans kommt aus dem Haus describes a change from the state 'im Haus' to the state 'nicht im Haus'. This sentence is represented semantically by the proposition

OBJ (AGT (Hans, Komm), INCHO (NEG (LOC (In, (x OBJ (Haus, x))))).

Hans ist aus dem Haus describes the result of his action in the above sentence and has the representation OBJ (Hans, NEG (LOC (In, (x OBJ
Thus, \textit{aus} is represented by a complex predicate derived from the predicate \textit{In}. \textit{Ausser} corresponds to the stative sense of \textit{aus}, but it is always used metaphorically in modern German (cf. Schmitz 1962: 30-31).

6.2.2.2. \textit{Bei} and \textit{mit} also have basic locative meanings. \textit{Bei} is treated semantically exactly as are the stative sense of \textit{an} and \textit{neben}. All are semantically nonempty and describe different relations of location. \textit{Hans wohnt bei der Kirche} has the representation

\[
\text{OBJ (OBJ (Hans, Wohn), LOC (Bei, (\forall x) OBJ (Kirche, x))})
\]

\textit{Mit} is problematical. One of its functions is to indicate an underlying Instrumental relation (see Section 7.3.), but its other main usage is to denote the notion of accompaniment. In this usage it has been said to be the surface realization of a comitative case (cf. Walmsley 1971 and Buckingham 1973). It is perhaps possible, however, to treat \textit{mit} in this sense as a logical predicate in a Locative relation to its argument. However, the semantic representation of a sentence containing an accompaniment \textit{mit}-phrase differs from the representation of a sentence containing a \textit{bei}-phrase: the representation of the \textit{mit}-phrase is associated directly with the representation of the noun phrase which it accompanies, whereas the representation of the \textit{bei}-phrase is associated with an entire predicate expression, as in the above example. For instance, the sentence \textit{Hans geht mit Maria} has the representation

\[
\text{AGT (OBJ (Hans, LOC (Mit, Maria)), Geh)}
\]

Here the Locative expression is embedded in an Agentive relation together with the grammatical subject \textit{Hans}. Consider next the sentence \textit{Hans sieht Maria mit Peter}. This sentence is ambiguous: it can mean that Hans and Peter together see Maria or that Hans sees Maria and Peter together.
The first interpretation corresponds to the semantic representation

\[
\text{EXP ( OBJ (Hans, LOC (Mit, Peter)), OBJ (Seh, Maria))}.
\]

The second interpretation has the representation

\[
\text{EXP (Hans, OBJ (Seh, OBJ (Maria, LOC (Mit, Peter))))}.
\]

This treatment of accompaniment mit-phrases corresponds to Buckingham’s (1972) observation that the Comitative case always occurs embedded in another case. The preposition ohne represents the negation of mit, either in the instrumental or accompaniment sense. Hans geht ohne Maria has the representation AGT ( OBJ (Hans, NEG (LOC (Mit, Maria))), Geh).

6.2.3.1. It might be said that von, nach, and zu are directional prepositions, but it is possible to derive them from locative expressions. Recall that semantic representations of directional in-phrases (e.g., in die Kirche) are derived from semantic representations of locative in-phrases (in der Kirche) by embedding the latter in the predicate INCHO. A directional zu-phrase differs from a directional in-phrase in that the former indicates motion toward a point (or something conceived of as a point), whereas the latter indicates motion to the inside of an object, building, etc. Thus Ich gehe zur Kirche does not imply entering the church, in contrast to Ich gehe in die Kirche. The resultant state of second sentence may be stated as ‘Ich bin in der Kirche’, but the resultant state of the first sentence may be stated as ‘Ich bin bei der Kirche’. Thus, zur Kirche has the semantic representation INCHO ( LOC (Bei, ( x) OBJ (Kirche, x))). Similarly, a directional von-phrase indicates motion out from the inside of some object, building, etc. Directional aus-phrases are represented semantically by embedding a locative in-phrase in the predicate INCHO (NEG). Likewise, directional von-phrases are represented by a locative bei-phrase embedded in the predicate INCHO.
(NEG). The semantic representation of the directional phrase von der Kirche is INCHO (NEG (LOC (Bei, (1x) OBJ (Kirche, x)))). ²

6.2.3.2. The preceding explanation of directional phrases requires some revision when a place name (without an article) or a direction is the object of a directional preposition. Von Madrid in Er kommt gerade von Madrid zurück is derived not from a locative bei-phrase, but rather from a locative in-phrase. The semantic representation of von Madrid is then INCHO (Neg (LOC (In, Madrid))). One would normally expect an aus-phrase as the surface realization of such a construction. However, aus Madrid indicates the place of birth, as in Er stammt aus Madrid, whereas von Madrid indicates merely a change of temporary location (cf. Schmitz 1962: 28). One can perhaps explain this particular prepositional alternation with geographical place names as a result of semantic change. That is, the original opposition in meaning between motion from a point (von) and motion out from inside something (aus) was replaced by an opposition between indication of mere change of location and indication of birthplace. This particular change only occurred with place names and geographical directions, however. The original opposition remained in all other cases. Nach is used with place names and directions and is complementary to von. (When the object of the directional preposition, conceived of as: a point, is not a place name or a direction, zu is the complementary expression to von.) A directional nach-phrase is represented semantically by embedding a locative in-phrase in the predicate INCHO. Thus, the semantic representation of nach Madrid is INCHO (LOC (In, Madrid)).
6.3. Temporal vs. Spatial Location

