THE FALL AND RISE OF EMPIRICISM*

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> . . .the tradition of all the dead generations
> weighs like a nightmare on the brain of the living.
> And just when they seem engaged in revolutionizing
> themselves and things, in creating something that
> has never yet existed, precisely in such periods
> of revolutionary crisis they anxiously conjure up
> the spirits of the past to their service
>
> Marx

1. __Some Things Kuhn Never Told Us__. The transformationalist revolution
in Linguistics fits Thomas Kuhn's account of scientific revolutions.[1]
There was a prevailing (Structuralist) paradigm, taxonomic grammar,
in which grammatical analysis consists of segmentation and classifi-
cation of actual speech into a form resembling a library catalogue.
This paradigm failed to provide an adequate framework for explaining
such phenomena as syntactic ambiguity, grammatical relations,
ellipsis, agreement, stress, constituent equivalences, etc. The
revolution that overthrew structuralism replaced it with the new
paradigm of generative grammar, in which grammatical analysis is
conceived of as the constructing and testing of theories about
the speaker's internalized linguistic competence. In this paradigm,
the grammatical analysis of a language is represented as a typical
case in science of inference from behavior to a theory about the
unobservable system responsible for it.

From the general intellectual viewpoint, the most significant
aspect of the transformationalist revolution is that it represents
a decisive defeat of empiricism in an influential social science. The

natural position for an empiricist to adopt on the question of the nature of grammars is the structuralist theory of taxonomic grammar, since, on this theory, every property essential to a language is characterizable on the basis of observable features of the surface form of its sentences. Hence, everything that must be acquired in gaining mastery of a language is "out in the open" and moreover it can be learned on the basis of procedures for segmenting and classifying speech that presuppose only inductive generalizations from observable distributional regularities. On the structuralist theory of taxonomic grammar, the environmental input to language acquisition is rich enough, relative to the presumed richness of the grammatical structure of the language, for this acquisition process to take place without the help of innate principles about the universal structure of langauge. Rationalists, on the other hand, find the taxonomic theory uncongenial because, for them, the essential properties of language underlie the surface form of sentence and are thus unobservable in the sense in which atoms are.

Chomskyian transformational theory is rationalist because it allows for unobservable grammatical properties, which have no linguistic reality on the taxonomic model, to be stated as part of the rules of the linguist's theory about the speaker's internalized linguistic competence. Thus, the shift from a conception of grammar as the data cataloguing of a corpus to a conception of grammar as the explication of the internalized rules underlying the speaker's ability to produce and understand sentences introduced "deep structure" levels of grammar which provided the linguistic reality that unobservable features otherwise lacked.[2]

The transformational rules that related these deeper levels to surface form also enabled the new paradigm to surpass the old one in explanatory power. With them, it was possible to explain the facts about syntactic ambiguity, grammatical relations, ellipsis, agreement, stress, constituent equivalences, etc. that were unexplanable in the taxonomic framework.[3] But, they also changed the picture of the problem confronting linguists in language acquisition. The input to the language acquisition process no longer seems rich enough and the output no longer seems simple enough for the child to obtain its knowledge of the latter by inductive inferences that generalize distributional regularities found in speech. For, now, the important properties of the language lie hidden beneath the surface form of sentences and the grammatical structure to be acquired is seen as an extremely complex system of highly intricate rules relating the underlying levels of sentences to their surface phonetic forms. Hence, the problem of language acquisition is now that of discovering sufficiently powerful principles about the universal form of language to compensate for the impoverished input to the child's language acquisition mechanism.

Linguistics today is in what may be called a 'Post-revolutionary Period'. We will look at one aspect of this period from the viewpoint of the historian of science in order to gain some needed perspective on the events that are now shaping the course of theoretical linguistics. From this perspective, we shall discover a danger to the transformationalist revolution and to its restoration of rationalism. We shall construct a picture of these events that will provide an interpretation of the present scene in linguistics that brings this danger clearly into focus.

One type of post-revolutionary situation occurs when the new paradigm does not succeed in restoring the field to the tranquil life of normal science. Instead, the introduction of the new paradigm is followed, almost immediately, by what seems to be another revolution which challenges one of the central features of the new paradigm. Thus, rather than a return to the smooth day-to-day business of normal science, there is the increasing chaos characteristic of a new upheaval. Not only are there conflicts with the forces that were overthrown in the original revolution, but now there are conflicts within the revolutionary camp itself, conflicts between what may be called the "revolutionary old guard" and the 'counter-revolutionaries".

There is little doubt that the current situation in theoretical linguistics fits this description. But there is no one satisfactory explanation of what the underlying dynamics of this situation are. An unregenerated member of the pre-revolutionary ruling class, that is, a linguist from the Bloomfieldian tradition of taxonomic theory, will see the current situation in transformational linguistics as the "revolution devouring itself". On the other hand, a counter-revolutionary, that is, a generative semanticist, will see the situation as a continuation of the transformationalist revolution, as a necessary further step in the dialectic that moves linguistics upward toward scientific utopia. Lastly, a member of the revolutionary old guard, that is, an interpretive semanticist,[4] is likely to see it as an unfortunate fractionation of a once highly unified position, something like what happened when the younger generation of psychoanalysts broke from Freud and splintered into Jungians, Adlerians, etc.

We find none of these explanations acceptable, although we admit that there is an element of truth in each. The pre-revolutionary ruling class is right in seeing the possibility of the revolution destroying itself, at least insofar as the danger to rationalism in linguistics is concerned. The old guard is right that the paradigm offered by generative semantics provides nothing in the way of new insights into the structure of language. And the counter-revolutionaries are right that the present controversies signify a dialectical process out of which a more articulated theory of linguistic structure can emerge.

However, we do not share their supposition that the theory that will emerge as the next stage in the progress of linguistics will be generative semantics. We view as incorrect their view that theirs is a genuine counter-revolution which offers a new paradigm embodying greater sources of explanatory power and deeper insights into language and employing simpler descriptive machinery. We think that their claim of their theory better achieving the original goals of the revolution against taxonomic theory is the very opposite of the truth. Rather, we think their theory, in its novel elements, constitutes the danger, referred to above, that threatens to replace the rationalism of the transformationalist movement by something very much akin to Bloomfieldian empiricism.

Thus, we view the present controversy between generative semantics and interpretive semantics as a struggle to preserve the Chomskyian revolution against counter-revolutionaries who, whether they realize it or not, are working to restore the former empiricist ruling class philosophy. We will present this view not simply as a vignette, but as a carefully detailed piece of "contemporary history of science", whose claim to truth is that it best describes the facts. We wish this picture to affect the course of events by making linguists aware of the broader intellectual implications of the present debates in the theory of grammar.

2. Before the Revolution. The history of linguistics in this century displays at least one full cycle from rationalism to empiricism and back. At the beginning of the century, linguists reflected the rationalism of the previous century. De Saussure emphasized the distinction between linguistic structure and speech, although for him sentential form was part of speech behavior rather than linguistic structure. Sapir argued that the speaker's linguistic knowledge is only abstractly related to observable phenomena in speech and sought a general definition of language.[5] Even Bloomfield's outlook was rationalistic at this time. He published an enthusiastic exegesis and expansion of the views of Wundt, whose ideas on language were based on the linguistic rationalism of Humboldt which, in turn, was developed out of Kantian rationalism.[6]

The essential elements of Wundt's position, which represented the culmination in the 19th century of the rationalist tradition beginning with Descartes and the Port Royal grammarians,[7] are that the sentence, intuitively defined, is the main unit of linguistic study, that there is a fundamental distinction between inner meaning and outer form in sentences, that language is a means for expressing propositions that are language invariant, and that this means is a distinctly human ability.[8] But, although this position strongly influenced Bloomfield at first, he ultimately rejected it as he came under the influence of the neo-positivist school that was developing at the time. Bloomfield's attempt to outline the

science of linguistics within the framework of Wundtian rationalism lacked an explicit methodology. He sought to remedy this, and accordingly, became interested in questions of methodology in science. This interest brought him into contact with the works of the neo-positivists who were developing canons of methodology along more or less traditional empiricist lines. They stressed the Humean bias against speculative or metaphysical conceptions, the instrumentalistic view of theoretical concepts on which such concepts express fictions, the reductionistic view of the relation of theories to observations, and an operationalistic, behavioristic, and physicalistic outlook on the domain of a science. These ideas Bloomfield brought into linguistics.[9]

Each of the essential elements of the Wundtian position were casualties of these methodological canons. The notion of an intuitively defined sentence was removed as too subjective to be consistent with behaviorist principles. The notion of meaning could not be reduced to the observable properties of the acoustic signal, so it had to be given up as inconsistent with physicalism, to be replaced by a stimulus response account of sentence use. The notion of language invariant propositions went along with the distinction between inner meaning and outer sentential form because, without this distinction, the notion of invariance could not be specified. Finally, the idea of language as a distinctly human characteristic disappeared in favor of the empiricistic idea of languages as culturally learned forms.

Linguistic descriptions could no longer be viewed as accounts of linguistic knowledge or explications of linguistic structure. Rather, in order to conform to these methodological canons, grammars came to be viewed as efficient data-catalogues of linguistic corpora, and linguistic theory took the form of a mechanical discovery procedure for cataloguing linguistic data. This, then, was the origin of the taxonomic paradigm and Bloomfieldian structuralism which dominated linguistic theorizing for the next thirty years.

The goal of linguistic investigation during this period was to determine explicit procedures for segmenting and classifying utterances that automatically apply to a corpus to organize it in a form that meets conditions (1)-(4) and to

(1) the grammar is a hierarchy of classes: the units at the lowest level in the hierarchy are temporal segments of speech events.

(2) the elements of each level of the hierarchy are determined by their distributional features together with their representations at the immediately lower level.

(3) information in the construction of a grammar flows only 'upward' from level to level, i.e., no information at a higher level can be used to determine an analysis at a lower level.

(4) the main distributional principles for determining class membership at level L_i are elements that are in complementary distribution or free variation at level L_{i-1}.

apply them in the study of particular languages. As can be seen simply from inspection, these conditions are motivated by physicalist and operationalist considerations. For if these conditions are met, the grammatical analysis of a sentence will observable physical events and consist in nothing more than further analysis of them, so that no appeal is made to mental capacities or events anywhere from the beginning to the end of a grammatical analysis.[10]

Such grammatical analysis was restricted to the areas of phonology, morphology, and the constituent structure of sentences until Harris found a way of extending it to the sentence level, that is, to the relations between sentences of a language. Harris's particular achievement was to find a way of setting up substitution frames for sentences so that sentences could be grouped in terms of the environments they share in a manner similar to the manner in which phonemes or morphemes were grouped by shared environments. Thus, distributional tests of the kind that taxonomic linguists employed below the sentence level could be used to determine co-occurrence relations between sentences. It was Harris's genuis to see the need for such an extension of the taxonomic paradigm and to hit on the idea of using strings of sentences, comprising a discourse, to provide the substitution frames so that distributional features of sentences could be revealed by substitution of one sentence for another in such frames. Thus, discourse analysis was the product of this attempt to extend the range of taxonomic analysis beyond the level of immediate constituents.

Harris developed syntactic transformations as the formal means of stating the equivalence classes of sentences that emerged from the use of such substitution tests. The classes 'passive sentence', 'interrogative', etc. are thus the sentence level counter-parts of immediate constituent classes like 'Noun', 'Verb', etc. For example, the passive transformation (5) states the co-occurrence pattern that

(5) $NP_1 \ V \ NP_2 \longleftrightarrow NP_2$ is V+en by NP_1

relates the subject and object in a sentence like (6) to the subject and object

(6) The cat bites the dog

in a sentence like (7), the regularity that the same noun phrases that can occur

(7) The dog is bitten by the cat

as the subject and object of the verb in an active sentence also occurs as the subject and object (respectively) of the verb in the corresponding passive. Thus, just as two sounds can be said to be members of the same equivalence class of phonemes if one can substitute for the other without ever changing one word into another, two sentences can be said to be members of the same equivalence class of sentences, active-passive pairs, declarative-interrogative pairs, etc., if the constituents of one sentence can appear at corresponding positions in the other without producing a significantly less acceptable string. Thus, transformational rules express co-occurrence regularities in essentially the same manner the phrase structure rules of immediate constituent analysis.[11]

Harris's conception of a grammar is an orthodox structuralist conception except for the addition of two new levels of grammatical structure beyond the structuralist levels of phones, phonemes, morphemes, words, and phrases. These are the level of kernel sentence forms and the level of transformations. The kernel structures constitute a small, well-defined set of sentence forms, and function as the base for the application of transformations. The application of transformations to kernels and structures derived from kernels yields all the sentence constructions of a language.[12] These kernel structures represent the basic construction types out of which more complex sentences are built transformationally, and thus, themselves, comprise those constructions that are 'simple declaratives', including simple intransitives, transitives, predicate constructions, etc. In addition, the level of kernel sentence forms also serves as the point at which the co-occurrence restrictions on individual lexical items are stated. These restrictions, as Harris phrases it, ". . .determine which member of a class occurs with which member of its neighbor class."[13] Thus, Harris's distinction between the kernel sentence forms and the transformational level is the origin of the present, more sophisticated distinction between the base and transformational components of a generative grammar.

Thus, contrary to popular belief, transformations come into modern linguistics, not with Chomsky, but with Harris's rules relating sentence forms. They are genuine transformations, since they are structure dependent mappings of phrase markers onto phrase markers. That this is so can be seen from the examples Harris gives of transformations. They use information concerning the bracketing of kernel strings and the category labels assigned to bracketed strings to determine their application and they perform the standard formal operations of permutation, deletion, etc. Thus,

they are more powerful than phrase structure rules because they use information beyond the left-right linear context of a symbol in a string.

Two points should be noted here. First, although it is true that to be fully consistent with his empiricist approach Harris ought to have taken actual sentences as kernel forms rather than the constructions he uses, which are quite abstract and only indirectly related to actual sentences, had he done so, he would have sacrificed any possibility of stating transformations with any degree of generality. Thus, in practice, he uses structures expressing syntactic classification of sentential segments. This is similiar to Bloomfield's practice of using ordering restrictions on phonological rules even though, in theory, he refused to tolerate them as consistent with physicalism.

Second, Harris's transformations are clearly less sophisticated than present day transformations, using a restricted form of variable reference, due to the fact that Harris's representations of syntactic structure in kernel forms does not contain the generality of Chomskyian underlying phrase markers. But this limitation does not imply that Harris's transformations are not true transformations, anymore than the fact that greater sophistication of contemporary transformations with respect to those in _Syntactic Structures_ shows that the latter are not true transformations. Chomsky's achievement was not to invent transformations, but, as we shall see below, to recognize the philosophical significance of Harris's transformational grammar and to clarify the role of transformations in grammar and provide a more general and complete formalization of them.

Harris's conception of transformational grammar had two further features of contemporary transformational theory worth mention. One is that he imposed strong order restrictions on the sequences of transformational rules, excluding certain sequences of transformations from occurring.[15] The other is that each sentence receives an analysis that decomposes it into a series of stages back to the kernel(s) and the intermediate stages describe both the sentence's relations to other sentences and its mode of construction out of them. In this connection, Harris had much to say about the particular characteristics of "parallel sentences", "overlapping sentences", and nominalizations.[16]

From the above review of Harris's transformational theory, it is clear that his _formal theory_ of linguistics is basically the same as Chomsky's in its first, _Syntactic Structure_, phase. The difference in Harris's and Chomsky's positions had to do with how this formal theory was interpreted in the light of their different philosophical and methodological conceptions. On Harris's

interpretation, transformational grammars were conceived of as mathematical systematizations of the linguistic data in a corpus which expresses facts about the distribution of linguistic units from phones to sentences. On Chomsky's interpretation, such grammars were explications of the internalized rules that comprise the speaker's grammatical competence. Therefore, Chomsky's revolution in linguistics consisted in developing a rationalist and mentalist interpretation of the same formal, transformational model that Harris construed in empiricist and behaviorist terms. The primary differences between these two interpretations concern five major topics: _novelty_, _explanation_, _explication_, _absolute formulations_, and _transformational levels_. Let us look at each.

