Reprinted from:
SYNTAX AND SEMANTICS, VOL. 7
Notes from the Linguistic Underground

ACADEMIC PRESS, INC.
New York San Francisco London

TOWARD GENERATIVE SEMANTICS

GEORGE LAKOFF
University of California, Berkeley

This paper was circulated in office-duplicated form as an internal memorandum of the Mechanical Translation Group, Research Laboratory of Electronics, M.I.T., in August 1963; the research was supported in part by the National Science Foundation, the U.S. Army Signal Corps, the Air Force Office of Scientific Research, and the Office of Naval Reseach. It is the earliest work to use the term "generative semantics" or to propose that the base component of a transformational grammar generate a set of semantic structures. Nonetheless it played only a very peripheral role in the development of generative semantics, namely that of involving Lakoff in a number of issues (such as the syntax and semantics of causative constructions, and the syntactic correlates of the notions of act, event, and affect) that Lakoff later treated in greater detail in works that proved more influential (Lakoff, 1965, 1968d; Lakoff and Ross, 1966). When a spate of papers were written three or four years later, arguing that deep structures had to be close to or identical to semantic structures, this paper had been largely forgotten. The brief final section entitled "Some Loose Ends" is omitted here.

I. A CRITIQUE OF SOME PRESENT NOTIONS ABOUT MEANING.

A serious, sophisticated attempt to describe what is requisite for a theory of meaning is put forth in Katz and Fodor (1963) and Katz and Postal, (1964). The approach taken by Katz, Fodor, and Postal has been to view a semantic theory as being necessarily interpretive, rather than generative. The problem, as they see it, is to take given sentences of a language and find a device to tell what they mean. A generative approach to the problem might be to find a device that could generate meanings and could map those meanings onto syntactic structures.

In assuming an interpretive stance, Katz, Fodor, and Postal have made some penetrating observations. They have attempted to show that before one can begin interpreting a sentence one must know the grammatical structure of the sentence. Before they can begin, they require that a complete grammatical description of a sentence be supplied by a transformational generative grammar. Such a description would include an account of all of the phrase structure and transformation rules that have applied, including the lexical selections, of course.

Interpretation must start somewhere, and so Fodor, Katz, and Postal include a dictionary of morphemes and their meanings. The form of their dictionary entries is enlightening. Each meaning of a morpheme is represented as a bundle of discrete elements. One meaning of the word *bachelor* might be represented by the following set of elements: (animate), (human), (male), [never married]. The first three elements are "semantic markers". These occur repeatedly throughout the language. The last is called a "distinguisher". This gives semantic information of a much more specialized sort and occurs much less frequently in the language.

Interpretation then proceeds by rules, called "projection rules". There are two kinds of such rules. The first and most important operate on the underlying P markers supplied by the generative grammar. The rules begin at the bottom of the tree and work up it node by node, giving an interpretation or "reading" for each node. The rules work essentially by embedding the meaning of the modifier into the meaning of the head. This is done by "amalgamating" the semantic markers and distinguishers of each.[1]

Fodor, Katz, and Postal contend that rules of this sort completely determine the meaning of a sentence. The nicety of these rules is that they operate only on the underlying P markers and on the meanings of the original morphemes in

them. Transformations, they claim, do not introduce any elements of meaning--or at least they should be written so that they do not.[2]

Although Katz and Postal offer some nice arguments, their work is not completely convincing. Their projection rules depend entirely on syntactic structures. They offer no semantic rules free of syntax. As I shall point out below, I believe there are some.[3] Meanwhile, I should like to point out some phenomena that any semantic theory will have to explain and that will put great strain on any interpretive semantic theory--especially on one so closely wed to syntax as the Fodor-Katz-Postal theory.