6.3.1. Fillmore (1971a: 42) proposes a special Time case in addition to the Locative case, implying that temporal expressions must be semantically distinguished from locative expressions. No justification is given for the necessity of this distinction. It is certainly true that both types of expressions can cooccur in the same simple sentence; if we accept the "one-instance-per-clause" principle (cf. Section 2.6.2.1.), we would presumably have to treat locative and temporal expressions as representatives of distinct cases. Several locative expressions can cooccur in the same simple sentence without violating the "one-instance-per-clause" principle, however, since only one location in space in indicated, and hence only one locative relation exists. If temporal expressions can be regarded as 'locations in time', it is possible to represent them semantically as locatives. Then, an expression such as "in the park at midnight" can be treated as a simple location in space-time. Relativity theory tells us anyway that time and space are indistinguishable as physical concepts. Time is merely one dimension of space. Thus it is sensible to speak of both temporal and spatial "location". Language use, of course, need not reflect physical reality. But as a matter of theoretical economy, temporal and spatial expressions should be represented semantically by only one relation, the Locative, unless convincing evidence is found that languages consistently express temporal and spatial location in a distinct fashion. We will see that, at least in German, this is not the case.

6.3.2.1. Since time is one-dimensional, there are fewer possibilities for temporal locations than for spatial ones. Temporal locations can be at a point in time, during or within a period of time, preceding a point
or period of time, or following a point or period of time. The preposition used to express location at a point in time is normally um: um Mitternacht, um diese Zeit, um vier Uhr. Spatially, um is used to indicate a location surrounding its object. If this object is perceived as a point (spatially or temporally), a location surrounding it is at it. Hence, um used with points in time expresses exactness. If inexactness is to be expressed, the postposition herum is added to a prepositional phrase with um: um diese Zeit herum. The preposition zu is used idiomatically with certain expressions: zur Zeit, zum ersten Mal, zu Mittag; this usage is comparable to the somewhat stylized usage of zu in a locative, non-directional sense: zu Köln, zu Hause, (Gasthof) zur Post, etc., (cf. Schmitz 1962: 45-46).

6.3.2.2. Temporal expressions denoting periods of time normally contain the preposition in if the state, activity, process, etc. described by the verb is not specifically to be understood as covering the entire period of time. Thus, in dieser Nacht, im Mai, etc., indicate temporal locations within the period of time mentioned. If the activity, state, etc., described by the verb is understood as covering the entire period mentioned, the preposition über is used: über Nacht, übers Wochenende. With certain expressions, an is used instead of in: am Samstag, am Tag.

6.3.2.3. Temporal location preceding a point or period of time is indicated by vor: vor Tagesanbruch, vor vier Uhr, vor acht Tagen. Temporal location following a point or period of time is indicated by nach: nach Weihnachten, nach einer halben Stunde. Seit, however, is used if the state, activity, etc., indicated by the verb is understood as covering the entire period of time from the point or period of time mentioned up until the time indicated by the tense of the verb. The
sentence \textit{Er kam seit dem Essen} is thus unusual, as it implies that the act of coming was spread out over the entire period of time indicated in the context of the utterance. \textit{Er kam nach dem Essen} is perfectly acceptable, as it indicates only that the act of coming followed the time period of the meal, and not that this occurrence lasted until some other time period or point. The semantic distinction between \textit{nach} and \textit{seit} relates to their specific meanings and to the presuppositions which they impose.

\textit{6.3.3.} The previous discussion has demonstrated that, with one exception (\textit{seit}), the prepositions used in German to express temporal location are the same as those used to express spatial location. Furthermore, their senses are similar, if not identical, when used with both temporal and spatial expressions: \textit{um} indicates a location immediately surrounding a point in time—i.e., at a point in time; \textit{in} indicates location within a period of time; \textit{über} indicates location covering an entire period; \textit{vor} indicates location preceding, i.e., in front of, a period or point in time; \textit{nach} indicates location following, i.e., after, a point or period of time; \textit{zwischen} indicates a point or period of time between two points or periods of time. It is clear, then, that temporal expressions are perceived of linguistically as locations in German. (The same appears to be true for English.) \textit{Seit} has no spatial sense; its interpretation is dependent on the period of time indicated by the linguistic context in which it occurs, mainly by the tense of the verb. Hence it should not be regarded as a counterexample to the general thesis presented here that temporal and spatial locations can be represented in semantic structures by the same semantic relation.
6.4. Prepositions as Surface Indicators of Semantic Relations

6.4.1. Some prepositions, in addition to their locative meanings (spatial, temporal, or metaphorical), can also function as surface indicators of underlying semantic relations. In this function they have no lexical meaning, and they are not represented semantically by simple predicates, but rather by higher-order predicates representing relations. Prepositions are not the sole indicators of underlying relations in English and German; both languages also depend highly on word order and derivational affixes for this purpose, and German utilizes inflectional endings as well. Whether a preposition representing an underlying relation actually appears in the surface structure of a sentence depends on the presence of other relations in the semantic structure of the sentence, as well as matters, such as topicalization, which influence subject choice. For instance, the Agentive relation is never indicated by a preposition if the argument standing in this relation to the predicate is chosen as the surface structure subject. Matters such as subject selection, passivization, etc., have been discussed at length elsewhere and are not repeated here. (See Fillmore 1968a, Chafe 1970, Brekle 1970, etc.; see also Sections 1.7. and 1.8. of this dissertation.) This section is mainly concerned with indicating how certain German prepositions can function as surface markers of underlying relations.