Novelty. Harris attached no special importance to the fact that speakers can produce and comprehend new sentences and other syntactic forms. He adopted a neo-Machian view on the question of whether the linguistic structures that must be presupposed to account for novelty are in any sense real, the essence of which is that theoretical constructs do not represent a portion of reality but represent only computing machinery that enables the scientist to predict one set of observables from another.[17] Harris acknowleuges that such linguistic structures exist in language but denies that this linguistic structure represents anything in reality, and in particular, anything in speakers.[18] At best, distributional structure exists in speakers only in the Pickwickian sense of "reflecting their speaking habits." As Harris expresses his position:

> . . .even when our structure can predict new utterances, we do not know that it always reflects a previously exist- ing neural association in the speakers (different from the associations which do not, at a given time, produce new utterances). For example, before the word _analyticity_ came to be used (in modern logic) our data on English may have contained _analytic_, _synthetic_, _periodic_, _periodicity_, _simplicity_, etc. On this basis, we would have made some statement about the distributional relation of _-ic_ to _-ity_, and the new formation of _analyticity_ may have conformed to this statement. But this means only that the pattern of habit existed in the speakers at the time of the new form- ation, not necessarily before: the 'habit'--the readiness to combine these elements productively--may have developed only when the need arose, by association of words that were partially similar as to composition and environment. . . Aside from this, all we know about any particular language habit is the probability that new formations will be along certain lines rather than others, and this is no more than testing the success of our distributional structure in pre- dicting new data or formations.[19]

Contrast this with Chomsky's often repeated claim that the ability of speakers to produce and understand novel forms is a proof of the existence of a system of internalized grammatical rules. Even Chomsky's preferred term for novelty, 'creativity of language', reflects the shift from data to speaker. Moreover, he even goes so far as to say that explanations of creativity that rely on habit have no force whatever.[20]

Explanation. Harris took the prediction of distributional regularities in a corpus to be the primary concern of the linguist. What matters for him is the construction of formula expressing observed distributional regularities that permit us to anticipate further co-occurrence relations that will appear when the corpus is suitably enlarged. Transformations, for Harris, like phrase structure rules, have this function. Chomsky, on the other hand, takes explanation rather than prediction to be the linguist's primary concern. For Chomsky, the basic question is at the level of the theory of language and theoretical psychology instead of at the level of writing grammars of particular languages. Chomsky seeks to explain how a human being can acquire competence in a language on the basis of the information available in the formative period for language learning. Grammars of particular languages, although of inherent interest, too, are of primary significance in that their common properties tell us what universals may be regarded an innate principles functioning in the acquisition process. The properties of a grammar are significant in this sense insofar as they enable us to say how the child narrows down the class of systems of sound-meaning relations to a class of possible grammars from which a choice can be made using the sensory information available in the formative period.

But, besides the explanation of acquisition, Chomsky has stressed two other areas of explanation, the explanation of features of grammatical competence in a particular natural language based on a hypothesis about universal grammar and the explanation of both the speaker's ability to make judgments about grammatical properties and the speaker's other performance based on a hypothesis about the internalized grammar and the psychological mechanisms of production and perception. However, in all three of these areas, prediction of new form plays the role of confirming or confirming hypotheses about the internalized grammar.

Explication. For Harris, there is no division of the strings of a language into two exclusive and jointly exhaustive sets, the sentences and non-sentences, but only a sliding scale of acceptability on which strings can be ranked as more or less possible. As Harris puts this position:

. . .there is no well-defined set of sentences in a language. Rather, some word sequences are clearly sentences, some are odd or even undecidable as to sentencehood in one or another way and some are entirely impossible.[21]

Harris takes this position because he considers rules of a grammar to be nothing more than compact formulations of co-occurrence patterns in a corpus. Thus, there is no way for him to explain away unclear cases of grammaticality. Doubtful intermediate cases must be so because that is their real status in the corpus. Chomsky, on the other hand, views each and every string of the language as belonging to one or the other of the two categories 'grammatical' or 'ungrammatical'. For him, the middle range of "undecidable cases" reflects not some inherent gradient in the phenomena which a descriptively adequate rule must represent but simply incomplete knowledge on the part of the linguist. As Chomsky writes:

Notice that in order to set the aims of grammar significantly it is sufficient to assume a partial knowledge of sentences and non-sentences. That is, we may assume for this discussion that certain sequences of phonemes are definitely sentences, and that certain other sequences are definitely non-sentences. In many intermediate cases, we shall be prepared to let the grammar itself decide, when the grammar is set up in the simplest way so that it includes the clear sentences and excludes the clear non-sentences. This is a familiar feature of explication.[22]

Absolute Formulations. Viewing a grammar as an explication of the speaker's internalized grammar makes it possible to frame rules in absolute terms rather than as probability statements. Chomsky could take such rules as statements of what the ideal speaker-hearer knows about the language and thereby treat them as an idealization of the kind familiar from physics and other sciences. Harris, on the other hand, could only treat grammatical rules as compact mathematical expressions of the distributional regularities in a corpus. Such statements of the likelihood that new forms will occur under certain conditions must express every feature of the situation that exerts an influence on the degree of likelihood. This means that all sorts of grammatically extraneous features are reflected on a par with genuine grammatical constraints. For example, complexity of constituent structure, length of sentences, social mores, etc. often exert a real influence on the probability that a certain n-tuple of morphemes will occur in the corpus. Thus, as long as the criterion for grammatical representation is what influences the distribution of linguistic forms in the corpus, such features will count on all fours with standard selectional relations in syntax. Chomsky's notion of absolute

formulations as part of an idealization permits him to exclude
from such formulation any factor that should be considered a matter
of performance rather than competence by simply considering the
former as something to be abstracted away from in the manner of
the physicist's excluding friction, air resistance, etc. from the
formulation of mechanical laws.

Transformational levels. Harris shared Bloomfield's positivistic
views on the nature of language. He once put his viewpoint as
follows:

> . . .as part of nature. . .(language) can be objectively
> studied if one considers speech and writing not as an
> expression of the speaker which has particular, introspectively
> recognized, meanings to the hearer; but rather as a set of
> events--sound waves or ink marks[23]

Transformations, then, were thought of as nothing more than computing
machinery for predicting co-occurrence relations, and therefore,
their introduccion constituted merely an extension of the scope
of the devices for data-cataloguing in structuralist linguistics.
But, within the Chomskyian framework, transformations took on a
new and revolutionary character. Because linguistic rules were
interpreted as representations of a mental rather than a phonetic
or orthographic reality the introduction of transformations constituted
the discovery of a new level of psychological structure. Their
discovery, on Chomsky's interpretation, constitutes for linguistics
a discovery of roughly the same magnitude as the discovery in
physics that matter has an atomic structure.

Thus, the significance of the Chomskyian revolution did not
lie in the proposal of a new type of rule nor in the many improvements
in the formalism of transformational theory that it contributed.
Indeed, the grammatical formalism that Harris constructed to extend
the structuralist theory of taxonomic grammar is fundamentally
the same as that found in Chomsky's earlier versions of transforma-
tional theory, and even current theory of the formal structure of
transformational grammars is essentially a sophistication of
Harris's original proposals. The profound contribution of the
Chomskyian revolution was to reinterpret Harris's formal innovations,
i.e., to see them from the opposite philosophical perspective and
to derive the important philosophical and psychological implications
that follow from this change in the interpretation of the formal
model.[24] Chomsky thus turned Harris's formalism against Harris's
empiricist conception of linguistic structure. He saw that,
mentalistically viewed, transformations implied the existence of
unobservable levels of grammatical structure, that these had to
be interpreted as constituting deep parts of the speaker's knowledge,
and that such strata offered a basis for making generalizations
about the universal structure of language, which made these

generalizations immune from disconfirmation in terms of the
variations in surface form from language to language. Finally,
this basis led to the renascence of 17th century universal,
philosophical grammar, the approach that had begun with Descartes
and the Port Royal grammarians, flourished with Humboldt, and
ended in the 19th century with Wundt and in the early 20th with
Bloomfield's search for a sound, empirically oriented methodology.

3. How Empiricism could make a Comeback. In this section, we
examine aspects of both the formal structure of the theory of
language and the sociological and historical structure of the
post-revolutionary period in linguistics. We do this to illustrate
how it would be possible for empiricism to make a comeback and to
sketch the form it would take. In the next section, we present an
important tendency in generative semantics as a case study of a
movement that realizes this possibility in essentially the form
sketched.

We begin with a few remarks about terminology. "Empiricism"
is the name of a meta-theory. It is a theory about theories of
how knowledge is acquired. It claims that the proper theory of
how knowledge is acquired says that it comes from sensory experience
by means of associative principles. On empiricistic theories,
innate mental mechanisms are restricted to procedures for inductive
generalization, and therefore, contribute nothing to the content
of our knowledge. "Rationalism" is the name of the opposing meta-
theory. It claims that the general form of our knowledge comes
not from experience but from innate schema. On rationalistic
theories much of the content of our knowledge is fixed as a biological
disposition of our mind and the function of experience is simply
to activate this disposition and thereby cause the innate schema
to be realized.

"Behaviorism", "operationalism", and "physicalism" have to
be distinguished from "empiricism".[25] Behaviorism contrasts with
mentalism. Behaviorism is the doctrine that there are no internal,
private mental states that causally underlie behavior which are
not themselves statable fully in terms of behavior. Operationalism
is a methodological "safeguard" against mentalistic theories,
requiring that each concept in a theory have a definition in terms
of physical operations that govern its application. Physicalism
constitutes another such "safeguard". It holds that the concepts
of any theory (in particular, psychological theories) must be,
in principle, reducible, without loss of content, to concepts of
physics and that the laws of other theories must be expressible
by laws of physics. Now, although these doctrines differ from
empiricism, they often go together because they support each other
and at bottom express the same conception of how to understand
phenomena. Empiricism, behaviorism, and operationalism assume

that such understanding requires us to consider only what is outside, what is public, what is observable to every experimenter.

We may extend the terms "empiricism" and "rationalism" to accounts of knowledge of one kind or another. That is, we may say that an account of what knowledge of a certain kind is can be empiricistic or rationalistic, depending on what properties the account ascribes to the knowledge. If the account ascribes properties that make it difficult or impossible for that knowledge to be explained on an empiricist theory of acquisition, then the account is rationalistic. If the account ascribes properties that make it easy for that knowledge to be explained on an empiricist theory, then it is empiricist. Since any account of how knowledge arises must begin with some notion of what that knowledge is like, it is clear that accounts of what the knowledge is like can be either more or less troublesome to philosophical theories about its acquisition. Traditionally, arguments for the existence of necessary truth were taken as arguments for rationalism because it was assumed that no associative principles could account for the acquisition of necessary connections.

Since grammars are accounts of linguistic knowledge, we can ask of a grammar (and a theory of grammars) whether it is rationalistic or empiricistic. Chomsky's account of grammar is clearly rationalistic, since, on it, linguistic knowledge is determined by unobservable mental structures which are invariant from language to language. For empiricism to make a comeback, this account would have to be changed so that the account of linguistic knowledge becomes empiricistic again.

What makes it possible for empiricism to make a comeback is that there is a deficiency in the theory of generative grammar that allows for an empiricistic account of grammars to be given. This deficiency is that there is almost no theory of the interpretation of formal grammars, no theory that tells us how such formal systems are construed as empirical theories that make specific claims about linguistic behavior. Transformational linguistics has contributed to some extent to this theory, but its contributions were limited, never explicitly recognized as such, and very fragmentary and in some case less than coherent. The development of transformational linguistics has been lopsided in favor of contributions to the characterization of the formal model of a grammar. Indeed, what has come to be known as transformational theory is almost exclusively an account of the formal structure of sentence generating grammars.

The distinction between the formal structure of a grammar, what we will call the "formal model", and the principles that assign it empirical content, which we will call the "interpretation" is a distinction between the abstract calculus that forms the

skeletal structure of the theory and the statements about the parts of the calculus that give them meaning. The formal model consists of a vocabulary of meaningless symbols, syntactic rules for forming strings in the calculus from the vocabulary, and a set of such strings distinguished as the axioms, and finally, principles that specify derivational relations between the axioms and other strings in the calculus. The interpretation consists of a set of what we shall call "correspondence principles" that connect the symbols and strings of the calculus to states of affairs in the world. They supply empirical content by relating strings of symbols or sets of them to aspects of the behavior of the things in the domain of the theory. The formal model plus an interpretation is an empirical theory of the domain.[26]

Here and there in linguistics we find fragments of an interpretation, but they are not thought of as correspondence principles. Generally, they are seen as part of the apparatus for determining predictions about the intuitions of speakers, as providing a means of confirming or disconfirming rules. Three notable examples are Chomsky's (partial) explications of the notions 'grammatical sentence', 'ambiguous construction', and 'synonymous sentence'.[27] The first explicates grammaticality in terms of the formal property of generation in an optimal grammar. This explication associates a derivation with the intuitive property of well-formedness and thereby enables the linguist to predict that a native speaker of English distinguishes between sentences like (8) and strings like (9). The

   (8) Colorless green ideas sleep furiously
   (9) Furiously sleep ideas green colorless

second explicates ambiguity in terms of the formal property of a sentence having two or more non-equivalent derivations. This explication associates the existence of multiple structural descriptions for the same sentence with native speaker's intuitions of multiple senses and thereby enables the linguist to predict that the native speaker of English recognizes the ambiguity of sentences like (10).

   (10) Flying planes can be dangerous

The third explicates synonymy in terms of the formal property of the same underlying phrase marker initiating the derivations of different sentences. This explication associates derivations originating with the same underlying phrase marker with the native speaker's intuition of sameness of meaning and thereby enables the linguist to predict that the native speaker of English takes sentences like (11) and (12) or sentences like (13) and (14) to have the same sense.

(11)   John hit Benny's sister
(12)   Benny's sister was hit by John
(13)   The woman who is old left
(14)   The old woman left

These associations, which were originally thought of as predictive, as determining the specific empirical claims that grammars with certain formal properties, e.g., rules enabling us to derive such and such a sentence, or ones that enable us to derive it in different ways, are ipso facto committed to, can also be thought of as interpretive, as specifying the empirical meaning of such formal properties in the grammar. That is, these associations function as correspondence principles that tell us the significance of these formalisms when used the other way around, i.e., when aspects of the behavior of speakers are used, via the connecting association, to say what the significance of the uninterpreted piece of formalism in the grammar is.

But not only have the correspondence principles offerred so far been an exceedingly small and fragmentary piece of a full interpretation, they are each themselves less than adequate. The definition of grammaticality of generation in an optimal grammar is only informative to the degree that we have a complete notion of what an optimal grammar is. By itself, the failure of a system of rules to generate a string means either that the string is ungrammatical or that the system is not optimal. Thus, we must know that the system is optimal to know the ungenerated string is ungrammatical. If we have a number of independent constraints that can be imposed on grammars which permit us to make an argument, apart from questions of grammaticality, that the grammar is optimal, then we have a basis for deciding questions of grammaticality. If we have no such constraints, there is no independent grounds for claiming the system is adequate and no basis for choosing between the alternatives of an ungrammatical string and an inadequate grammar.