It is a basic requirement of any semantic theory that two sentences that have the same meaning be assigned the same abstract representation (or reading). Moreover, any semantic relations (such as that of semantic subject to semantic predicate or semantic predicate to semantic object) must be identical for any two sentences with the same meaning. Now, let's assume that Katz, Fodor, and Postal are right when they claim that two sentences that are paraphrases of one another must have the same underlying P markers. If each sentence has only one underlying P marker, the sentences must have the same grammatical subject and the same grammatical object. Moreover, if the projection rules work as Katz, Fodor, and Postal claim they do, then the grammatical subject must be the same as the semantic subject, and the grammatical object must be the same as the semantic object. This does not appear to be true in English. Consider the following pairs of sentences:

(1) a. *I like the book.*

b. *The book pleases me.*

(2) a. *I fear John.*

b. *John scares me.*

(3) a. *I enjoy dancing.*

b. *Dancing delights me.*

The (a) and (b) sentences are full paraphrases of one another. They do not have the same underlying P markers. The grammatical subject of each (a) is the grammatical object of each (b) and vice versa. Moreover, semantic subjects and objects must be essentially different than grammatical subjects and objects. Whatever one designates as the semantic subject of (a) and (b) must differ from the grammatical subject of either (a) or (b). A more subtle

case of the difference between semantic and grammatical subjects and objects appears in causatives. Consider such pairs as:

(4) a. *The desk moved.*

b. *I moved the desk.*

(5) a. *John suffocated.*

b. *I suffocated John.*

(6) a. *The water boiled.*

b. *I boiled the water.*

(7) a. *The batter walked.*

b. *The pitcher walked the batter.*

The grammatical subjects of the (a) sentences are the grammatical objects of the (b) sentences. But the meaning of each (a) sentence is contained in the meaning of its corresponding (b) sentence. For instance, if someone moved the desk, we know that the desk moved. If someone suffocated John to death, we know that John suffocated, and so on. This implies that the semantic subject-predicate relation which holds in each (a) must also hold in each (b). The following paraphrases of the (b) sentences demonstrate this.

(4) c. *I did something (pushed the desk), causing the desk to move.*

(5) c. *I did something (pumped the air out of John's bedroom), causing John to suffocate.*

(6) c. *I did something (reduced the air pressure), causing the water to boil.*

(7) c. *The pitcher did something (threw four straight wide pitches), causing the batter to walk.*[4]

In each of the (c) sentences, the semantic and grammatical subject-predicate relations from the (a) sentences appear unchanged. In addition, the grammatical subjects of the (b) sentences appear as the grammatical and (I would claim) semantic subjects of *did something* and *cause*.

Now let's look at a very subtle case of sentences that are identical in meaning but have different underlying P markers.

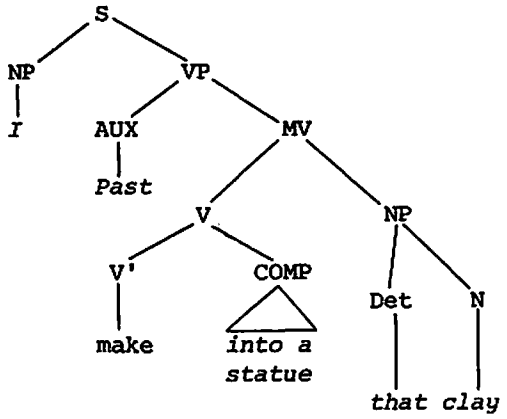
(8) a. *I made that clay into a statue.*

b. *I made a statue out of that clay.*

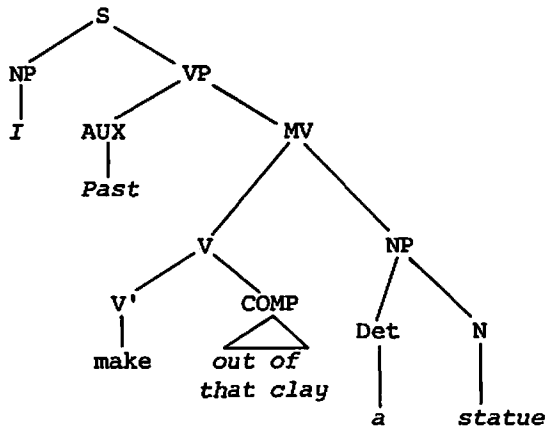
(9) a. *I made John into a millionaire.*

b. *I made a millionaire out of John.*

(8a) has the underlying P marker:



Whereas (8b) has the underlying P marker



Moreover, the verb V dominating V' + COMP in the P marker of (8a) has at least one different syntactic property than its counterpart in the P marker for (8b). It is a verb of affect, which means that it takes the proform *do something to*. Consequently, one can get (10)-(11) but not (12)-(13):

(10) *What I did to that clay was make it into a statue.*

(11) *What I did to John was make him into a millionaire.*

(12) **What I did to a statue was make it out of clay.*

(13) **What I did to a millionaire was make him out of John.*

Still another refutation of the claim that paraphrases must have the same underlying P markers comes from examples in which an intransitive verb has the same meaning as a transitive verb and its object. No one would deny that the verb in

(14) *I wrote.*

is intransitive. Nor would one deny that the verb in

(15) *I wrote a letter.*

is transitive and has an object--at least a grammatical object. Yet, (16) and (17) mean the same thing:

(16) *I wrote to John.*

(17) *I wrote a letter to John.*

It might be argued that (16) is a reduced form of (17) and has the same underlying P marker. But it would be more difficult to present the same argument for the sentences:

(18) *Yastremski hit the ball to left field for a single.*

(19) *Yastremski singled to left field.*

(18) and (19) mean the same thing but have very different underlying P markers. On the other hand, the P marker of (19) looks very much like that of

(20) *Yastremski ran to left field.*

The difference in meaning between (19) and (20) is more than can be attributed to the difference in meaning between *ran* and *singled*. In (20) we know that Yastremski went to left field. In (19) we know that the ball Yastremski hit (but which is not mentioned in the sentence) went to left field.

Moreover, the difference in meaning between (21) and (22)

(21) *Yastremski hit the ball.*

(22) *Yastremski hit a smash.*

cannot be attributed simply to the difference in meaning between *ball* and *smash*. It must be in part due to a

difference in syntactic properties of the verbs in the underlying P markers. The verb of (21) is a verb of affect, while that of (22) is not. Consequently, you can get (23) but not (24):

(23) *What Yastremski did to the ball was hit it.*

(24) **What Yastremski did to a smash was hit it.*

Yet the sentence

(25) *Yastremski hit a ball extremely hard.*

which has a verb of affect in its P marker, has the same meaning as (22), which does not have a verb of affect in its P marker.

A semantic theory will, at least, have to account for sentences that have the same meaning but have different underlying P markers. In addition, it will have to break down further what Katz, Fodor, and Postal call "distinguishers". For instance, an adequate theory will have to predict that the following sentences will have the same meaning:

(26) *John enraged Bill.*

(27) *John made Bill very angry.*

(28) *John made Bill become very angry.*

If the above three sentences are to receive the same "reading" (that is, if they are to be represented semantically in exactly the same way), then the dictionary entry for *enrage* must contain the meanings of *make, become, very,* and *angry.* Furthermore, these meanings must somehow be structured; they cannot merely be lumped into a set. And, in addition, a variable must appear in the dictionary entry to represent the grammatical object of *enrage.* The entry must somehow show that this grammatical object is the semantic subject of *become very angry.*

Let us take another example

(29) *Duke Carmel batted the ball.*

(30) *Duke Carmel hit the ball, using a bat.*

(29) and (30) have the same meaning. The dictionary entry for the verb *bat* must contain the meaning for the verb *hit* and, in addition, must have the meaning of *use a bat,* with the meaning of *use* and the meaning of *bat* structured with respect to one another so that one knows that *bat* is the semantic object of *use.* Furthermore, the entry must contain a variable to show that the syntactic subject of the verb *bat* is the semantic subject of *use a bat.*

II. THE GENERATIVE APPROACH

There are several motivations for proposing a generative semantic theory. One is the intuition that we know what we want to say and find a way of saying it. A theory that maps meaning onto syntactic structures might account for this intuition. Then there is the purely practical motivation (theorists should shut their eyes at this point) that researchers in machine translation will sooner or later be forced to develop such a theory. Ideal machine translation programs will have to include both interpretive and generative semantic devices, just as they must include interpretive and generative syntactic devices. And last, there is the formal motivation. A generative semantic theory may well be simpler and more economical than an interpretive theory. It will probably be a very messy business indeed to reconstruct semantic relationships from morphemic meanings and P markers, considering that sentences with different P markers can have the same meaning. However, talk about the economy of a generative theory is idle in the absence of a model of such a theory.