6.4.2.1. The preposition *von* can serve as an indicator of an underlying Agentive relation if the argument in this relation to the predicate of the sentence is not chosen as the surface structure subject. The argument in the Agentive relation is always chosen as the subject in German.
and English unless the sentence describes an action-process and is passivized. Consider the proposition

\[
\text{CAUS ( AGT (Brutus, DS), OBJ (Cäsar, INCHO (NEG (Leb))))}.
\]

This proposition is the semantic representation of the sentence Brutus tötete Cäsar (tense, etc., ignored). If we add a semantic specification (a feature, etc.) indicating Brutus' malice aforethought, we can rewrite this sentence as Brutus ermordete Cäsar. If, however, the sentence is passivized, the surface structure is Cäsar wurde von Brutus ermordet.

The noun phrase Brutus is in the Agentive relation in the above proposition; if it is not chosen as subject, it is preceded by the preposition von in the surface structure. Von also functions as the surface indicator of an Experiential relation if the argument in this relation is not chosen as subject. The passive surface realization of EXP (Hans, OBJ (Seh, Peter)) is Peter wurde von Hans gesehen. German indicates Agentive and Experiential relations in surface structure in the same fashion (as does English). No confusion arises, since these relations never occur together in the same simple sentence. There are many similarities between the Agentive and Experiential relations, and more work should be devoted toward a clarification of their interrelationship. Von can also be used to indicate possession; in this case it represents an underlying Benefactive relation.

6.4.2.2. The Instrumental relation is indicated in the surface structure of German sentences by the preposition mit, unless the argument in the Agentive relation is deleted, and the argument in the Instrumental relation is chosen as the subject (as in Der Schlüssel öffnet die Tür).

Consider the proposition CAUS ( AGT (Brutus, INST (DS, (x) OBJ (Messer, x ))), OBJ (Cäsar, INCHO (NEG (Leb))))). The active surface
form of this proposition is **Brutus ermordete Cäsar mit einem Messer**, and the passive form is **Cäsar wurde von Brutus mit einem Messer ermordet**.

6.4.2.3. The preposition **durch** is used in causative sentences to indicate the action or process which is the direct cause of the resultant process or state. The surface structure object of **durch** is a nominalization of this action or process, or a word or phrase standing for the action or process. If one specifies the way in which Brutus used a knife to murder Caesar (i.e., by stabbing him with it), one can replace the unspecified dummy predicate **DG** in the above proposition by the predicate **Stech** (for stechen). Then, one possible surface form of this proposition of this proposition would be **Cäsar wurde von Brutus durch einen Messerstich ermordet**. The word **Messerstich** is a nominalization of 'mit einem Messer stechen', which has the logical representation **INST**(Stech, (x) OBJ (Messer, x)). Note that the Instrumental relation is indicated in the surface structure by **mit** if only the argument in this relation is mentioned; if the argument and the predicate are both mentioned, **durch** must be used, and its object is a nominalization. If the object of instrumental **durch** is not a nominalized form, it is a word or phrase standing for an action or process, the exact nature of which may not be overtly indicated (i.e., it may be deleted). Consider the sentence **Ich schicke Ihnen das Buch durch meinen Boten**. The phrase **durch meinen Boten** is a reduced form of the longer phrase **dadurch, daß mein Bote es Ihnen bringt**. Thus the phrase **meinen Boten** stands for the activity which the messenger carries out. Similarly, the sentence **Herr Dr. Ahrens läßt Sie durch mich grüßen** may be paraphrased as **Herr Dr. Ahrens läßt Sie dadurch grüßen, daß ich Sie grüße**. Here the phrase **durch mich** is a reduced form representing
an embedded sentence describing what the person denoted by the first
person pronoun is doing. The existence of the instrumental durch-phrase
in German provides evidence supporting the hypothesis of event causation,
because the object of this preposition is always a word or phrase rep-
representing the causing event. The use of the preposition durch for the
causing event shows that it must be treated differently than Agentive
or Instrumental arguments, which are preceded by von and mit, respec-
tively, in surface forms (if they are not chosen as subjects). In the
sentence Cäsar wurde von Brutus ermordet, the preposition von indicates
that the noun phrase Brutus is in the Agentive relation to some unspec-
ified predicate. The nominalization of this sentence is Die Ermordung
Cäsars durch Brutus. Here the emphasis is on the activity which Brutus
carried out in order to murder Caesar.