The situation is even worse if there are no other acceptable correspondence principles, since, then, the grammar is defined simply as a system that generates all and only the grammatical sentences, and as a consequence, we face real circularity when we claim that a string is not grammatical because it is not generated. In fact, the two other explications presently available cannot bear the weight that is thus put on them. The explication of ambiguity fails completely if there are cases where different underlying phrase markers underlie synonymous sentences, since the explication takes multiple underlying phrase markers as a sufficient condition for ambiguity. Counter-examples are relatively easy to find, e.g. (15),

(15)   It was done by an automated processing device

(16), and (17). In each of these cases, there is an alternative bracketing

(16)   John wrote a letter about his experience[28]
(17)   Don't buy bright green rugs[29]

of the form (A (BC)) and ((AB) C), but no sense difference corresponding to it.

The explication of synonymy in terms of sameness of underlying phrase marker is in no better shape. Examples such as those Chomsky, Jackendoff, and others have proposed to support their theory that properties of surface structure are relevant to semantic interpretation are putative counter-examples to this explication.[30] In addition, changes in transformational theory such as the change in the conception of the passive transformation by which it became obligatory as the result of the introduction of a passive marker in the base narrow the range of cases for which this explication has application. Its range of application is further narrowed by the fact that the explication has no relevance to the infinite set of cases in which sentences with vastly different underlying phrase markers are synonymous because the meanings of their lexical items combine compositionally to provide the same meaning for both sentences, as in the examples (18) and (19). The area of application remaining for this explication

(18)   George is a bachelor
(19)   George is a human who is male and an adult and an
          unmarried person to boot

is not only small, but trying to characterize it would be extremely complicated.

But it would be pointless to even try to characterize it. The reason is that what these counter-examples show is that there is a role for a semantic explication of ambiguity and synonymy, and any role for semantic explications makes syntactic explications of such notions obsolete. Cases like (15)-(17) require us to explicate 'S is ambiguous in L' in terms of the condition that S receives more than one semantic representation in the grammar of L. But if we introduce such an explication for these cases, there is no point in keeping the syntactic explication for others, since every case of ambiguity that the syntactic explication covers is also covered by the new semantic explication. The same situation exists in the case of synonymy. Cases like (18) and (19) require us to explicate 'S_1 is synonymous with S_2 in L' in terms of the condition that S_1 and S_2 receive the same semantic representation in the grammar of L. But if we introduce such an explication, there is, again, no point in keeping the syntactic explication, since every case of synonymy that the syntactic explication covers is also covered by the new semantic one.

We may obtain some further idea of the primitive state of the theory of interpretation if we look at what a complete and systematic account of the interpretation of the formalism of grammars would contain. Clearly, such a theory would list every grammatical property that a language could exhibit and provide a correspondence principle for each. These principles would associate a term denoting some grammatical property such as intuitive well-formedness with a description of some formalism in the uninterpreted calculus such as that of a complete derivation. At the phonological level, we would find a correspondence principle for the properties of rhyme, alliteration, meter, etc. At the syntactic level, we would find one for the properties of grammaticality, ellipsis, sentence types, part of speech equivalences, pronominalization relations, agreement, etc. At the semantic level, we would find a correspondence principle for the properties of ambiguity, synonymy, analyticity, meaningless vs. meaningfulness, entailment, presupposition, etc. Further, a theory of interpretation would have to state meta-principles that guarantee that a system of correspondence principles provide a coherent interpretation of formal grammars. For example, there must be some meta-principle to determine what part of the formal model is interpreted and what part can be left without connection to linguistic behavior. One such meta-principle might be based on the linguist's working assumption that similar cases of formal structures must receive similar empirical interpretations. This assumption operated as one of the reasons for the elimination of generalized transformations from the grammar. On the one hand, if the assignment of different underlying phrase markers to the same surface structure is a condition for ambiguity, then, on this working assumption, the assignment of different T-markers to the same surface structure, in grammars with generalized transformations, should also be a condition for ambiguity. But, on the other, the existence of multiple T-markers underlying a sentence does not, empirically, correspond to any form of sentential ambiguity. Thus, a reason for eliminating generalized transformations is that, then, no situation arises where there is a distinction without a difference.[31] The formulation of meta-principles in a theory of interpretation would provide a place in the theory of grammars to state such assumptions explicitly.[32]

The present primitive state of the theory of interpretation is what provides the backdoor through which empiricism might return to linguistics. Since very many different actual and possible empirical theories can have the same formal structure (e.g., a system of phrase structure rules can be a description of the geneology of a family, a program for theorem-proving computers, a sentence generating grammar), a given formal system can be made to mean different things depending on what interpretation is imposed on its symbols and their formal relations in strings. Moreover, if this can be done for a whole system, nothing prevents a change

in a central part of a system from changing the general character of the whole system in some specific direction. Thus, empiricism might make a comeback if it could capitalize on the near vacuum in linguistic theory as far as a theory of interpretation is concerned in order to dislodge the rather weakly based rationalistic interpretation (based on Chomsky's proposals concerning novelty, explanation, explication, absolute formulations, and transformational levels) and replace it with an empiricist interpretation.

The problem for the empiricist would be how to find an interpretation that represents the internalized grammar that comprises the speaker's fluency in a way that makes an empiricist account of its acquisition seem natural. The focus of such an interpretation would clearly have to be the property of grammaticality. Grammaticality is the central notion in linguistic investigation and it occupies a pre-eminent position in the Chomskyian theory as well. Chomsky's presentation of transformational theory emphasizes the property of grammaticality, stressing it by the characterization of grammars as sentence generating devices. Thus, to find an interpretation that is empiricist, perhaps the most important thing is to do is to fully undermine Chomsky's notions of explication and absolute formulation which provide the basis for his conception of grammaticality.

We should therefore expect the Chomskyian notion of grammaticality as generation in an optimal grammar to be the main target of an empiricist counter-revolution. This notion supports a rationalist conception of language acquisition by making a sharp, absolute distinction between the grammatical and the ungrammatical and between the competence principles that determine the grammatical and anything else that combines with them to produce performance. Such cleavages are not found in linguistic experience, which better fits Harris's description of a sliding scale from the totally unacceptable to the clearly acceptable. Moreover, it is virtually inconceivable that inductive generalization applied to so heterogeneous a set of events as linguistic experience could give rise to so idealized a set of objects as Chomskyian grammars without the aid of strong a priori determinations of the form and content of their rules. Inductive generalization makes universal copies of particular phenomena, but like a photograph it reflects what is there. If sharp dichotomies are not in linguistic experience, then they have to be contributed by the machinery the mind uses to organize its experience. However, if instead of Chomskyian grammars, theories of language acquisition had to explain the acquisition of something closer to a description of actual experience, empiricism would look far more plausible.

An important secondary target of an empiricist counter-revolution has to be the absolute concepts at the semantic level of

synonymy, analyticity, and entailment. The presence of such absolute concepts leads directly to the existence of necessary truths, since these concepts will lead to our crediting speaker's with knowledge of meanings that by itself constitutes knowledge of necessary truth. Such knowledge poses a formidable stumbling block to empiricism, since no amount of repetition in experience can produce anything stronger than a highly confirmed association. It can never equal a necessary connection, and thus, empiricist theories stand no chance of accounting for how speakers could have come to know sentences whose meaning involves necessary connection.

The absence of even a fairly well-developed theory of interpretation makes it easy for the empiricist to attack these notions because without such a theory there is no rationalistic criterion for what is linguistic and what is not, what belongs in the grammar and what is extra-grammatical. If there were such a theory, then relative to its correspondence principles we could set up the criterion that what belongs in the grammar is whatever formalism is necessary to explain the properties and relations, e.g. rhyme, meter, ellipsis, word-order, sentence type, synonymy, ambiguity, etc., appearing in these principles. Without such a theory, we tend not even to think of such a criterion and in its absence the empiricist could return (without much notice being taken) to Harris's criterion that what belongs in the grammar is whatever influences the distribution of linguistic elements. This criterion would easily do away with the Chomskyian conception of grammaticality as dealing with only a limited set of the factors that influence distribution. It would be replaced by a conception that relativizes grammaticality to all sorts of performance and contextual factors, thereby almost by itself reinterpreting the formal model empiricistically. Furthermore, the criterion would also obliterate the distinction between beliefs about the meanings of words and beliefs about what words refer to, since, of course, both sets of beliefs determine the distribution of words in speech. Consequently, absolute concepts of synonymy, analyticity, and entailment would be replaced by graded concepts,[33] and these, because only contingent connections could be expressed with them, would be no obstacle to empiricist theories of how speakers come to know what they do about their language.

4. A Case Study: Generative Semantics Lakoff Style. Having seen how empiricism might come back into linguistics, we now will see how it is coming back. We do not claim that the linguists who are bringing it back are necessarily empiricists or are aware that their work has this thrust, but only that their work clears the way for the return of empiricism in the way described above.

It appears at first encounter that generative semanticists are developing a new and improved model of grammar, but there is strong reason to think that the model that generative semanticists are offering is either a notational variant of the model of grammar known as the "standard theory" or a modest extension of that model. We will not repeat the arguments for this claim.[34] The claims we wish to make here do not depend on them; rather, our claims here answer a question often asked in connection with these arguments, namely, how can generative semantics be a notational variant of interpretive semantics when it is perfectly clear that some new and controversial thesis is being put forth by generative semanticists? The answer is that the equivalence claim is about the formal model, while the controversy is about the interpretation. The issue between generative and interpretive semantics is over different interpretation schemes for the transformational model, one of which is empiricist and the other rationalist.

4. Lakoff on the Interpretation of Formal Grammars. In this subsection, we consider Lakoff's proposals to replace the absolute notions of grammaticality and of analyticity, synonymy, and entailment with graded ones. As argued above, these aspects of the rationalist interpretation of the transformational model are the two key areas where an empiricist counter-revolution would have to concentrate its attack.

Lakoff states his aims as follows:

There are a great many cases where it makes no sense to speak of the well-formedness or 'grammaticality' of a sentence in isolation. Instead one must speak of relative well-formedness and/or relative grammaticality; that is, in such cases a sentence will be well-formed only with respect to certain presuppositions about the nature of the world. . . Given a sentence, S, and a set of presuppositions, P, we will say, in such instances, that S is well-formed only relative to P. That is, I will claim that the notion of relative well-formedness is needed to replace Chomsky's original notion of strict grammaticality. . ., which was applied to a sentence in isolation.[35]

Lakoff claims further that he is not "blurring the distinction between competence and performance," since he distinguishes between extra-linguistic factors that enter into a speaker's judgments about well-formedness and "the linguistic competence underlying this," i.e., "the ability of a speaker to pair sentences with the presuppositions relative to which they are well-formed."[36] Chomsky[37] takes Lakoff at his word here and concludes that there is nothing more at stake than a question of terminology. As Chomsky argues,

the relation between (20) and its presupposition, say, that

(20)   John called Mary a Republican and then _she_ insulted _him_

Mary believes that to be called a Republican is insulting, is agreed to hold independently of anyone's factual beliefs and to be a matter of competence, and therefore, it doesn't matter whether one follows Lakoff and "define 'well-formed' as a relative concept, and. . .have the grammar generate (S,P) pairs such that S is well-formed relative to P" or follows him and defines 'well-formed' independently of beliefs of Mary's, John's, or anyone else's and then "assign to the semantic component of the grammar the task of stipulating that (20) expresses the presupposition that for John to call Mary a Republican is for him to insult her."38 The substance of Chomsky's position is that

> For sentences with presuppositions in this sense, nothing hinges on this terminological decision. . . What may appear at first sight to be a profound issue dissolves into nothing on analysis.39

But Chomsky is wrong here. There is a profound issue. Lakoff is allowing a competence-performance distinction, but not the one Chomsky has drawn which characterizes the notion of well-formedness so that strings in a language can be divided into the well-formed and the ill-formed just on the basis of their syntactic structure, without reference to the way things are in the world, what speakers, hearers, or anyone else believes, etc. What makes the situation confusing is that Lakoff keeps the terminology "competence", "linguistic knowledge", etc. but changes what such terms mean. One has to read closely and put together things that he says in different places to see that "competence" no longer refers exclusively to the system of grammatical rules that constitutes an idealized (in Chomsky's sense) speaker-hearer's ability to associate sounds and meanings, but includes a host of non-grammatical facts about the way things are in the world such as what speakers, hearers, people spoken about, etc. believe. Lakoff says:

> The study of the relationship between a sentence and those things that it presupposes about the nature of the world by way of systematic rules is part of the study of linguistic competence.40

Thus, for Lakoff, but _not_ for Chomsky, the well-formedness of (20) turns, in part, on the empirical facts concerning what beliefs Mary, John, the speaker, etc. have about Republicans, etc., whereas for both, at some level in the grammar, (20) is paired with the presupposition (in some sense of this term) that for John to call Mary a Republican is for him to insult her.

Lakoff would of course argue about whether such facts about people's beliefs are non-grammatical facts, but such an argument would be beside the point, since what we have here is a conflict between two conceptions of what the distinction between the grammatical and the extra-grammatical is. Lakoff's criterion for what is grammatical is explicitly that of structuralist linguists like Harris, namely, that whatever determines the distribution of morphemes is _ipso facto_ part of grammar.41 Thus, he argues that, since beliefs of those involved in the speech situation determine the distribution of such features as the stress pattern of (20) as distinct from that of (21) where the sentence expresses no more than that

(21)   John called Mary a Republican and then she insulted him

one event occurred and then another occurred (i.e., there is no sense of Mary insulting John back in connection with (21)), information about the existence of beliefs about John's having insulted Mary must be an integral part of the study of competence. Lakoff's criterion leads to an almost indefinitely expandable competence domain: any factor in a linguistic situation that influences distribution becomes a matter of competence. As we shall see below, Lakoff capitalizes on this feature of his criterion to come up with a variety of novel claims about competence.

Chomsky's criterion is close to the Wundtian conception of the subject of grammar. The object of study is the sentence, intuitively understood, and the theory of competence is a theory about the principles that explain the intuitions we, as speakers, have about aspects of sentence structure.42 Thus, a rule is counted as grammatical if it plays a role in explaining the structure underlying intuitions about ambiguity in sentences like (10), about synonymy in sentence pairs like (11) and (12) or (13) and (14), and about well-formedness in sentences like (8). But linguistic competence is distinguished from performance primarily in a negative way by the fact that the latter involves matters not relevant in the explanation of such intuitions, e.g., limitations stemming from the nature of the organism's psychological mechanisms, which restrict immediate memory, computation time, and information access. On the positive side, it is readily conceded that this criterion is nowhere nearly as fully developed as is desirable, principally because of the absence of a rich theory of the interpretation of formal grammars. The absence of this theory meant that the range of intuitions that would be required in a reasonably complete and convincing account of what a grammar must explain was drastically impoverished. Nonetheless, Chomsky43 made it quite clear that a factor that influences the distribution of linguistic forms cannot for that reason be taken to determine aspects of competence like grammaticality (rather than aspects of performance like

acceptability), since, as he observed, "The more acceptable sentences are those that are more likely to be produced, more easily understood, less clumsy, and in some sense more natural. The unacceptable sentences one would tend to avoid and replace by more acceptable variants, wherever possible, in actual discourse. . . The unacceptable grammatical sentences often cannot be used, for reasons having to do, not with grammar, but rather with memory limitations, intona- tional and stylistic factors, "iconic" elements of discourse. . . and so on."

Lakoff's criterion leads directly to a reintroduction of Harris's conception of acceptability on which the sentences of the language form a gradient from clearly impossible strings on up to clearly well-formed ones, since well-formedness is made a function of parameters that may vary in any way from speaker to speaker and to any degree in the same speaker over time.[44] Thus, Lakoff's proposal of relative grammaticality, if accepted, would take what is perhaps the most important step toward preparing the way for a return of empiricism, since it would eliminate Chomsky's strict dichotomy between the grammatical and the ungrammatical. Given that actual speech is so messy, heterogeneous, irregular, fuzzy, and full of one or another kind of performance error, the empiricist's explanation of Chomskyian rules that strictly divide the sentences into the jointly exhaustive and mutually exclusive categories of the grammatical and the ungrammatical as having been learned as a purely inductive generalization of a sample of actual speech is, to say the very least, hard to take seriously. On the other hand, something like Harris's or Lakoff's rules that represent a gradient from the clearly acceptable down, with some strings "odd or even undecidable as to sentencehood in one or another way and some. . . entirely impossible," because they reflect the character of actual speech, stand a much better chance of being explained on the basis of inductive generalization.

