THE EXPRESSION OF CAUSATION IN ENGLISH CLAUSES

DISSERTATION

Presented in Partial Fulfillment to the Requirements for
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By

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* * * * *

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PUBLICATIONS

"The Typology of Causative Constructions" by Medveld-
and Silnitskii (translation from Russian), Working
Papers in Linguistics No. 11, Columbus, 1972.

FIELDS OF STUDY

Major Field: Generative Semantics

Studies in Case Grammar. Professor Charles Fill-
more

Studies in Russian. Professors David Robinson
and William Daniels
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CHAPTER I - CAUSAL CHAINS

The present study is intended to explicate the structure of causative verbs and the ways in which English relates the logical structure of causative sentences to surface structure elements. I will be working within the theoretical framework known as generative semantics, and I will assume that the reader is basically familiar with this approach. Thus, the major topic of this dissertation is the deep structure predicate CAUSE and the way in which it is expressed in surface structure elements.

There are only two NP which express the role of "causer" in simple sentences—the agent and the instrument. The agent is the principal, volitional causer, and the instrument is the immediate, physical causer of the action described by the sentence. According to Charles Fillmore (1968), simple clauses allow only one agentive NP and one instrumental NP to occur. In "Some Problems for Case Grammar" (Fillmore, 1971), he makes it quite clear that he
regards the agent/instrument dichotomy as a constraint on the way in which chains of causation may be expressed in English. That is, only one volitional and one physical causer may be associated with each verb.

If agents and instruments play the role of "causers", then they must somehow both be associated with the predicate CAUSE. To my knowledge, no generative semanticist has ever tried to show how agents and instruments are related to CAUSE. I intend to show this relationship by deriving agents and instruments from the same underlying constituent--the sentential subject of CAUSE. That is, I will claim that CAUSE always takes a sentential subject in deep structure and that agentive and instrumental NP derive from that underlying sentence.

Hierarchies among Cases

My analysis will shed some light on a problem that has been noticed as far back as the time of Pāṇini (cf. Singh, 1970, pp. 26-28)--i.e. the problem of assigning case morphology to NP when more than one NP may occur in the same surface case form. For example, the verb shoot may take two types of instrumental NP--the "launcher" and the
"projectile". The launcher NP refers to the object that does the shooting, and the projectile NP refers to the object that gets launched. Consider the variety of objects which may fill either role:

(1) a. John shot Harry with { a bullet 
    { a pea 
    an arrow 
    buckshot 
    a paperwad }

   b. John shot Harry with { a gun
    { a rifle
    a cannon
    a crossbow
    a peashooter
    a slingshot

   It is not possible to express both of these instrument types as instrumental NP in the same simple clause:

(2) a. *John shot Mary with a bullet with a gun.

   b. *John shot Mary with a bullet and a gun.

   Rather, the "launcher" NP must be expressed as a from prepositional phrase:

(3) John shot Mary with a bullet from a gun.

Other languages may express these two roles in slightly different ways. For example, Sanskrit permits the instrumental marking to alternate with the ablative when no "projectile" NP is mentioned in the sentence:
(4) a. dhanuṣa vidhyati
    'with a bow' he shoots

b. dhanuṣa vidhyati
    'from a bow'

In such cases, English requires that the "launcher" be marked in the instrumental:

(5) a. John shot Mary with a gun.

b. *John shot Mary from a gun.

On the other hand, Russian never allows the launcher NP to be expressed in the instrumental case. The launcher is always marked with the preposition 'from':

(6) a. *Ivan vystrelil mariju pistoletom
    'shot' with a gun

b. Ivan vystrelil mariju ot pistoleta
    'from a gun'

The above sentences show that there is a hierarchical relationship between the launcher and projectile roles associated with the verb shoot. This hierarchy is probably universal in that no language which has a verb shoot should allow the following sentence to occur (where the blank space stands for some preposition or oblique case marking):

(7) *John shot Mary with a pistol ___ a bullet.

That is, whenever the projectile and the launcher are mentioned in the same sentence, the projectile takes precedence over the launcher as the surface
instrumental NP.