6.4.2.4. One final important preposition remains to be explained:
für. This preposition functions as a surface realization of the Bene-
factive relation. Hans tat es für Maria has the semantic represen-
tation BEN (Maria, AGT (Hans, DS)). (See Section 4.4.8.) Für also
functions as a surface indicator of the Objective relation in nomi-
nalized forms: Karls Liebe für Maria. Für further indicates the
Objective relation in sentences expressing purchase, acquisition,
支付，等：Er hat das Haus für 50,000 DM gekauft.
6.5. Semantic Analyses of German

Prepositional Expressions

DURCH

Instrumental: Cäsar wurde von Brutus durch einen Messerstich getötet

CAUS ( AGT (Brutus, INST (Stech, (1x) OBJ (Messer, x))))

OBJ (Cäsar, INCHO (NEG (Leb))))

Locative: Hans ging durch die Stadt

OBJ ( AGT (Hans, Geh), LOC (Durch, (1x) OBJ (Stadt, x)))

FÜR

Benefactive: Hans arbeitet für Peter

BEN (Peter, AGT (Hans, Arbeit))

Objective: Karls Liebe für Maria

EXP (Karl, OBJ (Lieb, Maria))

GEGEN

Locative: Das Auto fuhr gegen einen Baum

OBJ ( AGT ( (1x) OBJ (Auto, x), Fahr), LOC (Gegen, (1y) OBJ (Baum, y)))

OHNE

Locative: Hans spielt ohne Peter

OBJ ( AGT (Hans, Spiel), NEG (LOC (Mit, Peter)))

Instrumental: Hans fuhr ohne Auto

(AGT (Hans, NEG ( INST (Fahr, (1x) OBJ (Auto, x)))))

UM

Locative: Die Familie sitzt um den Tisch

OBJ ( AGT ( (1x) OBJ (Familie, x), Sitz), LOC (Um, (1y) OBJ (Tisch, y)))
AUS

Locative: Der Zug fährt aus dem Bahnhof

OBJ (AGT ((1x) OBJ (Zug, x), Fahr), INCHO (NEG (LOC (In, (1y) OBJ (Bahnhof, y))))

AUSSER (similar to AUS)

BEI

Locative: Bonn liegt bei Köln

OBJ (Bonn, LOC (Bei, Köln))

MIT

Locative: Hans kommt mit Peter

AGT (OBJ (Hans, LOC (Mit, Peter)), Komm)

Instrumental: Hans schreibt mit dem Bleistift

AGT (Hans, INST (Schreib, (1x) OBJ (Bleistift, x)))

NACH

Locative (Temporal): Hans kam nach Mitternacht

OBJ (AGT (Hans, Komm), LOC (Nach, (1x) OBJ (Mitternacht, x)))

Locative (Directional): Hans fuhr nach Köln

OBJ (AGT (Hans, Fahr), INCHO (LOC (In, Köln)))

SEIT

Locative (Temporal): Hans schläft seit Mittag

OBJ (AGT (Hans, Schlaf), LOC (Seit (1x) OBJ (Mittag, x)))
VON

Agentive: Cäsar wurde von Brutus getötet

CAUS (AGT (Brutus, DS), OBJ (Cäsar, INCHO (NEG (Leb))))

Benefactive: Das Buch von Dr. Ahrens

BEN (Dr. Ahrens, (1x) OBJ (Buch, x))

Locative (Directional): Hans kommt von der Schule

OBJ (AGT (Hans, Komm), INCHO (NEG (LOC (Bei, (1x) OBJ (Schule, x)))))

ZU

Locative (Directional): Hans geht zum Arzt

OBJ (AGT (Hans, Geh), INCHO (LOC (Bei, (1x) OBJ (Arzt, x))))

AN

Locative: Frankfurt liegt am Main

OBJ (Frankfurt, LOC (An, Main))

Locative (Directional): Hans fährt ans Meer

CAUS (AGT (Hans, Fahr), OBJ (Hans, INCHO (LOC (An, (1x) OBJ (Meer, x)))))

AUF

Locative: Die Katze sitzt auf dem Dach

OBJ (AGT ( Katze, x), OBJ (Katze, x), Sitz), LOC (Auf, (1y) OBJ (Dach, y))

Locative (Directional): Hans fährt aufs Land

CAUS (AGT (Hans, Fahr), OBJ (Hans, INCHO (LOC (Auf, (1x) OBJ (Land, x))))

HINTER

Locative: Die Garage liegt hinter dem Haus

OBJ ( Katze, x), LOC (Hinter, (1y) OBJ (Haus, y))
Locative (Directional): Der Hund läuft hinter den Baum

CAUS (AGT ((7x) OBJ (Hund, x), Lauf), OBJ ((7x) OBJ (Hund, x),
   INCHO (LOC (Hinter, (7y) OBJ (Baum, y))))

IN

Locative: Hans sitzt im Garten

OBJ (AGT (Hans, Sitz), LOC (In, (7x) OBJ (Garten, x)))

Locative (Directional): Das Kind geht in die Schule

CAUS (AGT ((7x) OBJ (Kind, x), Geh), OBJ ((7x) OBJ (Kind, x),
   INCHO (LOC (In (7y) OBJ (Schule, y))))

NEBEN

Locative: Das Institut liegt neben der Bank

OBJ ((7x) OBJ (Institut, x) LOC (Neben, (7y) OBJ (Bank, y)))