Rationalism, however, is an empirical theory. It might be a true hypothesis about the acquisition of knowledge or empiricism might be true. Hence, we have to show more than that Lakoff's proposal helps to clear the field for the return of empiricism; we have to show that Lakoff's work provides no support for empiricism. We cannot hope here to restate the case against empiricism in linguistics,[45] and so we have to accept the fact that those linguists who still remain empiricists will reply to what we have said in this paper "so much the better for generative semantics." But we can show that Lakoff's arguments in no way undermine or weaken the case Chomsky and others have erected for rationalism. Therefore, we now turn to the question of the adequacy of Lakoff's arguments for his proposal to relativize well-formedness to the beliefs of speakers, actors, etc.

Typical of Lakoff's arguments is the one that claims that the grammaticality of sentences with verb phrases like "realizes that I'm a lousy cook," "believes I'm a fool," "enjoys tormenting me," etc. does not depend on whether their subject is marked 'Human' but instead on whether the speaker assumes that the thing(s) in the world that he or she refers to by the subject are sentient. Lakoff's argument for this conclusion is that people who believe that such things as cats, goldfish, amoebas, frying pans, sincerity, or births are sentient find sentences like (22)

(22) My cat (goldfish, pet amoeba, frying pan, birth, etc.) enjoys tormenting me

"perfectly alright." Thus, Lakoff concludes that well-formedness is not an absolute notion but a relative one which varies with belief.

The argument initially strikes one as a simple non-sequitur. Why should anyone conclude that a sentence like (23) is well-formed in any sense from the

(25) My frying pan enjoys the fire because it's masochistic

mere fact that people who believe that frying pans have a mind find such a sentence "acceptable", "perfectly all right", or "perfectly normal"? What makes us take such judgments to be judgments about well-formedness in the sense in which this term is used in the theory Lakoff is criticizing? Perhaps all that such people mean when they say these things is that the sentence expresses something they think is true. After all, deviant sentences can be used to make true statements.[47]

The argument is a non-sequitur, but the plot thickens if we look more closely. Lakoff himself finds the argument convincing, so one may assume that he has some principle in mind that enables him to draw the conclusion that the judgments are legitimately judgments about well-formedness. One aspect of such a principle would have to be that ill-formedness is the only kind of sentential deviance to which the judgments of such people is relevant. This is, of course, dubious, but we may accept it for the sake of argument.[48] The other aspect of such a principle is that there is no distinction between a speaker's knowledge of the grammatical or semantic properties of a word and his or her beliefs about the things to which it refers in the world. That this must be assumed to make the argument work is easy to show. Assume it to be false. That is, assume that there is one criterion for determining the grammatical or semantic facts about a term like "frying pan" and another for determining beliefs about frying pans. The former might be as follows: an hypothesis H_i representing a putative

lexical sense of w is preferable to another Hypothesis H_j just in case H_i predicts and explains the semantic properties and relations of sentences in which w occurs better than does H_j or they explain them equally well but $\overline{H}_i$ is simpler.[49] The latter criterion might be as follows: a belief B_i about some class of things in the world is better than another B_j just in case it better explains the behavior of these objects or more simply if both explain such behavior equally well. Now, suppose that on the basis of the first criterion we learn that the meaning of "frying pan" in English today is, roughly, "non-sentient, physical object, artifact, used for frying food in." Suppose, however, that you and your friends have been making a study of some of the behavior of frying pans when other people forget about them, and that you find that this behavior is so strange that the only explanation that accounts for it is that they are sentient and desire to enslave the human race. You rush to the TV station, seize the microphone, and begin to sound the warning. What do you say? There is no word in the language meaning "sentient, physical object, artifact, used for frying food in." But this doesn't matter, you can deliver the warning using the term "frying pan." There is nothing illegitimate about this; it is a perfectly straightforward case of reference under a false semantic description.[50]

But if beliefs about the referents of words are independent of the meaning of these words in the way that the above account suggests, Lakoff's conclusion does not follow. Hence, his argument must deny any possibility of such distinct criteria and any distinction between the speakers' knowledge of the grammatical properties of words and their knowledge of the things in the world to which words refer. But since this is exactly what his argument against Chomsky's notion of absolute grammaticality is supposed to prove, the argument is circular. Lakoff is supposed to show that Chomsky's rationalist conception of a closed system of formal rules expressing the internal structure of sentence types and permitting us to make an absolute dichotomy between the ill-formed and the well-formed is untenable because it is incapable of handling the most interesting facts in the domain of syntax.[51] However, he begs the question because he simply assumes the empiricist principle that there is no distinction between grammatical information, including dictionary information of both a syntactic and semantic nature, and extra-grammatical information, including information about what the speaker believes about others, encyclopedia information concerning what various referents are, etc.

What the actual grammatical status of sentences like (22) and (23) is is, of course, another question. It might be that hypothesis that Lakoff rejects out of hand, viz., that only "uncle" is marked 'Human', so that only (24) is deviant. Or, for

(24) My uncle enjoys tormenting me (realizes I'm a lousy cook, etc.)

all we know, (23) might be non-deviant. The problem is not the lack of a criterion to tell us how we decide matters of this kind; the criterion mentioned just above together with a suitable set of definitions of the semantic properties and relations that have to be predicted and explained serves well enough. What is absent is some clear enough set of examples of the semantic properties and relations that need to be predicted and explained. What is relevant here, however, is that, whatever the examples turn out to be, there is nothing in what Lakoff says to show that, in principle, such deviance phenomena will be outside the range of the standard theory.

This may not be as clear for some of Lakoff's cases as it is for the case of examples like (22)-(24). Thus it will be worthwhile considering his examples (25) and (26).

(25) We have just found a good name for our child, who we hope will be conceived tonight

(26) We have just found a good name for our child, who we hope will grow up to be a good citizen after he is born

Lakoff's claim concerning the deviance of (25) is:

. . .it seems clear that the distribution of the grammatical morpheme who cannot simply be determined by a syntactic feature like [+Human]; rather, the relative who requires, at least, that the person referred to be presupposed to be alive at the time referred to in the relative clause.[52]

It is easy to show that an explanation of the deviance of (25) and the non-deviance of (26) can be given in the standard theory without reference to what the speaker believes. We can assume that the combination of a reading of an embedded sentence in the form of a relative clause with the reading of its head in the matrix structure is governed by the condition that the latter reading be identical to the reading of the pronominalized constituent. Taking the deviance of (25) to be semantic, this condition is a selectional restriction determining the existence of a derived reading for the whole sentence. In the example (25), the reading of the head noun phrase of the matrix structure will contain the semantic marker '(Alive at Speech Point)'[53] while the reading of the pronominalized noun phrase in the embedded structure, i.e., the object of the verb "conceive", will contain the semantic marker '(A/(Alive at Speech Point))'.[54] Thus, the selectional restriction on the combination of readings will not be satisfied, and the sentence as a whole will be marked semantically anomalous.

Note that this explanation does mention either presupposition or speaker's beliefs. Generative semanticists generally assume that selectional restrictions always determine presupposition, but this is mistaken, since the connection can fail in both directions.[55] Actually, in the cases where a selection restriction predicts a presupposition, the latter is something like an epiphenomenon. Thus, the correspondence between the selectional restriction of verbs like "enjoy", "realize", "believe", etc. that the reading of their subject contain the semantic marker '(Sentient)' and the presupposition that a sentence like (24) presupposes the existence of some sentient creature (appropriately related to the speaker) is due simply to the fact that the reading of this subject determines such a presupposition just insofar as the reading of any noun phrase in referential position determines a presupposition to the effect that there exists something with the properties expressed by the semantic markers in its reading. The selection restriction merely excludes readings of sentences whose subject does not contain the marker '(Sentient)', thereby leaving only those with the presupposition that there exists some sentient creature. Hence, although it appears that it is the selection restriction of the verb that determines the presupposition, the verb only influences the presupposition of its subject indirectly. Therefore, our explanation makes no reference to presupposition, etc., but accounts for the semantically deviant and non deviant cases in terms of whether or not a selection restriction on the semantic markers appearing in a reading is satisfied, that is, in terms of the internal semantic structure of a sentence.

Recently, Lakoff has extended his theory of relative well-formedness, making the notion of well-formedness depend on an even wider range of empirical facts about the beliefs of speakers.[56] Lakoff says:

Take an example. (27) involves the assertion of (28), and is

(27) Nixon was elected, but the blacks won't revolt
(28) Nixon was elected, and the blacks won't revolt

grammatical relative to a set of presuppositions like that given in (29). I will not go through the deduction here, but it should

(29) (a) Nixon is a Republican
(b) If a Republican is elected, then social welfare programs will be cut
(c) If social welfare programs are cut, the poor will suffer

(d) Blacks are poor.
(e) Blacks are discriminated against.
(f) Blacks form a substantial part of the population
(g) One would expect that poor, suffering people who are discriminated against and who form a substantial proportion of the population would revolt.

be obvious that Exp(Nixon was elected ⊃ ·The blacks won't revolt) can be deduced from these presuppositions (29)(a-g). Thus, (27) will be grammatical relative to these presuppositions. Since these presuppositions do not conflict with our knowledge of the world, (27) is a perfectly normal sentence. Of course, there are innumerable other sets of presuppositions relative to which (27) would be grammatical--all of those from which Exp(Nixon was elected ⊃ ·The blacks won't revolt) can be deduced.[57]

Lakoff himself is no doubt about the fact that on this theory the well-formedness of sentences depends on matters of empirical fact. He continues:

It should be clear that the general principles governing the occurrence of too, but, and reciprocal contrastive stress can be stated only in terms of presuppositions and deductions based on those presuppositions. This means that certain sentences will be grammatical only relative to certain presuppositions and deductions, that is, to certain thoughts and thought processes and the situations to which they correspond. This seems to me wholly natural.[58]

Moreover, he happily embraces the consequence that the pairing of sentences with their presuppositions, and hence the determination of well-formedness generally, is no longer a matter of mechanical computation.[59]

From the viewpoint of those sympathetic to the approach of the old version of Lakoff's theory of relative well-formedness, this new version must be considered both a natural extension and an important improvement. It represents a generalization in that now no particular belief of a speaker's (say, about cats, goldfish, amoebas, frying pans, etc.) is necessary for a sentence about them (like those in (22)) to be grammatical. All that is required now is that the speaker's beliefs, taken together, bear the relation of logical implication to the presupposition of the sentence. This has the advantage of permitting the generative semanticist to determine the relative grammaticality of a sentence in certain of the cases where the speaker has no specific belief about the truth of the presupposition, namely, those in which

the speaker's beliefs imply the presupposition. On the old version, these cases were treated on a par with cases in which the speaker has a belief that is inconsistent with the presupposition or in which the speaker's beliefs are independent of the presupposition.

From the viewpoint of those unsympathetic to the first version of Lakoff's theory because it is an attack on the rationalist distinction between the grammatical and the extra-grammatical, the new version is, as already indicated, even more empiricistic. Fortunately, however, it has consequences so absurd as to pose no threat to rationalism. The new version says that a sentence S is grammatical relative to a set of beliefs, B, of a speaker in case B implies P, the presupposition of S. But this means that Lakoff's theory entails the absurd claim that no one can have inconsistent beliefs. For suppose that someone has a set of beliefs containing one of the form P and another of the form ~P.[60] Then, by a well known argument,[61] this set of beliefs implies any proposition whatever. Thus, in particular, it implies the presupposition of (27), from which it follows that (27) is well-formed. But, by the same token, it also implies the denial of the presupposition of (27), from which it follows that (27) is not well-formed. Hence, Lakoff's theory must assert the contradiction that this sentence, and every other, is both well-formed and not well-formed. Lakoff can, of course, try to avoid this conclusion by denying that anyone ever has inconsistent beliefs, but this would be a pyrrhic victory since such a claim is only slightly less absurd than the contradiction itself.

Lakoff sometimes speaks as if he had in mind a weaker relation (between the presupposition of a sentence and the beliefs of a speaker) than that of logical implication, namely, independence, e.g., "Since these presuppositions do not conflict with our knowledge of the world, (27) is a perfectly normal sentence."[62] Thus, it might be thought that he has a way out of the above difficulty: to require simply that the presupposition of a sentence be consistent with the speaker's knowledge (or beliefs). But revision has equally absurd consequences. For example, for a radical skeptic who accepts no beliefs about anything every string in the language is grammatical, since every presupposition is consistent with a null set of beliefs. Thus, independently of their use of ancient Greek, we have to say that Pyrrho and Plato had entirely different competence in the language. Furthermore, every sentence about a subject that one knows nothing about (and modestly refrains from framing opinions on) is grammatical. Moreover, as we come to gain some knowledge about a subject and come to have some beliefs, sentences about that subject start to become ill-formed at a rate proportional to the increase in what we know and believe. Again, since most of us have different sets of beliefs, and since languages are individuated (in part) by the set of sentences counted as

grammatical, Lakoff's view entails the absurd consequence that almost all of us, except for the most "Tweedle-Dee/Tweedle-Dum" pairs, speak different languages.[63]

In our discussion of how empiricism might make a comeback, we said that a secondary target for an empiricist counter-revolution to deal with is the cluster of semantic notions 'synonymy', 'analyticity', and 'entailment', since such absolute notions like these lead directly to necessary truths. These notions permit us to determine the internal conceptual structure of linguistic constructions and to distinguish their semantic properties from features of the things to which they refer. They thus enable us to use the purely internal conceptual structure to express connections that are independent of the features of the actual world and so hold in any possible one. Accordingly, they lead to a rationalist account of the speaker's knowledge, insofar as they permit us to attribute knowledge of sentences expressing necessary truths to the speaker's competence. This, in turn, means that a theory of the acquisition of such a competence must contain more than principles of associative learning allowed by empiricism, since such principles only provide for probable connections. Hence, empiricism has to find some way of replacing these absolute semantic notions by graded ones, ones that imply no sharp division between the inside and outside of a concept. Given concepts with vague boundaries that permit no precise line to be drawn between internal conceptual structure and external features, the speaker's knowledge of the language can be characterized in a way that removes the obstacle of necessary truth that otherwise would block empiricist attempts to account for its acquisition on an inductive basis.

Now, turning to how generative semantics is clearing the way for a return os empiricism, we find Lakoff proposing just such an empiricist doctrine of concepts. He writes:

> . . .natural language concepts have vague boundaries and fuzzy edges and. . .consequently, natural language sentences will very often be neither true, nor false, nor nonsensical, but rather true to a certain extent and false to a certain extent, . . .[64]

In particular, he argues:

> Robins simply are more typical of birds than chickens and chickens are more typical of birds than penguins, though all are birds to some extent. Suppose now that instead of asking about category membership we ask instead about the truth of sentences that assert category membership. If an X is a member of a category Y only to a certain degree, then the sentence "An X is a Y" should be true only to that degree, rather than being clearly true or false. My feeling is that this is correct, as (30) indicates.

