

XXV. LINGUISTICS*

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RESEARCH OBJECTIVES

There have been two main traditions in the study of language in modern times. The first is the tradition of "universal" or "philosophical grammar," which flourished in the seventeenth and eighteenth centuries in intimate connection with philosophy and speculative psychology. The second is the tradition of modern linguistics, a nineteenth and twentieth century phenomenon that was also closely interwoven with the philosophy, psychology, and anthropology of its day. Philosophical grammar was concerned with general, universal principles of language structure; it attempted to ground these principles in a theory of mental processes, and to illustrate them with detailed study of particular languages. By modern standards, the work lacked care and attention to detail, and the conclusions that were reached, though often highly insightful, were deficient in empirical support and sharpness of formulation. In comparison, modern nineteenth and twentieth century linguistics has achieved a much higher standard of rigor, and has accumulated linguistic data of an incomparably greater scope and variety. It has been limited, however, by a much narrower interpretation of the purposes and goals of linguistic science. It has eschewed theory construction in favor of elaboration of methods of analysis, and it has not been concerned with linguistic universals – often, in fact, it has denied that there are, in any significant sense, genuine and deep universal principles that constrain the form and use of human language.

The work in linguistics at the Massachusetts Institute of Technology represents, in a sense, a synthesis of these two major traditions. In terms of its general goals and even many of its specific hypotheses, this work has a very classical flavor. But in the range and reliability of evidence and precision of formulation, this work accepts and attempts to surpass the standards of modern structuralism.

For classical linguistics, a central property of human language is what we can call its "creative" aspect, that is, its unboundedness and freedom from stimulus control. Under ordinary circumstances, what a person says is not determined by the stimuli that impinge on him or by identifiable physiological states, to any significant degree. The

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unboundedness of normal language is evident from the fact that almost every linguistic utterance produced and understood is quite new, not similar in any physically defined sense to those that have been produced in the past experience of the language user, and not conforming to familiar or memorized patterns, in any meaningful sense of the notion "pattern." Nor are these utterances "generalizations" from past experience, in any sense of "generalization" known to psychology or philosophy. Nor can language use be described in terms of "habits" or "repertoires of responses." In recognizing these facts, philosophical grammar was entirely correct and to the point.

To account for this creative aspect of normal language use, we must attribute to the language user knowledge of a certain organized system of rules that establish a sound-meaning relation for an infinite class of sentences. This knowledge is, of course, quite unconscious, but it is nonetheless perfectly real. Thus it is quite likely that no one reading this report has ever seen, heard, or produced the sentence

- (1) What disturbed John was being disregarded by everyone.

Yet every reader will understand that the sentence may be roughly paraphrased by either (2) or (3):

- (2) Everyone was disregarding the thing that disturbed John.

- (3) The fact that everyone was disregarding him disturbed John.

Thus sentence (1) is ambiguous, its possible interpretations being (2) or (3). If the word "our" is inserted in (1), giving (4), the sentence is unambiguous.

- (4) What disturbed John was our being disregarded by everyone.

The interpretation of (4) can only be along the lines of (3), with "him" replaced by "us." Or, to choose an example from a totally different sphere of language, speakers of English would know that the plural of the word *dap* is *daps*, whereas that of *linch* is *linches* (with *es* rather than *s*), in spite of the fact that most of the speakers would neither know the meanings of these words nor have heard them before.

A speaker of English has knowledge of these facts and numerous others without having been exposed to these sentences or to any explicit "teaching." He has mastered a system of rules that determine both the phonetic form of sentences (1)-(4) and their various semantic interpretations. The first task of the linguist who is investigating the structure of English is to try to determine this system of rules, the system that is called the "generative grammar of English." This generative grammar has in some manner been internalized by every speaker of English; it determines the pairing of sound and meaning for an indefinitely large range of possible sentences. It is this internalized generative grammar that makes possible the normal, "creative" use of language.