Locative (Directional): Hans setzte sich neben den Minister

CAUS (AGT (Hans, Setz), OBJ (Hans, INCHO (LOC (Neben,
   (7x) OBJ (Minister, x))))

ÜBER

Locative: Das Flugzeug fliegt über der Wolke

OBJ (AGT (7x) OBJ (Flugzeug, x), Flieg), LOC (Über, (7y) OBJ (Wolke, y))

Locative (Directional): Der Hund springt über den Bach

CAUS (AGT ((7x) OBJ (Hund, x), Spring), OBJ ((7x) OBJ (Hund, x),

UNTER

Locative: Das Land steht unter Wasser

OBJ ((7x) OBJ (Land, x), LOC (Unter, (7y) OBJ (Wasser, y)))
Locative (Directional): Der Hund läuft unter den Tisch

CAUS (AGT ((?x) OBJ (Hund, x), Lauf), OBJ ((?x) OBJ (Hund, x), INCHOC (LOC (Unter, (?y) OBJ (Tisch, y)))))

VOR

Locative: Hans wartet vor dem Theater

OBJ (AGT (Hans, Wart), LOC (Vor, (?x) OBJ (Theater, x)))

Locative (Directional): Hans kommt vor den Richter

CAUS (AGT (Hans, Komm), OBJ (Hans, INCHOC (LOC (Vor, (?x) OBJ (Richter, x)))))

ZWISCHEN

Locative: Göttingen liegt zwischen Kassel und Hannover

OBJ (Göttingen, LOC (Zwischen, Kassel, Hannover))

Locative (Directional): Die Katze springt zwischen den Stuhl und den Tisch

CAUS ((?x) OBJ (Katze, x), Spring), OBJ ((?x) OBJ (Katze, x), INCHOC (LOC (Zwischen, (?y) OBJ (Stuhl, y), (?z) OBJ (Tisch, z)))))
CHAPTER 7: GENERAL CONCLUSIONS

7.1. Several important conclusions follow from the present investigation. Evidence is presented in Chapter Two that interpretative theories of semantics, since they contain such metatheoretically questionable concepts as dictionary entries, selection restrictions, and the combinatorial hypothesis, are unnecessarily complex compared with generative theories. Furthermore, in spite of the fact that at least one interpretative theory (Jackendoff's) is at least descriptively adequate as generative theories, the latter are more easily applicable as models for human linguistic behavior. Language is established in the present study as a mediator between meaning patterns and sound patterns, and not as a device for specifying sets of sentences and assigning them semantic and phonological interpretations. Emphasis is placed on methods of semantic representation.

7.2. It has been shown in Chapters Two and Three that theoretical concepts should be carefully examined as to their applicability and theoretical justification. In particular, the importance of recognizing the object language-metalanguage distinction has been emphasized. On the basis of theoretical examination, dictionary entries and selection restrictions have been rejected in favor of meaning rules and presuppositions, respectively. Semantic features are shown to be useful only if they are regarded as atomic predicates in logical representations (see below). Atomic predicates have been classified into sentential and non-
sentential operators, and the establishment of case systems and their representation has been discussed.

7.3. One of the most important results of the present study concerns the effectiveness of the techniques of symbolic logic for semantic representation (see Chapter Four). Common nouns, verbs, and adjectives are treated as logical predicates, and semantic relations are represented as higher-order predicates. Variables and constants (proper nouns) are used as arguments of simple predicates; these variables are bound by such operators as the existential quantifier, the universal quantifier, the definite description operator, and the indefinite description operator. Logical representation of semantic structures is shown to be preferable to Katz' non-logical paraphrase notation. Symbolic logic is held to be perfectly applicable to problems of semantic representation, as long as it may be extended in scope (without losing the character of a logical system).

7.4. The difficult problem of the proper representation of deep cases has been resolved. Rather than as categories or as features, cases are displayed in the present treatment as higher-order logical predicates representing semantic relations. Thus, case concepts are no longer tied to either noun phrases or verbs (or to both), but rather are conceived of as relating noun phrases to verbs in sentences. The solution of the problem of representation of cases makes it possible for case grammar notions to be formalized; formalization has been notably absent in recent studies in case grammar (in particular, Fillmore 1971), perhaps because no acceptable method had been found for displaying cases in a notation consistent with their conceptualization. The representation of cases as relational predicates in symbolic logic also enables case grammar concepts
to be combined with generative semantics notions. Although logical notation with enclosed parentheses is used in the present treatment, it has been demonstrated that such a notation is interchangeable with representation in tree form. Similarities between the present study and current directions in research in generative semantics have been indicated.

7.5. In Chapter Four, a model of semantic representation is developed in which semantic relations play a major role. The semantic relations between the noun phrases and the verb of a simple sentence are shown to constitute its semantic structure. The meanings of individual lexical items in a sentence do not determine the interpretation of the sentences; rather, the system of semantic relations in the sentence (indicated by word order, propositions, inflectional endings, etc.) determines the way in which individual lexical items are themselves interpreted. The entire approach taken in the present study emphatically denies the combinatorial hypothesis: instead of building up the meaning of a sentence from the meanings of its constituent lexical items, the interpretation of a sentence is held to be primarily dependent on the structure of semantic relations which it contains.