(30) Degree of truth (corresponding to degree of category membership)

> (a) A robin is a bird   (true)
> (b) A chicken is a bird   (less true than a)
> (c) A penguin is a bird   (less true than b)
> (d) A bat is a bird   (false, or at least very far from true)
>
> (e) A cow is a bird   (absolutely false)[65]

This doctrine of "fuzzy concepts" leads, of course, to a graded notion of entailment:

> . . .we will want to talk about such concepts as 'degree of validity' and 'degree of theoremhood', which are natural concomitants of the notion 'degree of necessary truth'. If one wants a natural example of entailment, consider (31) and (32). We know that not all birds
>
> (31) $\underline{x}$ is a bird
> (32) $\underline{x}$ flies
>
> fly, but we might well want to say that once a bird has a certain degree of birdiness, say, 0.7, then it flies. We might then want to say that (31) entails (32) to degree 0.7.[66]

There is no point in belaboring the obvious. The absolute notion of analyticity on which examples like (30) (a)-(c) would be on a par as linguistic truths and on which examples like (30) (d) and (e) would be on a par as linguistic falsehood is replaced by a graded notion of degree of truth (or 'degree of necessary truth' whatever this might mean). The absolute notion of entailment on which sentences of the form (33) entail ones of the form (34) but sentences of the form (31) simply do not entail

> (33) $\underline{x}$ is a robin
> (34) $\underline{x}$ is a bird

sentences of the form (32) is replaced by a graded notion of degree of entailment.

What needs to be clarified is how numerical values representing extent of inclusion are determined. Lakoff cites two ways of interpreting degree statements. On one they reflect the results of testing subjects in Heider-type[67] situations where they are asked to rank birds as to their degree of birdiness, that is, how close the test item comes to their ideal of a bird. Here the statistical value that is obtained as the measure of degree of

birdiness is taken by Lakoff as representing the degree of inclusion (the degree of truth, the degree of entailment, etc.). On the other way of interpreting degree statements, such statements are taken as representing a measure of the distribution of some physical property in nature rather than a statistical statement about judgments of people about a physical property. Lakoff says:

> It is common for logicians to give truth conditions for predicates in terms of classical set theory. "John is tall" (or "TALL(j)") is defined to be true just in case the individual denoted by "John" (or "j") is in the set of tall men. Putting aside the problem that tallness is really a relative concept (tallness for a pygmy and tallness for a basketball player are obviously different), suppose we fix a population relative to which we want to define tallness. In contemporary America, how tall do you have to be to be tall? 5'8"? 5'9"? 5'10"? 5'11"? 6'? 6'2"? Obviously, there is no single fixed answer. How old do you have to be to be middle-aged? 35? 37? 38? 39? 40? 42? 45? 50? Again, the concept is fuzzy. Clearly, any attempt to limit truth conditions for natural language sentences to true, false, and 'nonsense' will distort the natural language concepts by portraying them as having sharply defined rather than fuzzily defined boundaries.[68]

The argument for the thesis that the meanings of words do not have sharply determined boundaries but grade off begs the question. In connection with the first way of interpreting inclusion, Lakoff argues as follows:

> If category membership were simply a yes-or-no matter, one would have expected the subjects either to balk at the task (of ranking) or to produce random results.[69]

But one has no right to have such expectations unless one can assume that the task Heider's subjects were asked to perform, the task of ranking different animals as to their degree of birdiness, is tapping their intuitions about the meanings of the words "robin", "chicken", "penguin", "bat", etc. rather than, what is more plausible in this case, their stereotypes about such animals. The distinction can be put in terms of an example. The meaning of the expression "airline hostess" is simply 'a woman who is employed by an airline in the capacity of a hostess.' Nothing in the meaning of the expression tells us, what is clearly true, that the American stereotype of an airline hostess includes such properties as attractiveness, a pleasant disposition, having a height of over three feet, etc. If one may assume that the Heider subjects are responding in terms of their stereotypes, then there is no reason to expect them to balk, since such stereotypes ought to vary in how close

they come to the ideal of a bird. If there is no reason to expect the subjects to balk, then the fact that they do not is no argument against category membership in semantics being a "yes-or-no matter". Hence, Lakoff's argument has to assume that there is no distinction between meanings of words and the stereotypes or theories people have about the things words refer to. On this assumption, and on this assumption alone, the responses obtained to the instruction "rank birds as to the degree of their birdiness" are evidence against meanings being sharp concepts, for these subjects were not instructed to rank the <u>meanings</u> of "robin", "chicken", etc. on a scale of degree of overlap with the category 'bird'. But this assumption is, of course, what has to be established to make an argument against category membership in semantics being a "yes-or-no matter".

In connection with the second way of interpreting inclusion, Lakoff also begs the question by assuming there's no clear distinction between facts about the meaning of words and facts about the things words refer to in the world. Note in the first place that Lakoff's only argument is a "where-do-you-draw-the-line?" argument, and that, as a class, such arguments are as fallacious as arguments that there must be ghosts because there is no way to prove there are none. How do we know that the failure to find a fixed answer to questions like "In contemporary America, how tall do you have to be to be tall?" is due to the looseness of the boundaries of the concept that functions in the language as the meaning of "tall" or to some deficiency in our knowledge about the distribution of heights in contemporary America that makes it unclear how to apply the term "tall" in certain "border-line" situations? Obviously, one can't decide that the latter difficulty is not responsible for this failure unless one assumes that the concept 'tall' reflects the knowledge and beliefs we have about how the heights of tall people merge, imperceptibly, into those of short people. But this assumption is exactly what needs to be established.

Thus, there is no argument against the rationalist view that the meaning of "tall" and other such linguistic concepts have sharply defined boundaries. On this view, to say that something belonging to a certain class is tall is to say that it exceeds in height the average member of that class,[70] and the difficulty in applying "tall" to someone derived from our imperfect knowledge concerning the average (or the amount of deviation permitted in determining the relation 'x exceeds y') height for the class. To see this, consider the following two questions.[71] Which has the greatest height, a tall man (not a giant) or one short man (not a midget) standing on the shoulders of another? Which is bigger, one thick noodle or two thin ones stuck together? Almost everyone asked these questions replies easily to the first, saying that the two short men are higher, but almost everyone has difficulty

in replying to the second question, most saying they don't know. The reason is clearly that in the case of the height of men we have a good idea of the average and of the distribution of heights whereas in the case of the thickness of noodles we are much less well informed (and perhaps it is harder to be adequately informed here). Thus, it seems reasonable to conclude that the indecision experienced in the latter case is due not to any difference in the degree of vagueness of the words "tall" and "thick" (both are relative in the same manner) but to our failure to possess the critical facts about the world.[72]

Now, we wish to consider, first, how well Lakoff's doctrine of fuzzy concepts handles the meaning of sentences, and second, how good a theory of truth it offers. As already noted, Lakoff provides two ways to interpret the meaning of a sentence in terms of fuzzy concepts. On both, however, the semantic characterization that sentences receive is fundamentally different from their meaning in the language. On the first scheme of interpretation, a sentence assigning some individuals to a class does so in terms of a coefficient expressing their degree of class membership, and the coefficient reflects an estimate of the judgments people make concerning how close these individuals come to the ideal represented by the class. Thus, on Lakoff's doctrine, sentences such as (30)(a-e) must be interpreted as asserting that people have a certain psychological propensity, that they tend to judge the animals in question as this or that close to the ideal of birdiness. But these English sentences assert nothing of the sort. They simply assert that the animals in question <u>are</u> birds. The point can perhaps be brought home more forcefully if we consider what happens when two people disagree about such a sentence, say (30)(c). On Lakoff's doctrine, they are disagreeing about the outcome of Heider type studies on how people judge penguins, when, in fact, they are disagreeing about whether penguins are birds. Moreover, if everyone wrongly believed that penguins are not birds, the party to such a dispute who claimed (falsely, from the point of view of the meaning of the sentence in English) that penguins are not birds would be right.

Using Lakoff's doctrine to interpret his own assertions of that doctrine (e.g., that natural language concepts are fuzzy), we obtain the paradoxical consequence that these assertions must be understood as claiming that most people tend to agree with him about these issues. Hence, since agreement between people bears no logical relation to what is the case, Lakoff's assertions become irrelevant to the issue of whether concepts are exact or fuzzy, since they are about how people will judge such questions when tested in Heider type studies. If Lakoff's interpretation were employed generally in science, confirmation would be replaced with public opinion polls and argument with propaganda.[73]

On the second scheme of interpretation, the coefficient expresses the actual degree to which the comparison class is close to the extreme of the property in terms of its empirical distribution. Thus, a sentence like (35) would be understood

(35) Basketball players are tall

as saying that basketball players are (on the average?) N units from the extreme of tallness in the empirical distribution of people's heights. But the English sentence (35) does not have a meaning that contains a fixed quantity expressing the percentile that basketball players are in in the distribution of heights. Thus, rather than finding with Lakoff that restricting "truth conditions for natural language sentences to true, false, and nonsense will distort the natural language concepts,"[74] we have found that expanding truth conditions as Lakoff suggests distorts the meaning of sentences in natural language.

Finally, what is to be said about Lakoff's doctrine of degrees of truth, according to which assertions of truth assert a degree of truth? Either the degree of truth of such a meta-sentence is always the same as the coefficient associated with the class assignment in the object sentence, in which case it is wholly redundant and one might as well stick with an absolute notion of truth, or it is sometimes different, in which case the whole theory of truth becomes incoherent. Consider a sentence of the form (36). Let "S" be (35) and let us assume basketball

(36) The sentence S is true to degree $\underline{K}$.

players are tall to degree .9. Then, if $\underline{K}$ must be .9, we are saying no more than that basketball players are in the 90th percentile by saying that (35) is true. Thus, 'true' is not really a degree term. On the other hand, if $\underline{K}$ is different from .9, then we lose the Tarski equivalence, which is basic to any theory of truth that asserting a sentence is equivalent to asserting that it is true.

In this section, we have considered Lakoff's attack on the absolute notion of grammaticality and on the absolute notion of meaning. These, we argued, would, if successful, remove the two major stumbling blocks to an empiricist effort to explain the acquisition of linguistic knowledge. Thus, we have claimed the generative semantics-interpretive semantics controversy represents an attempt at counter-revolution within Linguistics and represents a further episode in the continuing struggle between rationalism and empiricism within Philosophy. We have concentrated on Lakoff because his work has spearheaded the generative semanticist's attack on grammaticality and meaning, but this should not lead the reader to think he is atypical of the leading generative

semanticists in this. In connection with the absolute notion of grammaticality, Ross's recent work has the same thrust as Lakoff's in seeking to replace this absolute notion with a graded notion of acceptability, but Ross carries the whole business even further than Lakoff by making the application of syntactic rules, membership of grammatical elements in classes like 'Noun', 'Verb', etc., and so forth, all, a matter of degree.[75] We note here that the heart of Ross's argument is his rejection of Chomsky's conception of explication in which the unclear cases are decided on the basis of the rules devised to deal with the clear ones. Ross rejects this conception because he falsely thinks that it makes the empirical claim that hazy incremental phenomena of the kind he analyzes does not exist when it so treats unclear cases. He fails to see that Chomsky's conception makes no such claim, that it simply fails to treat these phenomena as purely syntactic.

In connection with absolute notions in semantics, McCawley's recent work seems to be heading toward an extreme contextualist theory of meaning, which could not avoid conclusions about semantic properties and relations similar to Lakoff's. For example, McCawley writes:

> It will develop that I should be talking about sentence tokens rather than sentence types. A 'semantic structure' will thus specify not the 'meaning' of a sentence but the 'content' of a token of a sentence, e.g., It's raining will have different 'content' depending on when and where it is said.[76]

This remark seems to advocate a semantics in which the context of utterance determines its semantic representation in the grammar, so that, for example, as two contexts are more alike (in the critical respects?) the sentence tokens occurring in them are more nearly synonymous.

5. Distinguishing Between Grammatical and Non-Grammatical Regularities.

At the beginning of the previous section, we argued that Lakoff's views on grammaticality and conceptual structure are based on an empiricist conception of the explanatory goals of a grammar, one quite close to Harris's. On this conception anything that influences the distribution, or co-occurrence patterns, of morphemes is ipso facto to be explained in the grammar. We also argued that Chomsky's position contains an alternative, rationalist conception, but observed that, because it had been so poorly developed, this rationalist conception presented no real obstacle to Lakoff's reinstituting the traditional taxonomic conception and then applying it to erode the competence-performance distinction and to thereby

free grammars of properties disturbing to empiricist theories of their acquisition. We tried to indicate that the development of a rationalist conception was retarded by the primitive state of the theory of the interpretation of the formal transformational model because to extend this conception beyond Chomsky's first formulation of it, on which the goals of a grammar are taken to be that of accounting for speaker's intuitions about sentence structure, it is necessary to spell out what is meant by "sentence structure" on the basis of a list of grammatical properties and relations and definitions of them, that is, on the basis of a theory of interpretation. In the present section, we will try to explain in somewhat more detail what this conception looks like on a rich notion of interpretation and how it applies to distinguishing grammatical phenomena from extra-grammatical ones.

On a rationalist conception, the pretheoretic intuition behind the study of grammar is that the central problem is to explain how features of the systematic relation between sound and meaning in a language account for the phonological, syntactic, and semantic properties of each of its sentences. The construction of grammars thus beginc with pretheoretic intuitions about three classes of grammatical properties and relations, phonological, syntactic, and semantic. The first includes rhyme, alliteration, meter, etc. The second word order, agreement relations, ellipsis, part of speech equivalences, etc. The third synonymy, ambiguity, meaninglessness, analyticity, etc. Moreover, we also have pretheoretic intuitions that the phenomena judged to be phonological are related to each other by virtue of their having to do with speech sound, that the phenomena judged to be syntactic are related to each other by virtue of their having to do with the manner in which sentences are built up out of their constituents, and that the phenomena judged to be semantic are related to each other by virtue of their having to do with the meaning of sentences and its compositional relations to the meanings of the sentences's constituents. Thus, in each of these cases, the properties and relations are grouped together (as phonological, syntactic, or semantic) on the basis of intuitions that they are about the same aspect of grammatical structure. Finally, speakers have pretheoretic intuitions that these three kinds of properties and relations are interrelated to each other in a grammar because they are each intuitively recognized as part of the structure of the sound-meaning correlation expressed in the grammar of the language.

On a rationalist theory of grammar that gives the theory of interpretation its proper place, this theory seeks to explicate these sets of intuitions in tandem with the construction of particular grammars. Such a theory formulates definitions of these properties and relations in terms of universal features of the structural descriptions of sentences in grammars. It also seeks to explicate

intuitions about the interconnectedness of phonological properties in terms of a theory of the phonological component, to explicate intuitions about the interconnectedness of syntactic properties in terms of a theory of the syntactic component, and to explicate intuitions about the interconnectedness of semantic properties in terms of a theory of the semantic component. The theory of grammar seeks finally to explicate intuitions of relatedness among properties of different kinds in terms of the systematic connections expressed in the model of a grammar that weld its components a single integrated theory of the sound-meaning correlation in a language.

These remarks are, of course, by way of describing the theoretical ideal. But as the theory of grammar makes progress toward this ideal, it not only sets limits on the construction of grammars and provides a richer interpretation for grammatical structures but it also defines a wider and wider class of grammatical properties and relations. In so doing, it marks out the realm of the grammatical more clearly, distinctly, and securely than could have been done on the basis of the initial intuitions. As Fodor has insightfully observed, such a theory literally defines its own cubject-matter in the course of its progress:

There is then an important sense in which a science has to discover what it is about: it does so by discovering that the laws and concepts it produced in order to explain one set of phenomena can be fruitfully applied to phenomena of other sorts as well. It is thus only in retrospect that we can say of all the phenomena embraced by a single theoretical framework that they are what we meant, for example, by the presystematic term "physical event", "chemical interaction", or "behavior". To the extent that such terms, or their employments, are neologistic, the neologism is occasioned by the insights that successful theories provide into the deep similarities that underlie superficially heterogeneous events.[77]

Therefore, on this rationalist view, our conception of the goals of the study of grammar is always a projection from the present state of linguistic theory to how it will define its subject-matter in its optimal state. Nonetheless, this conception provides us with a sound criterion for properties and relations that are genuinely grammatical, for deciding whether a new phenomena should be considered part of the subject of grammar or whether an old one, mistakenly assumed to be grammatical, should be excluded from grammar. This conception supplies the positive side of such a criterion to supplement Chomsky's proposal that the non-grammatical phenomena is one whose explanation requires principles concerning memory, computation time, etc. This proposal clearly needs

supplementation, since, without a positive notion of the grammatical, the "etc." can only be specified in the somewhat circular fashion of saying "and other extra-grammatical matters." Thus, we obtain a fully general criterion now that we can say that what makes a phenomena grammatical is the fact that the principles that explain it are all required to explicate the properties and relations that have been systematically interrelated by the laws and concepts originally devised to account for speakers's intuitions about rhyme, alliteration, ellipsis, word order, synonymy, ambiguity, etc.