The discovery of the generative grammar of English, and other languages, is, however, only the first task that faces the linguist. To the extent that such grammars have been developed and validated, the linguist can then turn to the question of how they are put to use, by the speaker or hearer, in normal conversation, in literature, in internal monologue, and so on. Furthermore, he can turn to the basic problem of classical linguistics: What are the universal principles that limit the form of such generative grammars? Clearly, there must be universal principles with a very narrow and limiting character. If this were not true, it would be impossible for the child, presented with scattered samples of a language for an extremely short period, to determine for himself the generative grammar of this language. But this is a task that normal humans accomplish with great facility. This indicates that they must approach the task forearmed with highly specific advance knowledge (obviously, unconscious) of the possible form that a generative grammar must assume. To put it loosely, although the child cannot "know" in advance whether the language to which he is exposed is English, Chinese, and so on, he must "know" that it is a "human language" of a highly special sort, which can only vary in very restricted ways. The problem of "universal grammar," now, as in the seventeenth century, is to determine the principles that limit the variety of human language and make possible the acquisition of language. To the extent that such principles

can be formulated and validated, we gain insight of an unparalleled kind into the innately determined character of human mental processes.

We feel that recent work, much of it carried out at M. I. T. , makes it possible to formulate a fairly precise theory of universal grammar in this sense, a theory which is, furthermore, reasonably well supported by substantial empirical evidence from a variety of languages. The major goal of our research, then, is to sharpen and deepen the theory of generative grammar, and to use it as a basis for the study of cognitive processes.

Since many of the problems of language lie in the area in which several disciplines overlap, an adequate and exhaustive treatment of language demands close cooperation of linguistics with other sciences. The inquiry into the structural principles of human language suggests a comparison of these principles with those of other sign systems, which, in turn, leads naturally to the elaboration of a general theory of signs, semiotics. Here linguistics touches upon problems that have been studied by philosophy. Other problems of interest to logicians – and also to mathematicians – are touched upon in the studies devoted to the formal features of a general theory of language. The study of language in its poetic function brings linguistics into contact with the theory and history of literature. The social function of language cannot be properly illuminated without the help of anthropologists and sociologists. The problems that are common to linguistics and the theory of communication, the psychology of language, the acoustics and physiology of speech, and the study of language disturbances are too well known to need further comment here. The exploration of these interdisciplinary problems, a major objective of this group, will be of benefit not only to linguistics; it is certain to provide workers in the other fields with stimulating insight and new methods of attack, as well as to suggest to them new problems for investigation and fruitful reformulations of questions that have been asked for a long time.

M. Halle, N. A. Chomsky

A. ON INSTRUMENTAL ADVERBS AND THE CONCEPT OF DEEP STRUCTURE

In a very interesting paper Lakoff¹ presents evidence that he takes to indicate that either the notion of deep structure (as defined by Katz and Postal² and by Chomsky³) must be abandoned or it must be considerably revised toward abstractness. Lakoff's arguments demand the attention of anyone concerned with the theoretical basis of syntax, for they support the "universal base hypothesis." This is the thesis that the base components of all natural languages are essentially identical, containing only a few syntactic categories (e. g. , S, NP, VP) and intimately related to semantic interpretation; the multiplicity of categories actually appearing in languages (e. g. , Prepositional Phrase, Auxiliary, Manner Adverb, Instrumental Adverb, Particle, Adjective), in this view, is a surface phenomenon to be transformationally derived. In this report, I attempt to show first, that Lakoff's evidence does not support his conclusion in the case of instrumental adverbs, and second, that the category 'Instrumental Adverb' must be present in deep structure.

Lakoff centers his argument around the two sentences

- a) Seymour sliced the salami with a knife.
- b) Seymour used a knife to slice the salami.

He points out that in recent transformational practice a) and b) are assigned different deep structures; but since deep structure is defined (in part) in terms of co-occurrence and selectional restrictions and a) and b) share many selectional properties, one is unable to state significant grammatical generalizations that can be captured if a) and b) are given identical deep structures. If one can also show that a) is a transform of b), then it is a consequence of Lakoff's proposal that the category Instrumental Adverb is unnecessary. This consequence is part of the motivation for Lakoff's more general conclusions that in grammatical theory (i) "there would be many fewer grammatical categories and relations than had previously been believed," and (ii) "the deep structures for sentences containing such adverbs would be more abstract (i. e., farther removed from surface structure) than had previously been thought."⁴

Lakoff first claims that in recent practice a) and b) would be represented at the level of deep structure by a') and b') (Diagram XXV-1). Presumably, the reason