According to Patañjali (Mahābhāṣya: Rohtak, vol. 2, pp. 315-316), one of Pāṇini's commentators, the order in which Pāṇini introduces his kārakas (cases) helps to explain hierarchical relations among cases such as that found with the verb shoot. Pāṇini stated the kārakas in this order: apādāna (ablative), sampradāna (dative), karaṇa (instrumental), adhikaraṇa (locative), karma (object), and kartā (agentive). With respect to the verb shoot, the "projectile" can only be realized as karaṇa (instrumental). The "launcher" may be realized as apādāna or karaṇa (ablative or instrumental). That is, a conflict arises between the projectile and the launcher in that both may be realized as the same kāraka--i.e. karaṇa. In the case of such conflicts, the kāraka mentioned first is assigned to the NP. Therefore, the launcher NP is assigned the kāraka of apādāna when it cooccurs with the projectile.

Pāṇini's treatment of case hierarchies does not satisfy the need to understand why such hierarchies exist at all. Why is Pāṇini's order of kārakas useful in resolving such conflicts? Singh (1970) proposes that sentences like those in (4)
have an underlying structure that is more complex
than the surface:

(8) dhanuṣo nirgatena ṣareṇa
    'from a bow' 'discharged' 'with an arrow'
    vidhyati
    'he shoots'

Sentence (8) is literally "he shoots with an arrow
discharged from a bow." Singh proposes that the
taraṇa (instrumental) function is transferred to
dhanuṣ 'bow' when nirgatena ṣareṇa is suppressed.

In chapter VI, I will propose an underlying
structure for shoot which is similar to that pro-
posed by Singh, although I will deny that the
launched NP comes from a reduced relative as (8)
suggests. My analysis will account for the source
of instrumental NP and the resolution of hierarchi-
cal conflicts among case roles in a way that has
not yet been explored in generative semantics.
Chapters II-V are devoted to presenting the back-
ground that is needed to justify the analysis in
chapter VI.

Types of Causatives

The second chapter of this dissertation is
the most philosophical in tone and approach, because
I discuss some of presuppositions associated with
the predicate CAUSE and the problem of expressing
presuppositions in lexical structure.
In the first half of Chapter II, I devote some time to the structural typology of causative verbs as developed by two Soviet linguists—V.P. Nedialkov and G.G. Silnitskii. Their work is the most thorough cross-linguistic study of causative verbs that I know of. Many of their assumptions and working hypotheses about lexical structure are quite similar to those of generative semanticists. Moreover, their work translates nicely into the framework in which I am working. That is, I will be working under the assumption that the predicate CAUSE is an operator that necessarily joins two sentences in deep structure.

Nedialkov and Silnitskii have directly influenced my work in the following ways. They have drawn my attention to the vast number of causative verbs which express the means as well as the result of causation. The last chapter in this dissertation is devoted to the lexical structure of these verbs, which they call "instrumental causatives". Moreover, Nedialkov and Silnitskii (1969b) have increased my awareness of the relationships between different types of causation. They provide some nice observations about permissive causation, which has led me to set up the "permissive/neutral/ coer-
cive" scale proposed in chapter II. Finally, their distinction between distant and contact causation, although not new to linguistics, points up an area that has been largely ignored or glossed over in previous generative analyses of causation.

Another important area of causation discussed in chapter II deals with the result of causation. The object complement of CAUSE is not just an S which contains the predicate COME ABOUT. There are a wide variety of verbs which can be in the object complement of CAUSE, and they are all "interpretable" in the system of tense logic which has been developed by von Wright (1963). This raises fundamental questions about the nature of semantic primes and deep structure constraints on the CAUSE operator. Moreover, I provide a criticism of von Wright's theory of actions insofar as his system fails to account fully for types of permissive causation or coercive causation.

The Sentential Subject hypothesis

In chapter III, I explore one of the basic assumptions which I accept for the underlying structure of all causatives—that the predicate CAUSE takes two sentential arguments rather than a simple NP and a sentence as arguments. This deep
structure is crucial to my approach, since I want to derive instrumental causatives by means of Predicate Raising (or some such process) from the sentential subject of CAUSE.