The empirical importance of such a criterion lies in the fact that linguistic behavior is an extremely complex integration of grammatical rules and other cognitive systems, so that grammatical rules often play an important role in phenomena which are not themselves grammatical, that is, matters of competence. Thus, if we fail to distinguish the role of grammatical rules in such hybrid phenomena from that of other cognitive mechanisms, we will mistakenly try to impose a homogeneous form of explanation on the phenomena. If we attempt to account for such a hybrid phenomena within the grammar itself, this will obstruct the development of a simple and revealing theory of the grammatical structure of the language, since the demand to integrate principles unrelated to the explication of grammatical properties and relations will prevent the rules of the grammar from properly rendering genuine grammatical generalizations about the sound-meaning correlation in the language.

The classical example of the benefits that come from clearly separating the contributions of different cognitive systems to a linguistic phenomena is Chomsky and Miller's treatment of the unintelligibility of multiple center-embedded sentences.[78] They made two points about such sentences which provide a basis for classifying them as grammatical but perceptually complex. On the other hand, to rule out such cases in the grammar would require that it contain a 'recursion counter', that is, a device that is selectively sensitive only to those recursions that are center-embedded in their surface manifestation. But such a counter would involve formal mechanisms otherwise unknown in the grammar and for which no other use could be found. Thus, Chomsky and Miller sought a treatment of the phenomena of unintelligible center-embedded sentences outside of the grammar. They sketched a plausible perceptual theory that predicts the difficulty of understanding in the case of center-embedded sentences in terms of performance assumptions about computation and the limit on information stored in immediate memory. Hence, the phenomena of loss of intelligibility in multiply center-embedded sentences was categorized as a non-grammatical phenomena, as a matter of acceptability rather than grammaticality.

We shall now discuss three other kinds of systematic linguistic phenomena that are properly handled outside of grammar, on the basis of the interaction of grammatical principles with principles from some non-grammatical cognitive theory. In the first case, we shall try to show that the phenomena can be best explained on the basis of perceptual theory, in the second, we shall try to show that it can be best explained on the basis of Grice's theory of conversational implicature,[79] and in the third, we shall try to show that it can be explained by the various disciplines in psychology that describe the conceptions of things that people have, their stereotypes, everyday theories, etc., over and above the linguistic concepts that serve as the meanings of the words that name them. In each case, we shall pick our examples from those that generative semanticists have used to argue for some extension of the theory of grammar. We shall show that each of these cases is better handled on the model of the Chomsky-Miller treatment of the loss of intelligibility in multiply center-embedded sentences, and that the failure to treat them outside grammar has led generative semanticists to postulate devices that impute spurious power to grammatical constructions.

Cases in which perceptual theory can account for phenomena that would otherwise require the power of the grammar to be considerably expanded have been explored in the literature of generative semantics. They have been hailed as leading to the discovery of new grammatical principles, particularly, global derivational constraints,[80] and as providing strong evidence for one or another generative semantics model of the organization of a grammar.

The segmentation and labelling processes in speech perception group together one class of linguistic examples under the rubric of perceptually suppressed sense. Consider, for example, the sentence in (37) which is clearly unacceptable on the reading in which 'fiancé' is the subject. Yet, it is parallel in structure to the acceptable sentences in (38, 39). Clearly, what

(37) The friend of my brother's fiancé left town

(38) The fiancé of my brother's friend was discovered to be a cat burglar so the friend of my brother's fiancé left town

(39) It was the fiancé of my brother's idea to give him a surprise party

is at issue is the salience of the subsequence '...brother's fiancé...'. Insofar as the general structure surrounding the sequence allows it to be interpreted as a possessive noun + noun sequence the sentence is blocked from having "fiancé" as its subject. Any

aspect of the sentence which perceptually separates "brother's" from "fiancé" or emphasizes "fiancé" as the head noun has the effect of making the interpretation with "fiancé" as subject an acceptable one.

Suppose now we required of the grammar that it account for these facts. There is no straightforward restriction on the operation of grammatical rules themselves that can selectively restrict the interpretation of cases like (39). Basically, what is at issue is a restriction on the surface string, rather than a restriction on the rules that produce such strings.[81] Perlmutter proposed that such cases be handled by an 'output constraint', a rule which examines final trees in a derivation to make sure that they do not have specific properties. In this case, such an output constraint would block any string having a complex noun phrase with a final possessive noun immediately preceding its head noun. Such well-formedness constraints, of course, would represent an increase in the power of the grammar, since they are constraints stated across tree configurations rather than constraints on the structural indices of transformational rules. Furthermore, it is not clear that such constraints would be sufficient to handle the continuum of acceptability facts exhibited by such cases. For example, all the cases in (37-39) would be marked as ungrammatical by such a restriction, yet (39) is acceptable.

To treat the phenomena correctly one could appeal to the perceptual attractiveness of the $\underline{N'sN}$ sequence as an account of the relative acceptability of sequences that have this property to differing degrees. However, once such a device is formulated to handle the cases of varying acceptability, it obviates the necessity for introducing the same device within the grammar to account for certain perceptually extreme cases. That is, the acceptability facts can be accounted for and the grammar kept free of new theoretical devices on the interpretation that all the cases in (37-39) are grammatically ambiguous. The perceptual strategy suppresses one of the interpretations, so it appears only when other conditions in the sentence such as semantic constraints or structural parallelism facilitate its interpretation with that structure.[82]

There are several other cases of such perceptually suppressed interpretations that have appeared in current literature. Consider, for example, the cases in (40-45). Clearly, they show that relative clauses can be extraposed

(40) The man$_i$ likes the girl who$_i$ lives in Chi

(41) The idea surprised the man which Harry proposed

(42) The man left who$_i$ lives in Chi

(43) The man likes your idea who$_i$ lives in Chi

(44) The man left who$_i$ the girl likes

(45) The man left$_i$ the girl likes

so long as there is some property of the string which uniquely marks the extraposed relative as not modifying an immediately preceding noun phrase. Such cases could again be partially handled with 'output constraints' that would block derivations without such unique marks. But this too would fail to account for the intermediate nature of many cases. Again, the perceptual principle of local phrase salience could account for the tendency to misinterpret cases in which relatives are potentially attached to adjacent nouns, even though that is not their correct structure. Hence, if such cases as (40-45) are classified as grammatical, but the case in (40) is classified as unacceptable, by virtue of perceptual complexity, the grammar does not require added power.

A final case of this type is discussed by Ross and Postal. They point out that there appears to be a left-right constraint on the surface appearance

(46) Yesterday John said he will distill the liquor

(47) Yesterday$_i$ John said$_i$ he distilled the liquor

(48) Yesterday John will say he distilled the liquor

(49) It was yesterday that John will say he distilled the liquor

of time adverbs such that an adverb cannot be displaced to the left across an intervening verb. Since adverbs are not morphologically indexed in English as to the verb they modify, such a constraint must refer both to the underlying tree in which the adverb is adjacent to its verb as well as to any of the surface structure trees which would destroy this property. That is, such a case would appear to motivate the use of a derivational constraint which states that certain relations between deep and surface trees cannot exist. Thus, a case like (48) can only be one in which the adverb-verb tense exhibits a mismatch and hence is semantically unacceptable.

Suppose we argued that there is a special case of the phrase-gobbling perceptual rule—an adverb within a perceptual clause modifies the first verb to appear after it. Then such cases as (46-48) could be generated freely in the grammar but would be perceptually interpreted as having the adverb modify

the second verb only with difficulty. This formulation correctly
predicts the acceptability of cases like (49) in which the initial
adverb is set off into its own surface clause, thus removing the
applicability of the adverb-verb attachment principle, and leaving
the adverb free to modify the second verb. Finally, we are now
in a position to explain the acceptability of a case like (50)
as due to the perceptual closure around the first adverb; even
though it is not in a structurally defined clause of its own,
it is in a perceptually distinct clause.

(50) Yesterday (pause) John will say he distilled the liquor.

These three cases share a number of characteristics.
First, in each case a range of acceptability levels across closely
related structures represents a challenge to grammatical theory
that can only be met within the grammar by increasing its general
descriptive power. At the same time, the basic principles of
phrase and sentence segmentation postulated as part of the mechanism
of speech perception account for the relative acceptability of the
sentences. This interpretation allows the assumption that they
are all grammatical, but differentially acceptable as a function
of the ease with which the intended structures are understood.

It is no doubt the case that the examples we have chosen
are particularly revealing of the effects of the perceptual
mechanism since they all involve a structure that must be perceived
despite the appearance of a perceptually more salient structure.
We have emphasized these cases because the segmentation mechanisms
that explain them have received recent experimental attention.
Several behaviorally based proposals have also recently appeared
to account for various aspects of pronominal reference and quantifier
scope. These phenomena are important because they have been invoked
by generative semanticists as motivating the need for increased
power of grammatical mechanisms. If these proposals can be shown
to be based on independently motivated perceptual principles then
the methodology we have outlined will succeed in showing that the
grammar can be kept free of such devices as derivational constraints
since the phenomena that would motivate such constraints are in
fact due to the operation of the perceptual mechanism.[84]

Now consider an example of the failure to make the distinction
between grammatical phenomena in generative semantics and conversa-
tional phenomena. In their paper, Gordon and Lakoff propose to
make knowledge of conversational conventions an integral part of
formal grammar. They write:

Our purpose in this paper is twofold: first, to
outline a way in which conversational principles can begin
to be formalized and incorporated into the theory of generative
semantics; and second, to show that there are rules of grammar,

rules governing the distribution of morphemes in a sentence,
that depend upon such principles. Our strategy for beginning
to incorporate such observations in terms of them is based
on the notions of natural logic and of transderivational
rules.[85]

Lakoff and Gordon propose that the grammar contain a set of
"conversational postulates" formulated on the model of meaning
postulates (conditional statements expressing a logical implication).
Presumably, the conversational postulates will define a class of
implicatures relative to a characterization of a set of contexts.
Thus, in Gordon and Lakoff's example, the sentence (51) uttered
by the duke of Bordello to his butler in a cold room with an open

(51) It is cold in here

window implies a command by the duke for the butler to shut the
window. The idea is basically that the antecedent of the conversa-
tional postulate will describe a class of contexts and a consequent
will express an aspect of a conversational implication. The
attempt to force conversational knowledge into grammar makes it
necessary to include rules that are not required for any other
purpose. In order to explain why a sentence like (52) can
conversationally

(52) Can you take out the garbage?

imply a request to take the garbage out rather than a question
about ability, Lakoff and Gordon introduce the aollowing rule:[86]

(53) ASK (a, b, CAN (b, Q)* → REQUEST (a, b, Q)

Thus, the explanation of why the hearer interprets (52) to imply
conversationally a request to take out the garbage is as follows.
The speaker knows, as part of his/her grammatical competence,
the rule (53) and also the appropriate context for its application.

Part of the trouble with conversational postulates stems
from difficulties inherent in the rules they are modelled on,
namely, Carnapian meaning postulates. These are brute force
statements of implicational relations arising from the meanings
of words in the so-called extra-logical vocabulary of a language.
They provide no basis to account for other semantic properties
and relations that are determined by the same aspects of meaning:
such failures to capture semantic generalizations can only be overcome
by revisions in systems of meaning postulates that convert them
into a semantic component in the sense of a dictionary and projection
rule.[87]

But the biggest trouble with conversational postulates is that, unlike meaning postulates, which at least represent semantic facts that a grammar has to account for, they represent pragmatic facts that can be handled by an independently motivated system outside grammar. The theory of conversational implicature due to Grice offers an explanation of such phenomena. The relevant part of Grice's theory is this. Speakers attempt to cooperate as best as they can to achieve the aim of a conversation (e.g., to transmit information, convince someone, etc.) and listeners believe that the speaker is attempting to cooperate and that the speaker knows the listeners know this. There are certain principles, "conversational maxims", that spell out in detail what such cooperation means. On the basis of these suppositions Grice explains cases where someone's utterance conveys a certain proposition to the listeners even though it is neither the case that the sentence uttered means that proposition in the language nor the case that the speaker literally said that proposition on that occasion. Consider how a Gricean theory would handle the fact that (52) can be used to make requests without assuming a rule in the grammar such as (53) in Gordon and Lakoff. Such an explanation would assume, contrary to Gordon and Lakoff, that the lexical reading of "can" expresses a sense of ability or capacity to do something. Thus, the meaning that the grammar assigns to a sentence like (52) is that of a question asking for information as to whether the addressee has the ability or capacity to perform the task. The problem is to explain how an utterance of (52) can express a request for help when the sentence that the utterance is a token of expresses only this question in its semantic representation. Another way to put the fact to be explained is to ask why it is odd in an ordinary context to reply to the speaker of (52) by simply acknowledging that one is able to perform the task, that is, why it is odd to treat the utterance as a simple request for information.

The Gricean explanation is as follows. We may assume that the speaker who has uttered a token of (52) is observing the cooperative principle and that the listeners assume so too. Yet, the speaker clearly seems to be violating the Gricean maxim to make one's contributions to a conversation relevant. This is because on the assumption that "can" has only an ability sense, the utterance of (52) to an able-bodied person appears irrelevant because such a person seems capable to do a simple task like taking the garbage out; and it must be obvious to the speaker that the addressee is able to do it. Thus, if the addressee and the other listeners are to maintain their assumption that the speaker is not violating the cooperative principle, they must suppose that the utterance is not being used with the meaning 'Tell me whether you are able to take out the garbage.' But since the addressee can reasonably assume that the speaker wants to have the garbage removed from the house; he or she can maintain the assumption that the speaker is

not opting out by treating the utterance as a polite way of making a request to remove the garbage. It is polite because it indicates to the addressee that the speaker is offering him or her a basis of declining, namely, incapacity.

Note that we can place this case between two more extreme ones. First (54) and second (55). In connection with (54) in most contexts, there is no

    (54) Can you untie your shoelace with one hand?
    (55) Can you lift the log that is crushing my leg?

reason for the addressee to assume that the speaker has any desire to see the shoelace untied in so peculiar a manner, and accordingly (54) is not normally taken to carry the implicature of a requisition to do something. (55) on the other hand, is an extreme case on the other side. Here, the addressee must conclude that the speaker's utterance is certainly no mere request for information because the addressee knows that the speaker, suffering as he is, is in no position to indulge in irrelevancies. The speaker obviously desired to stop the pain by having someone lift the log from his leg and equally obviously the addressee knows this. Thus, in the general case, this implicature exists when there is reason in the situation for the addressee to think that the speaker wants the action in question done and doesn't want information about the addressee's ability to do it. This form of requesting has preference in situations where it is clearly desirable for the speaker to choose a form that is polite because a negative response need not reflect badly on the addressee. The existence of reason to believe the speaker has such desires and his expression of them in this polite form permits the assumption of a request-implicature as the simplest way of preserving the supposition that the speaker is still abiding by the cooperative principle and its maxims.