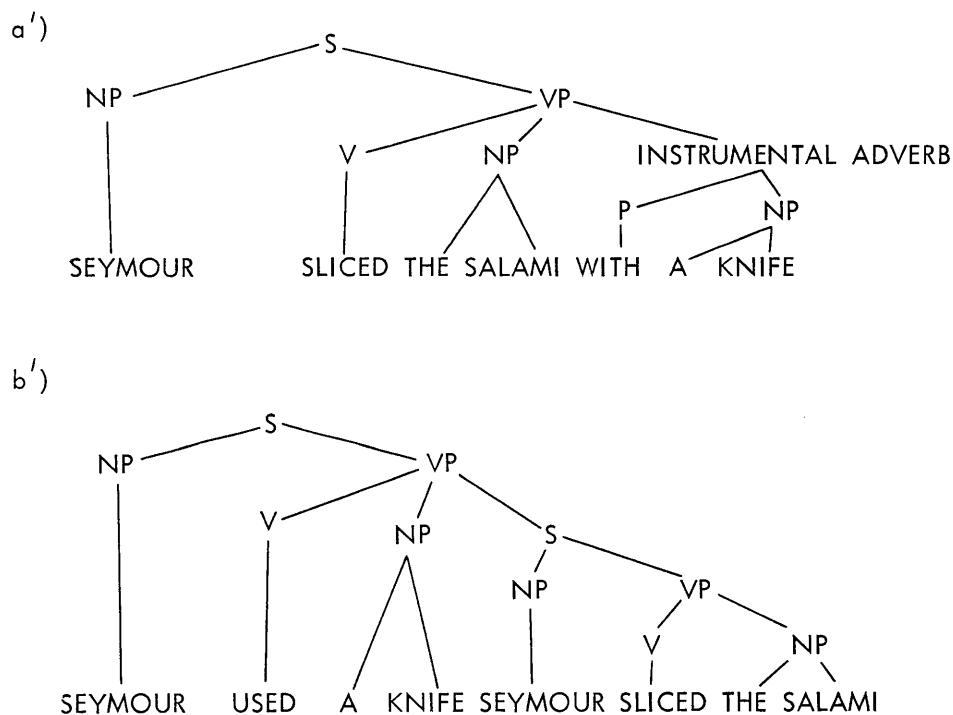


Diagram XXV-1.

for placing Seymour as subject of the embedded S in b') rather than knife is that we have

Seymour used a knife to cut himself

but not

*Seymour used a knife to cut itself.

Lakoff notices⁵ that

*Seymour cut the knife with itself

is also inadmissible, and takes this as evidence for the similarity of a) and b) at the deep-structure level. Otherwise, he claims, new constraints between the objects of a verb and the objects in an instrumental would be required. Such constraints Lakoff finds "exceedingly strange." There is independent evidence, however, for the existence of such constraints, or very similar ones. Consider first the verb call. (These examples are to be understood in the sense of call which requires a for-dative; the other sense, in which call has two direct objects, is not relevant.)

Seymour called me a porter
 =Seymour called a porter for me.

But we do not have the following sentences in the same sense:

*Seymour called me myself
 =*Seymour called me for myself.

Similarly, we have

Seymour brought Henry a concubine,

but not

*Seymour brought Henry himself
 =*Seymour brought Henry for himself.

The last sentences are good if himself refers to Seymour, but inadmissible if himself means Henry. In this respect, the instrumental phrase behaves as an indirect or oblique object of the verb. With- and for-phrases of this kind (dative or instrumental) are strikingly different from other phrases, and surely must be treated in special ways; for example, the rule interpreting nonintensive reflexive pronouns within such phrases may have to operate across a verb (that is, the antecedent of an oblique noun phrase in a verb phrase may have to lie outside that verb phrase).

Lakoff states that the deep structures of a') and b') have "little or nothing in common." Observe, however, that in effect the deep structure of sentence a) is itself present as an embedding in the deep structure of b). There is some evidence that even the instrumental of a) is present in b): in many dialects there occur sentences like

Seymour used a knife to slice the salami with.

This sentence is not from the deep structure with a relative clause in knife: compare

Seymour got a knife to slice the salami with
 =Seymour got a knife with which to slice the salami,

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and

Seymour used a knife to slice the salami with
#*Seymour used a knife with which to slice the salami.