Most analyses which treat CAUSE as a bisen- tential operator derive by-clauses from the subject of CAUSE. Therefore, I devote some time to explaining the issues and arguments behind this suggested source for by-clauses. These arguments are to be found chiefly in Gregory Lee (1971), David Dowty (1972), and Jonnie Geis (1973). I conclude the chapter with arguments against deriving by-clauses from the sentential subject of CAUSE, although I do not abandon the approach that CAUSE takes a sentential subject. I need the sentential subject as a source for the lexical structure involved in instrumental causatives, and I derive by-clauses from a source that is external to the sentential arguments of CAUSE.

Agents

Chapter IV is devoted to the NP role which Fillmore (1968) has called the "agent". I discuss the way in which the agentive role should be expressed in generative semantics. Much of this discussion deals with David Dowty's work, which
I believe is the most insightful treatment of agent-iveness so far advanced in the framework of generative semantics. Dowty provides evidence that agents are related to an underlying predicate of agentiveness which he represents with the symbol DO. My contribution to Dowty's work is to show that the notion of agent is not exclusively related to a verb of volitional causation in deep structure, but that agents are created as the result of a derivational constraint on the way in which causal chains are expressed in simple clauses.

Instruments

Chapter V discusses the so-called "instrumental" case role. Most of the discussion is devoted to reasons for rejecting Lakoff's (1968) proposal that the instrument is the underlying object of the abstract verb USE.

Chapter VI also deals with instrumental NP, but it treats them in the context of instrumental verbs. In this chapter, I propose that the preposition with is actually a lexicalization of the underlying CAUSE operator. I also point out the necessity for determining instruments by a derivational constraint, much in the same fashion as agents are determined. Other prepositional
phrases which carry some type of causal sense are discussed, and it is demonstrated that NP complements to a verb can be explained as a function of the lexical structure which they incorporate. More specifically, the verb shoot is analyzed in terms of the causal chain which it expresses, and the source of its NP complements is made more explicit.

The Structure of Lexical Items

This study goes into considerable detail on lexical structure in the framework provided by generative semantics. It seems to me that generative semantics has provided the only viable approach to studying lexical structure in the past few years. Proponents of opposing views (e.g. Fodor (1970), Shibatani (1972), Kac (1972)) seem to concentrate on fighting the excesses of generative semanticists rather than on providing genuine theoretical alternatives to the sorts of semantic representation provided by generative semantics.

There are several areas of lexical structure which are currently problematic within all frameworks of study. Presuppositions continue to be the "number one" difficulty in lexical representation. Some researchers have proposed that presuppositions should be derived from outside the phrase
marker which underlies a sentence (e.g. Fillmore, 1971b; Lakoff, 1970). On the other hand, McCawley (1972) seems to prefer the inclusion of as much presuppositional material as possible in the deep structure. This latter approach would allow some process like Predicate Raising to do the job of incorporating presuppositions in lexical nodes.

The rule called Predicate Raising actually has its beginnings in Lakoff's theory of exceptions (cf. Lakoff, 1971). Lakoff proposed that causatives could be broken down into an abstract causative verb with the feature specification:

\[
\begin{array}{c}
+V \\
+\text{CAUSATIVE} \\
+\text{PRO}
\end{array}
\]

which takes a sentential object. The transformation called "Causative" would raise the verb in the object sentence and combine it with the abstract verb in the matrix sentence. Of course, Causative could be blocked if the verb in the lower sentence were marked as an exception to Causative. In this way, melt could be used as either an inchoative verb or a causative verb, but die could only be used as an inchoative since it would be marked as an exception to Causative.\(^5\)

McCawley (1968) first proposed that the deep structure should consist only of abstract elements
called predicates and arguments. The rule of Predicate Raising was suggested as an operation which combines predicates to form "lexical nodes". These nodes would then be replaced by lexical items which are associated with matching lexical nodes in the lexicon.

The verb **kill** is most frequently cited as a verb whose lexical representation is formed by means of Predicate Raising. McCawley suggested that the sentence "x killed y" should derive from a source that has at least as much structure as the sentence "x caused it to come about that y was not alive". The deep structure would look something like (9):

(9)
```
  S
  \   / \\
  V  o--\--o
  \    o   o
   CAUSE       S
                 \   / \\
                 V  o--o
                 \    o
                  CONE ABOUT     S
                                  \   / \\
                                  V  o--o
                                      \    o
                                           NOT V S
                                                \   / \\
                                                V  o--o
                                                    \    o
                                                         ALIVE y
```

Predicate Raising applies cyclically to produce the following stages in the derivation:
When lexical insertion occurs, the lexical node \((\text{CAUSE(COME ABOUT(NOT(ALIVE))))}\) is replaced by the lexical item \text{kill}.