The semantic properties of English nouns, as portrayed by Fodor and Katz, are closely related to some of the grammatical properties of the same nouns. Some of Fodor and Katz's semantic markers bear a very close relation to Chomsky's "syntactic features". Chomsky might write the complex symbol for the word *bachelor* with the meaning "unmarried man" [count, concrete, animate, human, male]. Although there is no one-to-one correspondence between the semantic markers (animate), (human), (male), and the syntactic features with the same names, there is undoubtedly a close relationship between the two kinds of units.

Similarly, some semantic properties of English predicates are closely allied with certain grammatical properties of English verbs. The verbs that express "doing something", that is, those that have the proform *do something* and that take the progressive *be + ing*, seem to share an important semantic property. Moreover, all of the non-doing-something verbs (those that do not take both the proform *do something* and the progressive form) are exactly the attributive verbs. Non-doing-something verbs like *be, have, own, cost, like, love, know, see, hear,* and *want* are all attributives of some kind or other.[5] We can therefore set up a distinctive semantic feature DS (do something) and test whether a given verb is +DS or -DS by placing it in the frame, "What I'm doing is...". For example,

(30) a. *What I'm doing is listening to the lecture.*

b. **What I'm doing is hearing the lecture.*

(31) a. *What I'm doing is looking at the painting.*

b. **What I'm doing is seeing the painting.*

(32) a. *What I'm doing is learning the lesson.*

b. **What I'm doing is knowing the lesson.*

By this simple test we can assign the semantic property +DS or -DS to each verb. Another simple grammatical criterion can serve to define an important subclass of transitive doing-something verbs, the verbs of affect. Such verbs take the proverb *do something to*. For instance, (33) has the interrogative WH form (34):

(33) *John is painting the house.*

(34) *What is John doing to the house?*

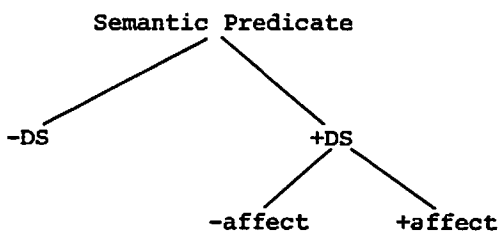
However, (35) does not have a corresponding form (36):

(35) *John is painting a picture of his grandmother.*

(36) **What is John doing to a picture of his grandmother?*

unless it means that John is covering a picture of his grandmother with paint. Here we have an instance of two different verbs *to paint*. *Paint*$_1$ means "to cover with paint"; while *paint*$_2$ means "to create a likeness with paint". Both are +DS verbs. The difference between the two verbs can in part be described by assigning the semantic feature +affect to *paint*$_1$ and -affect to *paint*$_2$.

We have now defined two semantic features, which are related by the tree structure:



This can be generated by the complex symbol rules:

(37) Semantic Predicate $\Rightarrow \begin{Bmatrix} +DS \\ -DS \end{Bmatrix}$

(38) $\text{action} \Rightarrow \left\{\begin{matrix}+\text{affect}\\ -\text{affect}\end{matrix}\right\}$

Such rules will yield complex symbols such as [+DS, +affect] which might be associated with the verb *hit* in the sentence *The batter hits the ball.* Notice that the DS feature only tells one something about the batter, that is that he performs an action, he does something. It says nothing about the ball. The affect feature, on the other hand, defines a relation between the batter and the ball; that is, the batter affects the ball, he does something to it. If we express the semantic subject and semantic object of the sentence by the ordered pair (sem. subject, sem. object), we can define the affect relation by +affect (subject, object). By using the notation [+DS, +affect] (subj., obj.), we can express all the information given by the semantic features. That is, the subject does something and the subject does something to the object.