These considerations show that the phenomenon can be handled in a natural way without the introduction of new rules within the grammar such as (54). To show this we have made use of the theory of conversational implicatures which has general motivation as an independent component governing language use. In addition, it is clear that within such a theory there are independent grounds for a general system which interprets requests for information into requests for action, that ranges well beyond sentences using "can". Consider the questions in (56-58), all of which have a request for information as their literal interpretation, but which are often ordinarily responded to in terms of actions.

    (56) Do you want to pass the salt?
    (57) Do you know your abc's?
    (58) Will you shut up?

Indeed, a literal reply to these questions would often be a (bad) joke. Such instances are paralleled by cases in which a literal request for information about the listeners knowledge is correctly responded to by providing the knowledge itself. Thus, (59) is generally interpreted as a request to be told the time, not an

(59) Do you know what time it is?

inquiry about the chronological competence of the listener. Similarly, the sentences in (60-62) can be responded to directly with the information asked about, rather than with statements to the effect that the listener indeed has the information in question. In each case, these questions have exactly the same implicature properties that we used to explain the conversational interpretation of (52). The form of question is polite in the

(60) Did Harry say when he'd get here? (tomorrow) (*yes)
(61) Do you know where the book is? (on the table) (*yes)
(62) Do you see any reason why I shouldn't stay? (it's late) (*yes)

sense that the listener can decline the request by pleading incapacity or lack of knowledge rather than by direct refusal. Also, in each case the interpretation has the non-literal meaning only if the listener has reason to believe that the speaker is not asking a question specifically about his/her capacity, but in fact wants to have the information asked about, if possible.

To treat the variety of implicature facts sketched above within the grammar would require a separate ad hoc rule for each of the different construction types which can have such an implicature. Clearly, rule (54) applies only to cases which include "can" in their derivation so that a separate rule is required for each of the other cases. Gordon and Lakoff recognize this by giving separate rules for cases involving will, want and can. Thus, to treat these phenomena within the grammar misses the significant generalization covering them and at the same time forces an incorporation of factual assumptions about a speaker's desires into the grammar. In short, it not only would represent a vast increase in the domain of grammar, it also would misrepresent the facts.

The last of the three phenomena that we proposed to examine from the viewpoint of the rationalist criterion for the grammatical concerns the distinction between grammatical meaning and cultural stereotype. The phenomena in question is the fact that people make judgments about birds, dogs, and many other things in a way that indicates they have a conception of the ideal bird, dog, etc. and that they can rate members of these classes in terms of how

close they come to this ideal. The phenomena has been studied by many psychologists, anthropologists, and sociologists, and recently interesting experimental work has been done by Heider. As we have seen above, the latter work was construed by Lakoff as showing that the standard notion of lexicographical meaning is too narrow and should be replaced by the broader notion of meaning that reflects the features on which such ratings depend. We saw also that this proposal replaced absolute concepts with graded ones, and further, required the introduction of an entirely new set of "grammatical principles", the machinery of 'fuzzy logic'. Thus, again, we find ourselves in a situation that fits perfectly the Chomsky-Miller paradigm. Lakoff's proposal complicates the grammar with such ad hoc machinery and turns it into a compendium of information from such subjects as theorize about stereotypes, without, as we have seen above, extending the semantic component's ability to explain a wider range of properties and relations.

Unlike the previous two kinds of cases a full theoretical framework which would systematize such facts does not as yet exist. However, in the literature of anthropology, sociology, and social psychology, one finds the beginnings of a theory of how stereotypes arise and play a role in our conception of the reference of lexical items. At this point, such studies have concentrated on isolating the factors that influence the stereotype. For example, Sargeant[88] has found that the political and economic policies of a newspaper are a direct influence on the character of the stereotype developed by its readers. The studies by Katz and Braly[89] show that the stereotype of 'foreign' is not a function of either actual contact with foreigners or direct knowledge of them. Levi-Strauss[90] points out that the stereotypical representation of notions like 'well-cooked meat' are predictable functions of general properties of the culture in question. Bettelheim and Janowitz[91] argue that in cases of racial and religious prejudice the stereotype attached to racial labels functions as a justification of the aggression produced by feelings of anxiety, frustration and deprivation.

We can see from these observations that a stereotype is a function of a complex set of factors and that as yet there is no clear theory about how these factors combine to form the stereotype attached to a lexical item. But, there is no doubt that some day social science will find the appropriate organizing principle to express the manner in which such factors combine. Thus, the grammar is not required to account for the acceptability differences in (30)(a-e) and is thereby free of the need to have new kinds of explanatory structures. Rather, we are suggesting that an independently motivated theory of cultural knowledge will account for such acceptability differences.

We are following in this case exactly the procedure used by Chomsky and Miller to remove the unacceptability of center-embedded sentences from the domain of grammar. While they did not have a full theory of speech perception nor a general theory of the relation between perception and language structure, they were able to make a plausible case that such a theory would naturally predict the perceptual unacceptability of center-embedded sentences. Similarly, we are arguing that there is good reason to believe that a theory of stereotypes will be developed within social science that will explain such acceptability differences as in (30)(a-e).

6. The Empiricist and the Rationalist Criterion for what is and what is not Grammatical

The three cases just considered show how generative semantics has distorted grammar by including within its goals those of a complete theory of acceptability. This assimilation of the phenomena of performance into the domain of grammaticality has come about as a consequence of an empiricist criterion for determining what counts as grammatical. In almost every paper Lakoff makes explicit his assumption that the explanatory goal of a grammar is to state all the factors that influence the distribution of the morphemes in the language. On this view, any phenomenon which is related systematically to co-occurrence is *ipso facto* something to be explained in the grammar. Since almost anything can influence co-occurrence relations in actual examples of speech, and it is no wonder that Lakoff repeatedly discovers more and more new kinds of "grammatical phenomena." In fact, the generative semanticist program for linguistic theory represents, if anything, a more extreme approach than even Bloomfieldian structuralism, which recognized a variety of extra-grammatical phenomena concerning language.

The point is simply that generative semanticist's criterion of what calls for grammatical explanation is so broad that every performance factor counts as a legitimate part of grammar. Performance factors such as the psycho-biological features of an organism that restrict the length of an utterance to those with fewer than a hundred billion words impose a restriction on the co-occurrence of very long strings of words and so must count as grammatical by the generative semanticist's criterion. Likewise, the attitudinal features of organisms that restrict the co-occurrence of obscenities in sentences with expressions characteristic of New England matrons also count. Everything from memory limitations, life-span, changes in technology to the changes in morals, has a systematic effect on the distribution of morphemes in that each of them are the basis of an unacceptability intuition.[92]

To tighten this criterion it would be necessary to specify antecedently the kind of oddity that does not count as grammatical. Yet to do this would re-impose the distinction between "grammatical source of acceptability orderings" and a non-grammatical source. Suppose an antecedent specification of the kind of oddity that counts as non-grammatical were to rule out those intuitions having to do with the expectations engendered by the rarity of the situation in which certain sentences can be used with their standard meaning. This would automatically exclude a string like (63) from the category of ungrammaticality.

(63) I just ate my toes and nose with Hollandaise Sauce.

But, then, this would assume a distinction between grammatical and non-grammatical determination of the distribution of morphemes. One such case would constitute the first domino. Once it fell, so would each other domino: next, conversational bizarreness, next, cultural deviance, next, perceptual complexity, etc. That is, the first such distinction between the grammatical and the non-grammatical represents a departure from the pure criterion that whatever systematically influences the distribution of a morpheme is grammatical. This departure would raise the question of why other cases that have just as much claim to extra-grammatical status are not treated similarly.

A rationalist criterion of the grammatical rejects the conception of grammaticality based on principles of distributional linguistics, as practiced by empiricist, taxonomic grammarians, from Bloomfield and Harris to generative semanticists. Instead, it is based on the notion of explication, which as we have seen, was one of the cornerstones of the Chomskyian revolution in linguistics. Thus, this criterion must take the form of a principle that what is grammatical is whatever has to be hypothesized as such in order to explicate the properties and relations of sentences that are antecedently construed as grammatical. This criterion assumes that, pretheoretically, as the result of both our intuitions and the work of descriptive grammarians of the past, we can identify certain properties and relations as grammatical, e.g., meter, rhyme, ellipsis, ambiguity, synonymy, word-order, agreement, etc., and that we can construct principles of grammar to explain them. These principles assume a simple and revealing form only by excluding a wide range of phenomena from the category of grammatical (i.e., from explanation on the basis of these principles).

It is the pretheoretic intuition behind linguistic research that the central problem for grammars is to describe the way speech sounds are organized so that representations of meanings can be associated with them systematically in a manner that predicts the phonological, syntactic, and semantic properties of each

sentence. Thus, the construction of grammars begins with pretheoretic
intuitions about three classes of grammatical properties, phonological,
syntactic and semantic. Phonological facts include such properties
and relations as rhyme, alliteration, meter, etc. Syntactic
facts include word order, agreement, ellipsis, part of speech,
construction type, etc. Semantic facts include meaninglessness,
synonymy, analyticity and ambiguity. Pretheoretically, phenomena
listed as 'phonological' are interrelated by virtue of their
having to do with speech sounds; the phenomena listed as 'syntactic'
as having to do with the manner in which sentences are built up
out of their constituents; the phenomena listed as 'semantic'
as having to do with the meaning of the sentences and their composi-
tional relations to the meaning of their constituents. Therefore,
in each of these cases properties are grouped together because
they are about the same aspect of grammatical structure. We also
have the pretheoretic notion that these three kinds of properties
are related to each other as parts of the sound-meaning correlation
expressed in the grammatical structure of sentences.

The construction of grammars for natural languages proceeds
in tandem with the formulation of a linguistic theory. Linguistic
theory seeks to formulate universal definitions of syntactic,
semantic and phonological properties in terms of features of the
structural descriptions of sentences generated in grammars. For
example, linguistic theory defines 'x is well-formed' in terms
of the existence of a derivation of x in the grammar. It defines
'x is fully synonymous with y' in terms of x and y receiving the
same semantic representation in every structural description.
It defines 'x rhymes with y' in terms of an overlap of features
in terminal segments of x and y in their phonological representa-
tions. Given general definitions of some grammatical properties
and relations in linguistic theory, linguists construct rules that
generate descriptions of sentences whose formal structure instantiates
the defining features of these phonological, syntactic, and semantic
definitions.

The rationalist conception of the aims of grammars is based
on the way in which definitions of grammatical properties function
in an interpretation of the formal transformational model.

On this conception, the development of linguistic theory
sets limits on the construction of grammars and provides an inter-
pretation of grammatical structures. Progress towards a fuller
understanding of grammatical structure may then come in the
development of further definition of grammatical properties in
linguistic theory.

The issue between the rationalist and the empiricist
conception of the domain of grammar is an empirical one. Our

estimate of the evidence at present, is that it heavily confirms
the rationalist strict separation of grammatical phenomena in the
traditional sense from extra-grammatical phenomena. We choose
the three cases discussed above because they have been the basis
for the generative semanticists attack on the rationalist distinction
between grammaticality and acceptability. In each case, we have
shown that the rationalist program can not only deal with the
phenomena brought up but does it in a more satisfactory way.
Moreover, as we have already indicated, the generative semanticist's
criterion leads to a theory that rapidly becomes a study and
compilation of everything. But a compilation of everything is a
science of nothing: the advantage of the rationalist program,
then, is that by distinguishing different contributions to linguistic
behavior explanation in terms of appropriate principles becomes
possible in each case. Such an explanation would not be possible
within a homogeneously grammatical account of everything, even
if there were normally different rules for each kind of extra-
grammatical fact (e.g., one kind for conversational facts, one for
perceptual facts, etc.).

Such a system might simply be a notational variant of the
rationalist proposal, in which case the grammaticality-extra-
grammaticality distinction would be substantively maintained but
expressed in different terminology. But if such a system were
not simply a notational variant, it would make false claims about
the extra-grammatical phenomena that it deals with in terms of
"grammatical" rules. For example, in the case of multiple center
embeddings these rules would incorrectly categorize as syntactic,
the psychological apparatus that limits the load on immediate
memory; in the case of conversational implicature they would incor-
rectly categorize as grammatical principles the maxims of action
like Grice's maxim that participants in talk exchanges try to
say only what is true and what they have evidence for; in the
case of concept determination they would incorrectly categorize
as semantic structures the stereotypes that people have about the
things words refer to.

We have described how an empiricist interpretation is
being imposed on the formal model of grammar. It is happening
in three stages. The first stage was the transformational gram-
marians' neglect of a theory of the interpretation of the formal
structures of grammar. This set up the conditions for a return
to empiricism by making generation in a grammar the critical
formal property with an empirical interpretation--'grammaticality'.
This made it appear that the rationalist interpretation of grammar
rested entirely on the grammatical/non-grammatical distinction.

The second stage in the return to empiricism is the direct
attack on this distinction. This attack attempts to relativize

grammaticality to presuppositions which in turn are relative to the speaker's system of contingent beliefs. In this way, the grammatical/non-grammatical distinction is replaced by a graded notion of grammaticality in which the beliefs of speakers determine the position of each sentence on the gradient.

The latest stage is the expansion of the domain of grammar to include all sentence acceptability phenomena. Thus, the connection of grammatical phenomena to contingent belief systems opened the way for the connection of grammar to any systematic psychological, pragmatic and cultural factors that determine features of acceptability.

This attack on the grammaticality distinction was complemented by an attack on other categorical distinctions within a grammar. Thus, all the distinctions offered to linguistic description by the rationalist interpretation of grammar are being replaced by continua.

These three stages constitute a return to empiricism in the following sense. The internalized grammatical rules of a speaker are not differentiated from contingent beliefs. Thus, a theory that would explain the acquisition of such rules does not have to account for linguistic or logical connections. It can depend on the same principles of learning that are appropriate to the acquisition of contingent beliefs about the world. Since empiricists believe they can handle the acquisition of the latter, they must welcome the advent of Generative Semantics.

It might be thought that the fact that Generative Semantics eases the burden for empiricists is irrelevant, since their burdens are intractible in any case. However, the existence of categorical distinctions and necessary truths has always been the ultimate argument against empiricism. A proof that they do not exist would necessitate rethinking many aspects of such traditional arguments. Correspondingly, empiricists have always tried to establish their position by arguing against such concepts.[93] Thus, it is clear that these concepts are the critical issue in the controversy between rationalists and empiricists. Fortunately, generative semanticists have not proven that such distinctions do not exist. However, we have shown that their viewpoint is moving towards this claim. Caveat lector.

Footnotes

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1. Kuhn, T. S. The Structure of Scientific Revolutions, in The International Encyclopedia of Unified Science, Vol. II, No. 2, The University of Chicago Press, 1962.

2. Cf. Katz, J. J. The Underlying Reality of Language and Its Philosophical Import, Harper & Row, New York, 1971, Chapters 1-5.

3. Cf., for example, Chomsky, N. Syntactic Structures, Mouton, The Hague, 1957.

4. There is an unfortunate ambiguity in the use of "interpretive semantics" among linguists. On the one hand, the term contrasts with "generative semantics" and denotes the theory on which grammars are "syntactically based", that is, have a level of deep syntactic structure and assign semantic representations interpretively to otherwise uninterpreted syntactic phrase markers (be they underlying or derived). This is the sense in which we use the term here. On the other hand, the term denotes what Chomsky now calls the "extended standard theory", the view that there are surface structure interpretive rules. This view contrasts with the theory in Katz, J. J. and Postal, P. An Integrated Theory of Linguistic Descriptions, M.I.T. Press, Cambridge, 1965.

5. Sapir's speculations on the biological basis for language are confused because he has an extremely narrow notion of what counts as instinctive and fails to distinguish the universal from the particular in individual languages. See Sapir, E. Language, Harcourt, Brace, and World, New York, 1921, pp. 3-23.