McCawley's approach to lexical structure has been generally accepted among generative semanticians, although details may differ among researchers.
Predicate Raising has subsumed a number of rules that are designed to incorporate structure into lexical nodes, and Lakoff's Causative transformation is only one of these. Lexical nodes in generative semantics differ from the terminal symbols in the Aspects model (Chomsky, 1965) in that their internal structure resembles the constituent structure of sentences. Lexical nodes represent a bundle of semantic information that can be "unpacked" by means of Predicate Raising and other transformations.

It is difficult to enumerate all of the advantages or disadvantages inherent in McCawley's approach. One problem that has never been adequately researched is the problem of creating grammatical categories like verb, noun, preposition, conjunction, etc. out of the two "deep" categories "predicate" and "argument". Since verbs and adjectives have different properties, there must be some point in the derivation where adjectives are formally distinguished from verbs.  

On the other hand, Predicate Raising also takes care of the need to mark selectional restrictions on lexical items in the lexicon. For example, it is not necessary in McCawley's system to state in the lexicon that the verb kill must take an
animate direct object. That selectional restriction is a natural consequence of the fact that ALIVE is predicated of the object at the level of deep structure. It will be seen in Chapter VI that the lexical structure which I propose for the verb *shoot* naturally explains the selectional restrictions associated with it.

Lexical nodes must specify more than just the grammatical category of the lexical item and some type of internal constituency of predicates. Each lexical node in the lexicon carries the information of what structure cannot be incorporated by the lexical item, what information must be incorporated by the lexical item, and what information may optionally be incorporated by the lexical item. For example, the verb *die* cannot be used as a causative because the lexical node does not contain the predicate CAUSE. The verb *kill* must be treated as a causative because its lexical node must contain the predicate CAUSE. Finally, the verb *melt* may optionally be treated as a causative because the occurrence of CAUSE in its lexical specification is optional.

Polysemy is marked in the lexicon by indicating what part of the lexical node is optional.
I will follow the practice of enclosing optional material in parentheses. Therefore, the lexical node for the verb break would indicate the fact that break is optionally a causative verb in the following manner:

(13)

\[ \text{(CAUSE) BECOME BROKEN} \]

Since the time of McCawley's first article on Predicate Raising, there has not been much new research into the structure of lexical nodes. It is obvious that the lexicon must provide more information than a lexical node and a phonological representation. For example, sociolinguistic information which is commonly referred to as "register" is probably not incorporated into any lexical node by means of Predicate Raising. Stylistic groupings of words like pop/dad/father, shrink/psychiatrist, grownup/adult, etc. are governed by the speech context and not the logical structure of the sentence.

In the next chapter, I will discuss what elements need to be specified in the lexical node of verbs called "causatives". I will show that
much more is involved than simply claiming that a verb contains the predicate CAUSE. For example, there are different types of causation—permissive, coercive, contact, and distant. Moreover, there are causatives which express the result of causation and causatives which also express the means of causation. It is necessary to go into these areas in order to specify more clearly the way in which chains of causation can be incorporated into a lexical node.

Footnotes to Chapter I

1. I will use the term "agent" and "instrument" to refer to the roles of volitional and physical causer, respectively. Their terms "agentive NP" and "instrumental NP" will refer to the surface structure NP which express these roles. This distinction is important because I will be discussing sentences whose underlying structure contains more than one instrument or agent, but whose surface structure contains only one instrumental or agentive NP. For example, I discuss the verb shoot below, which can take two possible types of instrument. The terms "principal" and "immediate" will be explained in chapter II.

2. William Lycan has pointed out to me that (2.b) is acceptable as an answer to a question like "What did John shoot Mary with?" However, (2.b) still seems odd in the context of a "normal assertion" (whatever that is). I wish (2.b) to be taken as a normal assertion rather than as the answer to a question.