The feature combination [+DS, - affect] would, however, be used to classify two kinds of utterances that should be distinguished, for instance,

(39) *John painted the picture.*

(40) *John played baseball.*

Note that one can ask (41) but not (42):

(41) *What did John do to produce the picture?*

(Answer: *He painted.*)

(42) **What did John do to produce baseball?*

In sentences like

(43) *John painted a picture.*

John wrote a book.

John breathed a sigh.

John built a house.

John made a desk.

the subject effects something, causes something to come into being. We therefore set up a feature "effect" (+effect is to be read as "the subject effects the object") and add the rule:

(44) $-\text{affect} \Rightarrow \left\{\begin{matrix}+\text{effect}\\ -\text{effect}\end{matrix}\right\}$

Among the attributives, or -DS verbs, are the pure attributives *be* and *have*. The construction *be*+adjective usually has a parallel in the form *have*+nominal. For example, (45a) means the same as (45b):

(45) a. *I am very ill.*

b. *I have a bad illness.*

Similarly, with the following pairs:

(46) a. *I am enthusiastic.*

b. *I have enthusiasm.*

(47) a. *I am fortunate.*

b. *I have good fortune.*

In addition to the pure attributive *have*, there is the possessive *have*. The possessive *have* occurs in sentences like (48), while the pure attributive occurs in (49) and (50).

(48) *I have a house.*

(49) *The house has a porch.*

(50) *I have two arms.*

That the two *haves* are not the same can be demonstrated through the following examples. We can say (51) and (52) but not (53):

(51) *I have a house and two barns.*

(52) *I have a head and two arms.*

(53) **I have a house and two arms.*

(53) does not make sense because *have* cannot take on the meaning of both a possessive and a pure attributive at the same time.

To distinguish between pure attributives and possessives, we set up the feature (poss.) and add the rule

(54) $$-DS \Rightarrow \left\{ \begin{matrix} +poss. \\ -poss. \end{matrix} \right\}$$

Not only must possessives be distinguished from pure attributives, but so must the verbs of perception, such as *see, hear, know, perceive, understand,* etc. To take care of these, we set up the feature "perc.", and add the rule.

(55) $-\text{poss.} \Rightarrow \left\{\begin{matrix}+\text{perc.}\\-\text{perc.}\end{matrix}\right\}$

To make further distinctions we can set up the following features:

Volition (Vol.) - to take care of *wish, want, desire,* etc.
Taste - to take care of *like, love, prefer, stand,* (as in *How can you stand her?*)
Expectation (Exp.) - for *expect, plan,* etc.
Valuation (Val.) - for *cost, measure, take, weigh,* etc., and add the rules

(56) $-\text{perc} \Rightarrow \left\{\begin{matrix}+\text{Vol}\\-\text{Vol}\end{matrix}\right\}$

(57) $-\text{Vol} \Rightarrow \left\{\begin{matrix}+\text{Exp}\\-\text{Exp}\end{matrix}\right\}$

(58) $-\text{Exp} \Rightarrow \left\{\begin{matrix}+\text{Taste}\\-\text{Taste}\end{matrix}\right\}$

(59) $-\text{Taste} \Rightarrow \left\{\begin{matrix}+\text{Val}\\-\text{Val}\end{matrix}\right\}$

We can account for some other major semantic properties of verbs if we set up two features to cross-classify with DS. These are "change" and a space-versus-state feature that we will call "space". +space refers to the spatial properties of the subject; -space to the internal state of the subject. The change feature tells whether the spatial properties or internal state changes. Examples:

(60)

DS	change	space	
-	-	+	I am here.
-	+	+	I got here.
-	-	-	I am sane.
-	-	-	I have my sanity.
-	+	-	I became insane.
-	+	-	I lost my sanity.
+	-	+	I sat.
+	+	+	I ran.
+	-	-	I thought.
+	+	-	He turned Communist.