If a) and b) are related by embedding, then one would expect to find partial similarities and some differences. I need not argue for the existence of similarities, since Lakoff presents many. But there are interesting differences between a) and b) which Lakoff neglects to mention.

Consider, for example, Lakoff's statement that a) and b) are synonymous.⁶ In fact, given the theoretical assumptions Lakoff accepts for the purposes of his argument (namely, that semantic interpretation is defined on deep structure in the usual way and that transformations preserve semantic interpretation), if a) and b) have the same deep structure, then it is necessary that they be synonymous. On the other hand, if they differ in some way in deep structure it is not necessary for them to have the same meaning. Instead, one might expect differences traceable to the presence of the verb use in b) and its absence in a). But there are some such differing selectional properties:

(i) All at once Seymour broke the door open with a bat

is not synonymous with

- (ii) ?All at once Seymour used a bat to break the door open;
(iii) Seymour finally managed to open the door with his penknife

is not synonymous with

- (iv) ?Seymour finally managed to use his penknife to open the door;
(v) Seymour rapidly sliced the salami with a knife

is not synonymous with the following

- (vi) ??Seymour rapidly used a knife to slice the salami,

and no permutation of the adverb yields a synonymous S:

- (vii) ??Seymour used a knife rapidly to slice the salami
(viii) Seymour used a knife to slice the salami rapidly
=Seymour used a knife to rapidly slice the salami;

sentence (viii) is quite different from (v), in that it means

- (ix) In order to slice the salami rapidly, Seymour used a knife.

Whatever sense one gives to ?using something rapidly (not: using something up rapidly), it is not the same as slicing something rapidly. That is because special semantic properties of use are showing up:

I did a little slicing . . .

*I did a little using

It is not at all surprising that the additional morphological material in b) should have peculiar selectional properties; only if a) and b) were transforms of the same deep structure would this fact be surprising and indeed inexplicable.

Thus I believe that Lakoff is in error when he writes that a) and b) are synonymous. Under normal stress, a) and b) should be understood to be different by most speakers of English.

The fact that sentences a) and b) differ in their selectional properties shows that they are not identical at the level of deep structure, given the set of assumptions Lakoff accepts in his paper. Therefore one cannot rely on "deep-structure constraints," as Lakoff does, to account for the particular similarities of a) and b). How then are these properties to be accounted for? I shall construct an alternative treatment of one class of examples discussed by Lakoff. For this class there is crucial evidence showing that instrumental adverbs must be syntactically defined in deep structure rather than transformationally derived.

One fact noticed by Lakoff is that sentences like

*Henry broke the window with a chisel with a hammer

are ill-formed. He relates this fact to the nonoccurrence of an instrumental reading for sentences like this:

*Henry used a hammer to use a chisel to break the window.

Lakoff gives no motivation, however, for the nonoccurrence of the last type of sentence. These facts are only superficially related; that is, they are an instance of a false generalization. For clearly there are limitations on the number and kind of adverbial phrases associated with a given verb:

*Call me him a taxi

John called a taxi for me

*John called me a taxi a horse

John called a taxi a horse for me

*John sliced me a salami with a knife with a chisel

John knew ecstasy with Mary

*John knew the answer with a slide rule;

and it is possible, in fact necessary, to subcategorize verbs on this basis for lexical insertion. I shall call verbs that take an instrumental I-type verbs. Apparently there are no verbs with more than one instrumental object and this is evidently true about datives, too (though conjoined oblique objects are possible). The fact about Instrumentals

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is expressed in the theory Lakoff rejects by the form of the Phrase Structure rules, which make no provision for two Instrumental Adverbs within the same VP.

In accordance with the discussion above, figure out, but not know, is an I-type verb because we have

John figured it out with a slide rule,

where the with-phrase is instrumental. I find no reason to label verbs like use, utilize, make use of, employ I-type verbs, since there is no evidence that they take oblique objects of the appropriate kind:

*Use it with a slide rule;

it is necessary to exclude the interpretation "along with a slide rule," which is not an instrumental sense.

The I-verb category is useful in describing the following fact: When use (and more generally, use-verbs) has a verb-phrase complement of a particular type (not an in order to clause, but a resultative clause), the embedded verb must be an I-type verb. I shall refer to this as Condition I.