3. Actually, kartā is not the same as Fillmore's agent. For example, kartā can be nonvolitional or inanimate, but agents cannot.
4. I am indebted to Prof. Jag Deva Singh for introducing me to some of the insights which have been gained by Indian grammarians. Although it would be foolish to claim that Pāṇini's kāraka theory is the same type of analysis as Fillmore's case grammar theory, it would also be ridiculous to pretend that there is no similarity between the two. Although I use the terms "kāraka" and "case" interchangeably in this brief discussion, I recognize that a more detailed comparison of the two theories would yield many differences between the two notions.

5. See Gruber (1972) for an alternative view of lexical exceptions. Gruber takes the position that lexical items may be ordered with respect to each other in terms of which gets inserted first. Thus, kill would be inserted before die, thereby ruling out the use of die as a causative verb.

6. This proposal is incorrect insofar as (1) does not express an act of killing:

   (1) Merlin turned John into a rock.

Inanimate objects are not dead objects, but McCawley's analysis makes no distinction between them.

7. Leonard Gabbay (1972) has tried to capture the difference between parts of speech in terms of syntactic configuration and the application of syntactic rules. For example, he has shown that long and short form adjectives in Russian are a function of the syntactic rule that places adjectives in prenominal position (cf. Adjective Shift in English). This is the type of research that is needed to establish the point at which grammatical categories are created in a derivation.
CHAPTER II - CAUSATIVE VERBS

In this chapter, I will examine some of the syntactic and semantic properties of causative verbs. There are differing opinions as to what constitutes a causative verb. Most researchers will agree that the following are causative verbs: force, cause, make, have, etc. These verbs take agents and instruments, and their direct objects are complement sentences. There are also causative verbs that incorporate the result of causation in their meanings: kill, inform, frighten, melt, break, drop, etc. These verbs also take agents and instruments in their environments, and their direct objects (except in the case of inform) are simple NP.

The above verbs are causatives in a non-controversial sense. However, there are verbs which might be considered causatives but are not usually treated as such. For example, there are different types of causation: allow, let, permit, lead to, result in, result from, etc. The first three verbs allow agents and instruments, but they
do not seem to be as strongly "causative" as *force*, *make*, *cause*, etc. I will treat verbs like *allow*, *let*, and *permit* as "permissive causatives," and I will show how they are related to more orthodox causatives below. The other three verbs—*result in*, *result from*, and *lead to*—are causatives which do not take agents. I will also discuss why these verbs should be treated as causatives.

Since agents and instruments may be considered participants in a chain of causation, it is also appropriate to question whether all verbs that take agents or instruments ought not to be considered causatives. There are verbs which describe activities that are directed by the will: *smile*, *walk*, *eat*, *talk*, *shout*, *climb*, etc. At least one researcher (Dowty, 1972) treats these verbs as distinct from causative verbs, even though they take agents.

Certainly, agents may be said to "cause" themselves to do things. The sentence "John intentionally broke the window" seems to entail "John caused himself to break the window." But "the rock broke the window" does not entail "the rock caused itself to break the window." Therefore, I will treat such activity verbs as causatives in this sense. That is, I will take the extreme position that all agent-
ive verbs involve the semantic prime CAUSE at some level. I will have more to say about this property of agents in chapter IV.

One of the most interesting classes of causative verbs is that which expresses the means as well as the result of causation. The causative nature of these verbs has been somewhat ignored in the literature. I am referring to verbs like slice, hammer, hold, club, manipulate, kick, punch, slap, unlock, poison, stab, shoot, etc. All of these verbs express a causal situation in which the result is achieved by some means specified in the verb.

Although this chapter is devoted to different types of causatives, I will also discuss some of the deeper properties of the semantic prime CAUSE. Linguists who attempt to practice lexical decomposition are always faced with the problem of where to stop. What is semantically prime and what are the relationships among semantic primes?

The Object Complement of Causatives

To begin with, let us consider just those causatives which take object complement sentences--force, make, have, cause, allow, let. Karttunen (1970) calls these verbs "if-verbs" because they describe a sufficient condition for the truth of
their object complements.

(1) a. John \{caused\} Mary to stay home.
    \{forced\}
    \{allowed\} \\

b. John \{made\} Mary stay home.
    \{had\}
    \{let\}

All the sentences in (1) presuppose that Mary stayed home.