Changes that are directed may be of two major kinds: "to" and "from".

(64) *I went to Chicago.*

I came from Chicago.

I gained my sanity.

I lost my sanity.

Changes may also be undirected. For instance,

(65) *I moved.*

(66) *I changed.*

Features to represent these phenomena can be introduced by the following set of rules, the first of which is a revised form of (37).

$$\text{(66) Semantic Predicate} \Rightarrow \left[\begin{Bmatrix}+\text{DS}\\-\text{DS}\end{Bmatrix}\ \begin{Bmatrix}+\text{change}\\-\text{change}\end{Bmatrix}\ \begin{Bmatrix}+\text{space}\\-\text{space}\end{Bmatrix}\right]$$

$$+\text{change} \Rightarrow \begin{Bmatrix}+\text{directed}\\-\text{directed}\end{Bmatrix}$$

$$+\text{directed} \Rightarrow \begin{Bmatrix}+\text{direction}\\-\text{direction}\end{Bmatrix}$$

where +direction corresponds to "to" and -direction to "from".

A feature system such as this can help explain some regular formations in English that are usually written off as idioms. For instance,

(67) *His face went pale.*

The leaves turned yellow.

I came to know that.

Words for spatial change regularly come to be used to express change of state. In all of these phenomena, the space feature is neutralized, that is, the distinction between +space and -space is lost. This is analogous to the phonological phenomenon in many American dialects in which the /d/ of *ladder* and the /t/ of *latter* become indistinguishable.

Moreover, such a feature system can define the set of possible answers to the question, "What happened?" Let us take a look at some permissible and nonpermissible answers.

(68) *What happened? The light turned red.*

What happened? I got sick.

What happened? I asked for a candy bar.

What happened? John wrote a book.

What happened? I ran away.

What happened? John hit the ball.

What happened? I made John into a millionaire.

*What happened? *The light was red.*

*What happened? *I was sick.* (OK in sense "I vomited")

*What happened? *I wanted a candy bar.*

*What happened? *I had a house.*

*What happened? *Meat cost two dollars a pound in those days.*

*What happened? *I used to like music.*

The permissible answers to *"What happened?"* are exactly those whose semantic predicate has either the feature +DS or the feature +change.

Substantives, like predicates, can be analyzed into their major semantic properties. By using rules of a similar form, we can generate the principal semantic properties of substantives. Here are some sample rules:

[The rules and the explanations of the features involved in them are omitted here.]

The rule to introduce subjects, predicates, and objects will be

(69) $T \rightarrow$ [s. pred.](s. subj., $\left\{\begin{matrix}\text{s. obj.} \\ \emptyset\end{matrix}\right\}$)

where T stands for Thought. $\emptyset$ stands for a possible null object. There is a large class of sentences with a grammatical object but with no semantic object. For instance,

(70) *John played baseball.*

(71) *John danced a rhumba.*

(71) has the paraphrase

(72) *John danced a dance, which was a rhumba.*

The main clause of (72) has the same meaning as (73); since (73) has a null semantic object, it follows that (72) has a null semantic object.

(73) *John danced.*

Moreover, if (73) has a null semantic object, so must (74):

(74) *John danced a beautiful dance.*

(74) is exactly the same case as (71), since *rhumba* has all the semantic content of the noun *dance* and in addition has some attributive notion for which we have no word. Semantically, *rhumba* contains an attributive that modifies the word *dance*, just as *beautifully* modifies *dance* in (74).