A rough criterion for distinguishing in order to clauses from resultative clauses is a paraphrase. (By a "paraphrase" I mean something expressing part but not necessarily all of the meaning of something else.) The sentence

She used a sexy dress to attract him

may be paraphrased as

She used a sexy dress in attracting him;

but in general, in order to clauses cannot be so paraphrased:

She dressed nicely to please her mother

≠[?]She dressed nicely in pleasing her mother.

It would be desirable to have a firm, syntactic characterization of "resultative clause," but I have not yet found one. For the purposes of this report, I have accepted the paraphrase criterion that Lakoff uses, although I do not believe it is entirely reliable.

Consequently, we may say that the sentence

Seymour used a knife to slice the salami

contains a resultative clause:

Seymour used a knife in slicing the salami;

furthermore, it satisfies Condition I, for slice is an I-type verb. But a verb like know, which takes no Instrument, would cause Condition I to be violated:

*Seymour used a knife to know the salami,

or perhaps more credibly,

*Seymour used a slide rule to know the answer.

A further consequence of Condition I is that sentences of the type

*Melvin used a hammer to use a chisel to break the window

are ill-formed (cf. Lakoff⁷), for use is not an I-type verb; in other words, using something cannot be the result of using that something. Compare:

Seymour used a knife to get the salami sliced.

We see why Condition I is defined in terms of syntactic rather than solely semantic features: a plausible case can be made for use having the semantic feature [+Instrumental]; nevertheless, use must be excluded from Resultative clauses after use-type verbs. Only a (syntactic) subcategorization like the one I have sketched can single out the appropriate class of verbs satisfying Condition I, the I-type verbs. Lakoff handles the problem of multiple embedding of use-verbs by an ad hoc constraint; he employs an entirely different constraint to rule out know from embedding in sentences like b). This other constraint, which uses a semantic feature, is incorrect, as I shall show.

Condition I is rather natural: it specifies that the result of using an instrument must be something that it is possible to do with an instrument. (Moreover, the same instrument must be involved; this condition would allow one to formulate deletion conditions in case instrumental phrases, in addition to the I-type verbs, actually occur in S below use.) Condition I relates the constructions exemplified in sentences a) and b) in a natural way: if a) were out, then b) would be out, for if a) were out, slice would not be an I-type verb.

Thus far, I have only shown that this condition could be used to account for the non-occurrence of sentences like

(i) *Seymour used a slide rule to know the answer

given the nonoccurrence of sentences like

(ii) *Seymour knew the answer with a slide rule.

I have not yet shown that some such condition is necessary. I shall give crucial cases favoring a condition defined in terms of I-type verbs over the semantic feature treatment that Lakoff presents. The necessity for a Condition I will then entail the necessity for a nonsemantic characterization of instrumentals.

Lakoff claims that in both constructions

c) Someone V'd something with some instrument

d) Someone used some instrument to V something

V must be [+Activity]. He states that if d) has a deep structure like that of b'), then the nonoccurrence of sentences like (i) could be accounted for "by a constraint between the verb 'use' and the next lowest verb in its complement sentence. This is a [type of] constraint needed elsewhere in English grammar. For example, the verbs force, remember, try, etc., require an activity verb in their complements But the real problem here is not just whether a new type of constraint will have to be added to the theory of grammar to handle [ii]. The real difficulty is that if [a] and [b] have essentially different deep structures, then the constraints prohibiting [i] and [ii] will have to be entirely different constraints. In one case we would have a constraint between a verb and a type of adverbial. In the other case, we would have a constraint between two verbs."⁸ [Lakoff's references have been renumbered.]

I have presented evidence that a) and b) do not have the same deep structure. Therefore Lakoff's conclusion, just quoted, that the constraints prohibiting (i) and (ii) are "entirely different," would seem to follow and a significant grammatical generalization would seem to be incapable of formulation within present theory. But this unpleasant consequence does not follow, for the verb-verb constraint Lakoff describes is an incorrect expression of the "generalization." Since a) and b) do not have the same deep structure, Lakoff's argument quoted above actually demonstrates the defect in his treatment: it fails to relate a) and b) significantly.

Condition I claims that the verbs embedded in resultative clauses below use must be I-type verbs. Lakoff's constraint claims that such verbs must be [+Activity]. Consider an activity verb that is not an I-type verb, for example, the verb consider. Consider is [+Activity], presumably, because one can say

I forced John to consider the alternatives;

and in reply to the question What were you doing all morning? one can say

I was considering learning Greek.