7.6. The application of the theory of relational semantics to the analysis of German prepositional expressions, although limited in scope, has provided some interesting results. German prepositions are classified into two groups: those which have semantic content and those which indicate underlying semantic relations. The former are represented semantically as logical predicates standing in a locative relation to their arguments—all semantically nonempty propositions are shown to be basically locative, including those used in temporal expressions. Semantically
empty prepositions are shown to function as surface structure indicators of semantic relations: they are thus represented semantically as higher-order relational predicates. Directional expressions involving prepositions are derived from locative expressions embedded in the predicate INCHO. Thus, not only the similarity of the expressions in der Kirche and in die Kirche is established, but also the similarity of bei der Kirche and zur Kirche. Important evidence supporting the hypothesis of event causation is provided by instrumental expressions containing durch: the object of durch in such expressions represents the causative event.
FOOTNOTES

Chapter One

1 All page references concerning this paper are to the slightly revised version printed in Fodor and Katz (1964).

2 See Chapter 3 of this dissertation for a discussion of this distinction.

3 The use of the term "projection problem" is unfortunate, because Katz and Fodor later speak of "projection rules" as a part of the semantic apparatus which they propose. The two senses of the term 'projection' should not be confused.

4 This negative definition of semantics was later revised. See Katz (1967) and (1972).

5 This model is later referred to by Chomsky as the "standard theory" (1971). (To be more exact, "a standard theory" (185)).

6 A fairly consistent application of the feature analysis to some problems of English syntax can be found in Jacobs and Rosenbaum (1968).

7 All page references concerning this paper are to the reprint (Weinreich 1972).

8 But see the discussion of Katz and Postal's feature 'Selector' in Section 2.3.3.2.

9 Weinreich's main example in this connection, pretty children, was unfortunate, because most speakers of English do not agree that it must mean 'pretty girls'.

10 The distinction appears identical to earlier conceptions of open and closed classes or grammatical and lexical morphemes.

11 Whether such usages are accepted depends on the norm of the language (cf. Coseriu 1967).

12 One is reminded here of Hockett's metaphor of the "skeleton" and the "flesh" of a sentence (1958: 262).

13 The similarity of these notions to other conceptions of topic and comment (cf. Hockett 1958: 191), theme and rheme (cf. Halliday 1967), and new and old information (Chafe 1970) is obvious.
Jackendoff, for instance, characterizes the focus of a sentence as "the information in the sentence that is assumed by the speaker not to be shared by him and the hearer" and the presupposition as "the information in the sentence that is assumed by the speaker to be shared by him and the hearer" (1972a: 16). This notion of 'presupposition' is not to be confused with concepts of presupposition used in logic and in generative semantics (cf. Garner 1971 and Keenan 1971).

14 See Section 1.7 of this dissertation.

15 The important innovation, mentioned earlier, of representing dictionary entries in set form instead of trees is not considered here.

16 For instance, he insists on the validity and usefulness of of the analytic-synthetic distinction in natural language (Katz 1972), in spite of numerous philosophical arguments that this distinction is an arbitrary one at best (cf. Quine 1951, White 1952, etc.).

17 The term Objective is not to be confused with the surface structure relation object.

18 Hammer and chisel are both Instrumental. If they were to appear as conjoined subjects, this would be permissible, since they would then be dominated by one occurrence of the actant Instrumental.

19 Recursion is effected by embedding sentences under Objectives (28).

20 See Section 2.6 of this dissertation.

21 The two-place predicate run in John ran the dogs is the causative of the one-place predicate run in John runs.

22 The notion of duality, and its importance in human linguistic evolution, are discussed in Hockett (1960) and Hockett and Ascher (1964). Chafe derives his conception from this earlier work.

23 I am intentionally using traditional phonemic notation here, although Chafe speaks of phonetic structures.

Chapter Two

1 See Chapter 1 for a detailed discussion of the form of a dictionary entry and the difference between markers and distinguishers.

2 See the discussion of Weinreich's semantic theory in Chapter 1.

3 It is apparent today that Weinreich's simple distinction of 'cluster' and 'configuration' is inadequate for indicating all of the relations which can hold among components of a dictionary entry. His identification of deep sentence structure with the componential structure of dictionary entries still holds, but our conception of deep sentence structure today includes many more relations than the 'predication' and 'transitivity' which Weinreich recognized (cf. Fillmore 1966a,b, 1968a).
If one substitutes the more recent notion of 'semantic structure' for Weinreich's notion of 'deep structure', however, his proposal for representing the semantic part of a dictionary entry by a deep-structure definitional sentence remains probably one of the most useful suggestions that has ever been made in an attempt to clarify the nature of the relations among the components of a lexical reading.

4 This is one of the first uses of the term presupposition in modern linguistics. (cf. Lipka, forthcoming).

5 Cf. the discussion of features and dictionaries in Section 2.2.

6 See Morgan (1969) for a discussion of "world-creating verbs".

7 See Section 3.4 of this dissertation.

8 It is questionable whether this constraint is really selectional. It might be considered to be a derivational constraint.

9 Both Weinreich and Bierwisch arrive at the conclusion that the semantic representations of syntactically complex expressions are of the same character as the semantic representations of simple lexical items (Weinreich 1966: 84; Bierwisch 1971: 433).