One extremely important feature must yet be added to all of our semantic categories, the "dummy" feature, which is illustrated in such sentences as

(75) *Someone did something to someone.*

From (75), we know only that the subject is human, the predicate +affect, and the object human. No additional semantic information appears. When this happens, we say that the feature "dummy" has been chosen by the rule:

(76) $\left\{\begin{array}{l}\text{s. pred.}\\ \text{s. subj.}\\ \text{s. obj.}\end{array}\right\} \rightarrow \left\{\begin{array}{l}\text{+dummy}\\ \text{-dummy}\end{array}\right\}$

In addition, dummies in the subject and object may dominate embedded thoughts, just as syntactic matrix dummy dominated by a noun will dominate a nominalization. For instance, the *that* clause in (77) is dominated semantically by a set of features that are contained in the noun *fact* and whose +dummy form is realized in the proform *something* (as opposed to *someone*), as in (78):

(77) *I know that he is sick.*

(78) *That he is sick is something that I know.*

Let us look at an example of an embedded thought. Sentences (79a) and (79b) have the same meaning:

(79) a. *Popeye popularized spinach.*

b. *Popeye made spinach popular.*

Embedded in that meaning is the meaning of (80), which would be represented as (81):

(80) *Spinach became popular.*

(81)
$$\begin{bmatrix} \text{s. pred} \\ \text{-DS} \\ \text{+change} \\ \text{-space} \\ \text{+directed} \\ \text{+direction} \\ \text{+dummy} \end{bmatrix} \left(\begin{bmatrix} \text{s. subj.} \\ \text{+p.o.} \\ \text{+living} \\ \text{-l. animate} \\ \text{-dummy} \end{bmatrix}, \begin{bmatrix} \text{s. obj.} \\ \text{-p.o.} \\ \text{+state} \\ \text{+quality} \\ \text{-dummy} \end{bmatrix} \right)$$

spinach *popularity*

Note that the adjective *popular* is represented in (81) by its noun form *popularity*. The equivalence of the pure attributives *be* and *have* allows us to do this.

To get the meaning of (79a,b), we identify the thought (81) with the +dummy object of

(82)
$$\begin{bmatrix} \text{s. pred.} \\ \text{+DS} \\ \text{-affect} \\ \text{+effect} \\ \text{-change} \\ \text{-space} \\ \text{+dummy} \end{bmatrix} \left(\begin{bmatrix} \text{s. subj.} \\ \text{+p.o.} \\ \text{+living} \\ \text{+l. anim.} \\ \text{+h. anim.} \\ \text{+human} \\ \text{+male} \\ \text{-dummy} \end{bmatrix}, \begin{bmatrix} \text{s. obj.} \\ \text{-p.o.} \\ \text{-state} \\ \text{-act.} \\ \text{+event} \\ \text{+dummy} \end{bmatrix} \right)$$

Popeye

Each of the -dummy entries in (81) and (82) would have an appropriate distinguisher added to the meanings provided by the features. Both predicates have +dummy entries because their meanings are entirely determined by their feature specifications. The meanings of *become* or *come to have* is completely specified by the feature +change and by the fact that it is a pure attributive. The meaning of *make* in (79a) is completely specified by the +effect feature and the other negative features.

It may be argued that the embedding rule exemplified above is completely equivalent to some syntactic transformation. This is not so. The conditions that govern the rule are semantic. If the predicate of the matrix thought is +effect, then the predicate of the embedded thought must be either +DS or + change. The restrictions on the embedding

rule represent the semantic law that one cannot cause a state that already exists. Among the sentences excluded are

(83) a. **I made him know that.*

b. **I made him see that.*

When (83b) is given an interpretation, it is taken to mean "I made him come to see that".

Another major semantic rule also involves an embedding within a matrix thought that has a +effect predicate. If the matrix is (84a) and the thought identified with the subject is (84b), then we get the resulting thought (84c):

(84) a. $\begin{bmatrix}\text{s. pred.}\\ +\text{effect}\end{bmatrix}\left(\begin{bmatrix}\text{s. subj.}\\ +\text{dummy}\\ \left\{\begin{matrix}+\text{quality}\\ -\text{state}\end{matrix}\right\}\end{bmatrix}, [\text{s. obj.}]\right)$

b. $\begin{bmatrix}\text{s. pred.}'\\ +\text{dummy}\end{bmatrix}\left([\text{s. subj.}'], [\text{s. obj.}']\right)$

c. $\begin{bmatrix}\text{s. pred.}\\ +\text{dummy}\end{bmatrix}\left([\text{s. subj.}'], [\text{s. obj.}]\right)$

This rule is the linguistic equivalent of the chain of causation. Suppose *John* is the subject of (84b). If what John does causes something to happen, we say that John caused that thing to happen. For example, we know from (85) that the Yankees won because of what Mantle did:

(85) *The Yankees won because of Mantle.*

Similarly, (86) can mean 'He does something to make me afraid':

(86) *He scares me.*

It can also mean 'What he can do makes me afraid', 'What he might do makes me afraid', etc. The wide variety of possible meanings for (86) is a result of the generality of the conditions on (84b).