6. Bloomfield, L. The Study of Language, Holt, New York, 1914.

7. Chomsky, N. Cartesian Linguistics, Harper & Row, New York, 1966.

8. Cf. Wundt, W. "The Definition of the Sentence," in Language and Psychology, edited by A. Blumenthal, John Wiley, New York, 1970.

9. Cf. Bloomfield, L. "Linguistic Aspects of Science," in International Encyclopedia of Unified Science, Vol. I, edited by Neurath, Carnap, and Morris, The University of Chicago Press, 1955, p. 231.

10. Cf. Katz, J. J. "Mentalism in Linguistics," Language, Vol. XL, No. 2, 1964, pp. 124-137.

11. In discourse analysis, transformations serve as the means for normalizing texts, that is, for converting the sentences of the text into a standard form, so that they can be compared and inter-sentence properties discovered.

12. Harris, Z. "Co-Occurrence and Transformation," (LSA Presidential Address, 1955) Language, Vol. 33, No. 3, 1957, pp. 444-445.

13. Ibid., p. 446.

15. "Co-Occurrence and Transformation in Linguistic Structure," pp. 442-443.

16. Ibid., pp. 442-443.

17. Cf. Mach, E. The History and Root of the Principle of the Conservation of Energy, Chicago, 1911, p. 57.

18. Harris, Z. "Distributional Structure," Word, Vol. 10, No. 2-3, 1954, pp. 146-162, section 1.2.

19. Ibid.

20. Chomsky, N. Topics in the Theory of Generative Grammar, Mouton, The Hague, 1966, pp. 9-18, particularly, pp. 11-12.

21. Harris, Z.

22. Chomsky, N. Syntactic Structures, Mouton, The Hague, 1957, pp. 13-14.

23. Harris, Z.   p. 458. Compare this quotation with Bloomfield, L. "Language or Ideas," Language, p. 93.

24. In his interview (cf. The Creative Experience, ed. by S. Rosner and L. E. Abt, Dell Publishing Co., New York, 1970, p. 76), Chomsky says "From the very beginning of my work I have tried to explain the characteristics of a given stage of the language by trying. . .to attribute to (the speaker) certain mental characteristics from which one could derive the facts. . .I have tried to ask. . .how the speaker of the language organizes his knowledge

so that the form is such and such or that the syntactic structure is such and such, and I think that this is the only innovation I've introduced into the field of linguistics."

25. "Empiricism" is also to be distinguished from "empirical." A theory is empirical if it is about the empirical world, and as such, confirmable or disconfirmable on the basis of observatation and experimentation. Thus, Chomsky's rationalism is every bit as empirical as Bloomfield's empiricism.

26. This distinction is slightly different from some of those in the literature. Cf. Nagel, E. The Structure of Science, Harcourt, Brace, and World, New York, 1961, pp. 90-105.

27. Chomsky, N. Syntactic Structures, Mouton, The Hague, 1957, pp. 2-17 and 88-91.

28. This example is due to Barbara Hall-Partee.

29. This example is due to D. Terence Langendoen.

30. Cf. Chomsky, N. Studies on Semantics in Generative Grammar, Mouton, The Hague, 1972.

31. Chomsky, N. Aspects of the Theory of Syntax, MIT Press, Cambridge, 1965, ch. 3.

32. Also, there should be meta-principles that determine the kinds of empirical events a formal structure in the grammar can be associated with. For example, it might be claimed that semantic correspondence principles can only connect grammatical formalisms to language universal cognitive structures, while phonological correspondence principles must often link grammatical formalisms to language specific articulatory configurations. Further, there ought to be constraints that determine the conditions under which the same formal structure can be referred to by different kinds of correspondence principles. For instance, it would clearly be absurd if one principle connects ellipsis to the operation of erasure transformations as in most discussion, but another principle allowed mapping rules that correlate phonetic structures with physiological properties of the vocal tract to apply prior to such erasures.

33. For the empiricist conception of graded concepts, cf. Quine, W. V. Word and Object, MIT Press, Cambridge, 1960, especially section 12.

34. Cf. Katz, J. J. Semantic Theory, pp. 384-414, and more recently, Katz, J. J. "Interpretive Semantics Meets the Zombies," Foundations of Language, Vol. 9, No. 4, March 1973, pp. 549-596.

35. Lakoff, G. "Presupposition and Relative Well-formedness," in Semantics, ed. by D. Steinberg, and L. Jakobovits, Cambridge University Press, Cambridge, 1971, p. 329.

36. Ibid., p. 330.

37. Chomsky, N. "Some Empirical Issues in the Theory of Transformational Grammar," in Studies on Semantics in Generative Grammar, p. 121.

38. Ibid., p. 121.

39. Ibid., p. 122.

40. Ibid., p. 329.

41. Lakoff uses this criterion in several places in the article, e.g., Ibid., p. 330, p. 331, p. 337, and so on.

42. Chomsky, N. Aspects of the Theory of Syntax, MIT Press, Cambridge, 1965, pp. 3-9.

43. Ibid., pp. 10-15.

44. Lakoff allows for an absolute notion of grammaticality in a certain exceedingly narrow range of cases: ". . . languages exhibit certain low-level or 'shallow' constraints on the form of sentences. . . Violations of such constraints does indeed make for ungrammaticality of an absolute sort: *'Hit Sam Irving,' *'I went Boston to.'" "Presupposition and Relative Well-formedness." Two remarks should be made about this. First, it represents an acknowledgement of the existence of counter-examples to the thesis Lakoff wishes to put forth that there is no absolute notion of grammaticality. Second, it assumes, without argument, that such verb-subject constraints and preposition-noun constraints can be stated in isolation from everything else in the grammar, that is, that they have no implications for "higher-level" or "deeper" aspects of sentence structure. Lakoff seems to be claiming that whatever rules are needed to explicate these clear cases of ungrammaticality do not, as one might expect on Chomsky's notion of explication, imply decisions in unclear ones. Thus, whereas the unclearness of an unclear case for Chomsky is a matter of the state of our knowledge, for Lakoff, as for Harris, it is due to the inherent fuzzyness of the phenomena themselves.

45. Chomsky, N. Language and Mind, Harcourt, Brace, & World, Inc., New York, 1968, for example.

46. Lakoff, G. "Presupposition and Relative Well-formedness," pp. 332-333.

47. This is what the interest in semi-sentences was all about, cf. Fodor, J. A. and Katz, J. J. (eds.) The Structure of Language: Readings in the Philosophy of Language, Prentice-Hall, Inc., Englewood Cliffs, 1965, pp. 384-416.

48. Some argument is needed to show that there is no further type of deviance, such as semantic anomaly, exclusive of ill-formedness, to which the judgments are relevant.

49. Cf. Katz, J. J. Semantic Theory, pp. 284-286.

50. Cf. Donnellan, K. "Reference and Definite Descriptions," Philosophical Review, Vol. LXXV, No. 3, July 1966, pp. 281-304; also "Proper Names and Identifying Descriptions," Synthese, Vol. 21, Nos. 3/4, October 1970, pp. 335-358.

51. Lakoff says: "It is not at all clear that very much that is interesting would be part of the study of presupposition-free syntax," "Presupposition and Relative Well-formedness," p. 337.

52. Lakoff, G. "Presupposition and Relative Well-formedness," p. 331.

53. The notion of the speech point will be formulated in terms of the system of temporal specification in the semantic component; cf. Katz, J. J. Semantic Theory, pp. 306-362.

54. "A/" is the antonymy operator which converts a semantic marker into an n-tuple of incompatible ones. Cf. Katz, J. J. Semantic Theory, pp. 157-161. We note, first, that the explanation here is highly simplified, and second, that this example is not intended to contrast with "the child which we hope. . ." since these sentences with "which" are even less acceptable.

55. Katz, J. J. "Interpretive Semantics Meets the Zombies," Foundations of Language, Vol. 9, No. 4, March 1973, pp. 568-574.

56. Lakoff, G. "The Role of Deduction in Grammar," in Studies in Linguistic Semantics, ed. by C. Fillmore and D. T. Langendoen, Holt, Rinehart, and Winston, New York, 1971, pp. 62-70.

57. Ibid., p. 68.

58. Ibid., pp. 68-69.

59. Mistaking his own theory for a fact about language, Lakoff even claims to have discovered that the well-formedness of sentences is undecidable. Lakoff, G. "The Role of Deduction in Grammar," pp. 69-70.

60. If a speaker's beliefs are treated as occurring essentially in contexts of the form 'X believes B' so that the inadmissability of detaching B prevents the contradiction from being derived, then Lakoff's whole theory collapses, since now beliefs do not imply presuppositions.

61. (P & ~P) imply P; P implies (P v Q); (P & ~P) also imply ~P; but (P v Q) and ~P together imply Q.

62. Lakoff, G. "The Role of Deduction in Grammar," p. 68.

63. Robin Lakoff seems willing to stick with the consequences of this theory to the bitter end. Cf. "Language and Woman's Place," in Language in Society, Vol. 2, No. 1, April 1937, pp. 45-79, where similar considerations lead her to claim that men and women (speakers of English) speak different languages. We are endebted to Virginia Valian for pointing this out to us.

64. Lakoff, G. "Hedges: A Study in Meaning Criteria and the Logic of Fuzzy Concepts," in CLS, Vol. 8, 1972, p. 183.

65. Ibid., p. 185.

66. Ibid., p. 186.

67. Heider, E. R. "On the Internal Structure of Perceptual and Semantic Categories," (Unpublished), University of California at Berkeley, Department of Psychology.

68. Lakoff, G. "Hedges: A Study in Meaning Criteria and the Logic of Fuzzy Concepts," p. 183.

69. Lakoff, G. Ibid., p. 183.

70. The class that serves as the standard varies with the comparison-class. If the comparison-class is dogs, then the standard is animals; if the comparison class is skyscrapers, then the standard is buildings; etc. However, the standard for any given case can be determined from the meaning of the word in question, cf. Katz, J. J. Semantic Theory, pp. 254-260.

71. Further discussion of this case is found in Katz, J. J. The Underlying Reality of Language and Its Philosophical Import, footnote 10, pp. 13-14.

72. Indeed, there is nothing fuzzy or vague about the concept 'tall' as it appears in the meaning of sentences like "That pygmy is tall," "That basketball player is tall," and "Pygmies are as tall as basketball players," nor does this concept depend on the distribution of heights in the world. Suppose the world were to change so that pygmies grew to gigantic height and only midgets were allowed to play basketball. The meanings of these sentences would remain unchanged. The first would still denote some pygmy and say of this designatum that it exceeds the average height of pygmies (whatever it is at the time). The second would still denote some basketball player and say of this designatum that it exceeds the average height of basketball players (whatever it is at the time). The third neither change meaning nor be necessarily false (to some degree?) but would still be false (though with another change it could be true). This sentence expresses a proposition that clashes with our stereotype of pygmies and basketball players, nothing more.

73. There is also a problem about the selection of the subjects for such Heider type experiments. If one selects them from the population at large, chances are that they can make no judgments at all. If one selects them from sub-populations that can be expected to have an opinion on these issues, then the value expressing the degree of truth that is empirically determined can be expected to vary depending on whether the sample comes from the Cambridge or Berkeley area.

74. Note that 'true' and 'false' are not truth conditions but truth values, and that 'nonsense' is not even a truth value. Nonsense says nothing and so cannot even be a candidate for saying something in a way that makes a statement.

75. Ross, J. R. "A Fake NP Squish," to appear in New Ways of Analyzing Variation in English, ed. by C. J. N. Bailey and R. Shuy, Georgetown University Press, Washington, D. C.

76. McCawley, J. D. "A Program for Logic," in Semantics of Natural Language, ed. by D. Davidson and G. Harman, D. Reidel Publishing Company, Dordrecht Holland, 1972, p. 542, footnote 7. We are endebted to an unknown referee for bringing this remark of McCawley's to our attention.

77. Fodor, J. A. Psychological Explanation, Random House, New York, 1968, pp. 10-11.

78. Chomsky, N. and Miller, G. A. "Finitary Models of Language Users," in Handbook of Mathematical Psychology, ed. by R. D. Luce, R. R. Bush, and E. Galanter, John Wiley & Sons, New York.

79. Grice has never published the lectures in which he presented the fullest version of his theory, but a sketch can be found in Katz, J. J. Semantic Theory, ch. 8.

80. This is rather ironic since, in fact, Chomsky was the first to think of such mechanisms; in Aspects of the Theory of Syntax, he writes: ". . .it is clear that we can characterize unacceptable sentences only in terms of some "global" property of derivations and the structures they define--a property that is attributable, not to a particular rule, but rather to the way in which the rules interrelate," p. 12. Chomsky dismisses this possibility for the reasons referred to above. We thank D. T. Langendoen for bringing this passage to our attention.

81. Cf. Perlmutter, D. Deep Structure and Surface Structure Constraints in Syntax, Holt, Rinehart, and Winston, New York, 1972. See also Bever, T. "A Survey of Some Recent Work in Psycholinguistics" in Specification and Utilization of a Transformational Grammar, SR No. 3, Thomas J. Watson Research Center, IBM, New York, 1968, and Fodor, Bever, and Garrett, The Psychology of Language, McGraw Hill, New York (in press), for reviews.

82. The existence of this behavioral strategy underlies cases of ungrammatical sentences which are nonetheless acceptable. For examples, in English quantified possessive pronouns, as in (1-3), (1) The picture of the three of you; (2) The three of yours picture; (3) The three of yours'es picture; cannot be preposed. Even though (3) is clearly recognized as ungrammatical, it is also more acceptable then (2), presumably because the "-es" serves further to separate the possessive from its head noun and to make perspicious the possessive morpheme. We owe this phenomenon to V. V. Valian (in conversation). See also Bever, Carroll and Hurtig (forthcoming) for a discussion.

84. Bever, T. "The Cognitive Basis for Linguistic Structures," in J. R. Hayes (ed.), Cognition and the Development of Language, John Wiley and Sons, New York, 1970, Kuno, S. "Functional Sentence Perspective: A case Study from Japanese and English," Linguistic Inquiry, Vol. III, No. 3, 1972, Grosu, A. The Strategic Content of Island Constraints, Unpublished Ohio State University dissertation, 1972, and Langendoen, T. D. and Bever, T.

85. Gordon, D. and Lakoff, G. "Conversational Postulates," (to appear).

86. The asterisk marks such cases as special for the following reasons:

"Strictly speaking, (53) [without asterisks] is inadequate in an important way. Sentences like "Can you take out the garbage?" are ambiguous in context: it can either be a real question, a request for information about your ability to take out the garbage, or it can convey a request to do so. However, it can only convey a request if it is assumed by the hearer that the speaker does not intend to convey the question. In this case, the conversationally implied meaning (the request) can be conveyed only if the literal meaning (the question) is not intended to be conveyed and if the hearer assumes that it isn't. We will indicate this notationally by putting an asterisk after the illocutionary content." ("Conversational Postulates")

87. Katz and Nagel, "Meaning Postulates and Semantic Theory," Foundations of Language, (in press).

88. Sargent, S. S. "Stereotypes and the Newspapers," Sociometry, Vol. II, 1939, pp. 69-75.

89. Katz, D. and Braly, K. W. "Verbal Stereotypes and Racial Prejudice," Journal of Abnormal and Social Psychology, Vol. XXX, 1935, pp. 175-179.

90. Levi-Strauss, C. The Raw and the Cooked.

91. Bettelheim, B. and Janowitz, M. "Ethnic Tolerance: A Function of Social and Personal Control," American Journal of Sociology, Vol. LV, 1949, pp. 137-145.

92. For example it would have been odd to ascribe "atomic power" to a detergent in 1900 but is common today. Any factor of human experience, even the secular success of a scientific theory, can effect linguistic distribution of words and morphemes;' hence any factor can assume "grammatical" status.

93. Quine, W. V. "Two Dogmas of Empiricism," From a Logical Point of View, Cambridge: Harvard University Press, 1953.