10 For a detailed discussion of the various specific problems involved in the analysis of idioms, the reader is referred to the above-mentioned works.

11 Weinreich's literal interpretation of this idiom as 'firing a projectile at a light wind' (1969: 56) is to my mind incorrect, since the breeze clearly refers to what is shot out, and not what is shot at.

12 In the discussion of 'words' in the last paragraph, I have naturally meant 'lexical morphemes'; it would be ridiculous to assert that the and by have 'conceptual meanings' or even 'dictionary entries'. But this is exactly what Katz and Fodor imply.

13 Cf. the discussion concerning 'negative transportation' in Lakoff 1970c, Jackendoff 1969, etc.

14 This is my interpretation of Dowty's sketchy diagram (68).

15 There are also, of course, numerous similarities between analysis in terms of atomic predicates and treatments in stratificational linguistics (cf. Lockwood 1972).

16 Kastovsky's insertions are not quite correct: -ize is the proper realization of CAUSE DO BECOME and de- is the realization of NEG alone. Cf. the word militarize.

17 The definitions of Source and Goal are taken from the version of Fillmore's article printed in Steinberg-Jakobovits (1971: 376); there is evidently a misprint in Kiefer (1969: 116).
Chapter Three


2. More recent treatments, involving the atomic predicate DO, are not considered here. See Section 2.5.3.3.

3. For example, Katz regularly uses the term "semantic theory" in his writings (cf. the title of his latest book on the subject). Such an expression, without an article, can only be interpreted as meaning 'the whole of semantic theory', or perhaps, as semantic metatheory. But Katz uses this term to describe his own theory, which should properly be called "a semantic theory". Furthermore, his theory is highly language-specific (for English). Hence, it should perhaps be termed "a semantic theory of English". Unlike other researchers in semantics (e.g., Chafe 1970: chap. 17), Katz is not concerned with applying his theory to languages other than English.

4. Linguists who propose formalized systems do not (generally) rely on intuitional judgments: "A paper presenting a generative grammar will contain a set of rules which assigns structural descriptions to sentences with no appeal to the intuitions of the linguist" (Dougherty 1972: 14).

5. Some tests depend more on introspective considerations than on intuitions: see the discussion in Section 3.2.3.1.

6. For some speakers, giggling is regarded as distinct from laughing; for these speakers the sentence She giggled but did not laugh is not contradictory.

7. 'Intuition' is defined in A New English Dictionary on Historical Principles (Oxford) as "the immediate perception of an object by the mind without the intervention of any reasoning process" and in The Penguin English Dictionary as "immediate unreasoned perception". 'introspection' is defined in the Oxford Dictionary as "the action of looking within, or into one's mind; examination of one's own thoughts, feelings, or mental state" and in the Penguin Dictionary as "act of observing one's own feelings and mental processes". 'Intuition' has, however, often been used in linguistics more in the sense of 'introspection' (as well as in the sense of 'innate knowledge'). But acceptability judgments as discussed in Section 3.2.1.2. are based on 'intuition' in the dictionary sense. That is, the writer who relies on such determinations often expresses his "gut reaction" as to whether he would accept a proposed string or not. This judgment may be considered to be based on innate knowledge—but it is still an unreasoned reaction in the majority of such cases. In this paper the terms 'intuition' and 'introspection' are used as defined above. It is important that the concepts to which they refer not be confused.
Chafe's views on introspection, which I accept, are, of course, rather controversial. Many linguists still adhere to the behaviorist bias against discussion of 'thoughts' or 'concepts', especially when it is asserted that one can derive useful information from introspective considerations or analyses. But such biases should no longer play a role in modern linguistics. Discussion of concepts and introspective reasoning about concepts are inherently no less scientific than the analysis of sound spectra.

That is, formalized according to the suggestions in Section 3.2.2.3. Many of these suggestions depend on introspective considerations, such as recognizing irrelevant ill-formedness, "distractors", etc. Also, the recognition of tautologies and contradictions rests on introspection.

For instance, consider the fact that many logicians reject the analytic-synthetic distinction (Quine 1951, White 1952, etc.). They find no evidence for it in language use or in logic. Furthermore, many linguists reject the distinction between linguistic and extra-linguistic knowledge (Bolinger 1965: 568-569, T. R. Anderson 1968: 414, etc.). It is difficult to imagine a testing procedure which can consistently distinguish between linguistic and extra-linguistic knowledge. Assume that the knowledge that fathers are necessarily older than their sons is extra-linguistic. As a common example of linguistic knowledge, consider the fact that bachelors are unmarried. The two sentences That bachelor is married and John's father is younger than John is (biological father, of course) are to my mind both contradictory, and I can see no way of distinguishing the types of contradictoriness which they represent.

It is important to emphasize here, as is mentioned in Section 2.2.5.1, that the meaning rule father of \( \rightarrow \) older than is a relation between the object language words father and old, and not between the concepts to which they correspond. Hence it is a language-specific rule, since it states a relation between two expressions of the English language. If one regards the concepts represented by father and old as universals, it is possible to propose a meaning postulate relating the logical predicates to which these concepts correspond. Such a meaning postulate would then be a semantic universal. For a clear explanation of the distinction between language-specific and universal meaning rules, see Bar-Hillel (1969: 6-10).