The nature of the semantic transform defined by (84) gives us reason to believe that a generative semantic theory may be more economical than an interpretive theory. A matrix thought like (84a) can be mapped into many different syntactic structures. An interpretive theory would have to have a different rule for each different syntactic structure.

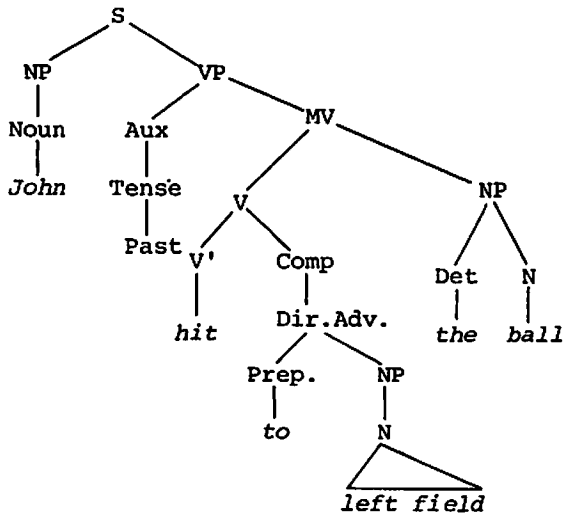
Moreover, an interpretive theory would have to give as output all the possible meanings for each syntactic construction. This would be an extremely uneconomical way of accounting for the simple semantic regularity given by (84).

NOTES

[1]Amalgamation is basically a process of putting markers together with markers and distinguishers together with distinguishers.

[2]Katz and Postal claim that the question, negative, and imperative morphemes must be introduced in the phrase structure rules so that the transformations that manipulate them will have no effect on meaning. Klima has given independent syntactic grounds to substantiate their claim.

[3]The view that semantic rules can operate only on syntactic structures leads one into some messy contradictions. One centers about the possibility of defining a degree of meaningfulness parallel to Chomsky's degree of grammaticalness. Let us take the sentence *John hit the ball to left field*. It has the P marker



If we substitute for the verb *hit* the verbs *grasp, know, fall,* and *think,* we get sentences with varying degrees of grammaticalness.

(a) *John grasped the ball to left field.*

(b) *John knew the ball to left field.*

(c) *John fell the ball to left field.*

(d) *John thought the ball to left field.*

Of the above sentences, (a), (b), and (d) break the categorical restriction that the verbs chosen cannot occur before directional adverbs. (c) and (d) break the categorical restriction that the verbs do not take grammatical objects. (d) breaks more categorical restrictions than (a), (b), and (c) and is therefore the least grammatical of the four. A theory in which semantic rules can only operate on underlying P markers would predict that the most grammatical of the above sentences would be the most meaningful, and the least grammatical, the least meaningful. This is not the case. (a), (b), and (c) are not meaningful at all. (d), however, has the meaning that John (exercising mind over matter) got the ball to go to left field by thinking. Other examples of the same sort are *My wife drank me into the poorhouse* and *John splashed me into the center of the pool.*

[4]Some may claim that the paraphrases I offer are not "full" or "normal" paraphrases. I would retort that they are essential paraphrases, in the sense that they are meant to illustrate what all paraphrases of the (b) type have in common.

[5]As Barbara Partee has pointed out, every verb has attributive forms, namely, the simple present and simple past. *I run, I create things, I used to play baseball,* all contain examples of doing-something verbs used as attributives. The non-doing-something verbs, however, are always attributives.