But consider is not an I-type verb; one cannot say in an instrumental sense

*I considered it with { a book
my mind
a computer.

The occurrence of sentences like

I considered slicing the salami with { a book
my mind
a computer

shows only that slice is an I-type verb. Though one can ask What did you slice the salami with? one cannot ask in the same sense *What did you consider the alternatives with? Lakoff's condition would thus fail to exclude consider from a use-construction,

but Condition I would have the correct consequences:

*I used a book to consider it (with)

*I used a book to consider slicing the salami (with).

A small sample of similar non I-type verbs which by Lakoff's criteria are activity verbs would include divulge, entertain the thought, learn, discuss, and, of course, the use-verbs themselves.

Are there I-type verbs that are not activity verbs? I suspect that verbs taking instrumentals are redundantly "activities" of one sort or another; that is, I would guess that the I-type verbs are a proper subset of the activity verbs. But "activity" is still too heterogeneous and loosely defined to be certain. Nevertheless, if there are nonactivity verbs that are also I-type and fail to occur in resultative clauses below use, this would show at most that Lakoff's constraint and Condition I intersect; that is, the verb use obeys both conditions. In this case it is still Condition I that expresses the relation between constructions of the forms a) and b).

There is an interesting set of verbs which provides additional evidence for the necessity of a condition like I. These verbs have two senses, one [+Activity] but non I-type; the other, [+Achievement] and I-type. (For this or a similar notion of "achievement," see Vendler.⁹) Examples are swim, run, climb. Consider first swim. One can say

I spent the morning swimming in a mudhole

I forced Henry to swim every morning for a month and it did wonders for his asthma

Paris remembered to swim and saved himself from drowning thereby.

In this activity sense of swim one cannot use instrumentals:

*He spent the morning swimming in a mudhole with a breaststroke.

*I forced Henry to use a breaststroke to swim (with).

In the sentence

Paris remembered to swim with a breaststroke and saved himself from drowning

with a breaststroke is not an instrumental, but a manner adverbial. It is important to distinguish the senses of with that indicate manner, accoutrement, or accompaniment from the instrumental sense, just as one must distinguish resultative from in order to-clauses. I shall give examples of this difference.

But there is a sense of swim which does allow instrumental adverbials; this sense usually requires an object and suggests completed action, or "achievement":

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Archaeological evidence has shown that someone swam the Hellespont with a breaststroke.

He used a breaststroke to swim the Hellespont.

He used a breaststroke in swimming the Hellespont.

The verb run is similar. In its activity sense it cannot occur with instrumentals:

He runs with special racing shoes (=accoutrement)

He uses special racing shoes to run (=in order to)

?He uses special racing shoes in running (=accoutrement).

But in its achievement sense, run does seem to be I-type:

He plans to run the race with special racing shoes

and therefore we have

He plans to use special racing shoes to run the race.

He plans to use special racing shoes in running the race.

The verb climb is quite analogous:

He climbed Mt. Everest with Marvel crampons

He used Marvel crampons to climb Mt. Everest.

He used Marvel crampons in climbing Mt. Everest.

But in its activity sense, we have

The last time he was seen, he was climbing with Marvel crampons (=accoutrement)

He was forced to use Marvel crampons to climb (=in order to)

*She begged him to use Marvel crampons to climb;

the last is completely out if he is understood as the subject of to climb, though it may be possible to impose an in order to interpretation on it otherwise.

The achievement senses of swim, run, and climb should be compared with win:

He won the race with { a breaststroke
special racing shoes
Marvel crampons.

It goes without saying that Condition I is just a hypothesis; one could easily falsify it in obvious ways, for example, by finding a verb that cannot take instrumentals but can occur in resultative clauses below use-type verbs. I have only sketched out the condition to show how I believe the facts Lakoff discusses may be successfully handled without abandoning the notion of deep structure or rendering it radically abstract. If Condition I is correct, then it is clear that Lakoff has noticed several false

generalizations, which are merely his hypotheses for describing significantly related facts. I do not deny that the facts Lakoff presents are significantly related: he has persuasively shown the need for a deeper treatment of selectional restrictions.

Joan W. Bresnan

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