My predicate NECESSARY is the same as Lakoff's predicate CERTAIN. The term is derived from modal logic (see Linke 1971), and must not be confused with the ordinary English word necessary, which can be used to express obligation as well as actual necessity.

Once again, it must be emphasized that this is an expression which says something about the meaning of the English word old: "I claim that nobody has fully mastered the semantics of English [my emphasis, RTK] who does not know that from John is older than Paul and Paul is older than Dick (with the occurrence of Paul referring
to the same person) one can deduce John is older than Dick. A complete semantics of English must contain a rule to this effect" (Bar-Hillel 1969: 6). If the cited meaning rule were translated into German, it would be a German-specific meaning rule concerning the meaning of the word alt.

Chapter Four

1 See the discussion of BE and HAVE as atomic predicates in Section 2.5.3.2.

2 Stratificational theory, of course, also treats language as a mediator between meaning patterns and sound patterns (cf. Lockwood 1972). Because of difficulties of comparison between stratificational theory and other models, it is not applied here. But it is nevertheless a very attractive model for language study.

3 For advanced reading on logical theory, see Copi and Gould (1967) and Linsky (1971).

4 The term simple is not to be confused with the term atomic.

5 A detailed discussion of quantifiers and operators would go beyond the scope of this dissertation. For explanation of the logical terms and concepts employed in this chapter, see Reichenbach (1947).

Chapter Five

No footnotes

Chapter Six

1 For a study of word-formation and related problems, see Marchand, Hans (1969), The Categories and Types of Present-Day English Word-Formation (Munich).

2 The directional prepositions zu and von are also in some cases derived from stative senses of an and auf, as well as bei (cf. Schmitz 1962: 38ff.).

3 Leb is the predicate in German corresponding to English Alive. Actually, such predicates are held to be semantic universals, and it is immaterial what we call them. There would thus be nothing wrong with having Alive as an underlying logical predicate for a German sentence. But German terms are used here for logical predicates underlying German sentences, to avoid confusion.
BIBLIOGRAPHY


____ (1971b), "Dependency and Grammatical Functions", FL 7, 30-37.


Babcock, Sandra S. (1972), "Periphrastic Causatives", FL 8, 30-43.

Bach, Emmon (1967), "Have and Be in English Syntax", LG. 43, 462-485.

____ (1968), "Nouns and Noun Phrases", in Bach and Harms (1968), 90-122.


Bolinger, Dwight (1965), "The Atomization of Meaning", Lg. 43, 57-91.


Chafe, Wallace L. (1967), "Language as Symbolization", Lg. 43, 57-91.
____ (1968a), "Idiomaticity as an Anomaly in the Chomskyan Paradigm", FL 4, 109-127.
____ (1973), "Language and Memory", Lg. 49, 261-281.


(1972), Papers from the Eighth Regional Meeting, April 14-16, 1972. Chicago: Department of Linguistics, University of Chicago.


(1972), "A Reformulation of Certain Syntactic Transformations", in Peters (1972), 21-62.


(1968a), "The Case for Case", in Bach and Harms (1968), 1-88.

(1968b), "Lexical Entries for Verbs", \textit{FL} 4, 373-393.


(1972b), "On Generativity", in Peters (1972), 1-19.


Fraser, Bruce (1970), "Idioms within a Transformational Grammar", *FL* 6, 22-42.


Jackendoff, Ray S. (1968), "Quantifiers in English", *FL* 4, 422-442.


(1972a), Semantic Interpretation in Generative Grammar. Cambridge, Massachusetts: The M.I.T. Press.

(1972b), "Any vs. Every", LI 3, 119-120.


(1971), "Generative Semantics is Interpretive Semantics", LI 2, 313-331.


(1973a), "Interpretive Semantics Meets the Zombies: A Discussion of the Controversy about Deep Structure", FL 9, 549-596.


(1968), "Instrumental Adverbs and the Concept of Deep Structure", *FL* 4, 4-29.


(1970d), "A Note on Vagueness and Ambiguity", *LIT* 1, 357-359.


(1972a), "Linguistics and Natural Logic", in Davidson-Harman (1972), 545-665.


____(forthcoming), "Re-Discovery Procedures and the Lexicon".


____(1968), Introduction to Theoretical Linguistics. Cambridge: at the University Press.


McCawley, James D. (1968a), "Concerning the Base Component of a Transformational Grammar", FL 4, 243-269.


____(1970b), "English as a VSO Language", Lg. 46, 286-299.


Moser, H., ed., (1967), Satz und Wort im heutigen Deutsch. Dusseldorf:


Peters, Stanley (1972), "The Projection Problem: How is a Grammar to be Selected?", in Peters (1972), 171-188.


Postal, Paul M. (1966), "On So-called Pronouns in English", in Dinneen (1966),

____(1970), "On the Surface Verb 'Remind'", LI 1, 37-120.


LIST OF ABBREVIATIONS

The following abbreviations are used for the more commonly cited periodicals:

CLS    Chicago Linguistic Society Papers
FL     Foundations of Language
JL     Journal of Linguistics
Lg.    Language
LI     Linguistic Inquiry