Causative verbs do not express a necessary condition for the truth of their complements because the negation of the above sentences does not force any conclusions about the truth or falsity of the complement sentences:

(2) a. John didn't \{cause\} Mary to stay home.
    \{force\}
    \{allow\} \\

b. John didn't \{make\} Mary stay home.
    \{have\}
    \{let\}

All of the above verbs are syntactically similar in that they provoke Subject Raising:

(3) a. John forced Mary to leave.

b. *John forced that Mary leave.

However, Subject Raising is not an exclusive property of the CAUSE predicate, because noncausatives may also take Subject Raising:

(4) a. John \{believed\} Mary to be a pauper.
    \{knew\}
    \{wanted\}
b. John \{asked \} Mary to leave.
\{ordered \}
\{advised \}

Therefore, Subject Raising is not an exclusive property of CAUSE.

The verbs in (4.b) are interesting in that they can be used to report a causal situation in some instances. For example, one might use (4.b) as an answer to the question "what caused Mary to leave?" Perhaps it is the quasi- causative nature of these verbs that has led two Soviet linguists, Nedialkov and Silnitskii (see below), to classify them as causatives.

In spite of the uniform pattern in (1), not all causatives take Subject Raising. Karttunen points out that some causative expressions take that-clauses—e.g. bring it about, make sure, see to it. Therefore, the CAUSE predicate alone cannot be said to control the surface syntactic shape of the object complement.

Nedialkov and Silnitskii's Typology

Two Soviet linguists, Nedialkov and Silnitskii (1959a), have provided an interesting classification of causative verbs. Although their approach is non-generative and somewhat atheoretical, they appear to hold a view of lexical structure that
is similar to the one advocated by generative semanticists.

Medialkov and Slnitskii (henceforth NS) work with an abstract level of representation which refers to "situations". An example of a situation would be

(5) a. John (r) sleeps (s)
    b. The bird (r) sings (s)

where r stands for the subject/object (for Latin res) and s stands for the situation/state of affairs (for Latin status).

Causal situations involve two simple situations which are related by the causal link k (cf. the CAUSE predicate in generative semantics). Thus, a sentence which expresses all the possible elements of the causal situation would be:

(6) a. John's (r₁) abruptness (s₁) caused (k) Mary (r₂) to leave (s₂)
    b. Our (r₁) strike (s₁) makes (k) everyone (r₃) angry (s₃)

The symbols are defined as follows: r₁=causer, s₁=causing situation, r₂=affected object, s₂=caused situation. According to NS, no causal situation may lack any of the above elements, although causal constructions—the linguistic expression of causal situations—may lack one or more of the above elements.
X3 make very inexplicit proposals about how causal situations are related to linguistic structure. However, they do mention an operation called "semantic ellipsis". which deletes elements from the causal situation. In this sense, they are treating the causal situation as if it were the deep structure of the causal construction. The following sentences are semantically elliptic:

(7) a. John (r₁) caused (k) Mary (r₂) to leave (s₃)
b. Mary (r₁) caused (k) considerable confusion (s₄)

(7.a) fails to express the causing situation (s₁) and (7.b) fails to express the causing situation (s₁) and the affected object (r₂).

A causative verb may now be characterized as any verb that contains the causal link k (i.e. the predicate CAUSE). X3 classify causative verbs according to the amount of the causal situation which they express. This criterion gives us four types of causative verbs:

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<td>k cause</td>
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The verb cause does not specify what types of activity occur in either the means \( s_i \) or the result \( s_j \) of causation. However, lexical causatives like kill and shoot do specify the situation which results \( s_j \). The verb order, despite its doubtful status as a causative, does specify the means by which the result is achieved (i.e., by some type of communication). Similarly, the verb shoot expresses the means, as well as the result, of causation.

Since I find the classification in (8) very useful, I will retain the terms "instrumental" and "resultative" for further discussion. However, the classification in (8) is much too simplistic in that it does not distinguish between the various types of noninstrumental-nonresultative (i.e., "bare" causatives) like make, force, lead to, result in, permit, allow, help, etc. I am aware of the differences among these verbs, and they discuss them in a later article (1969b) which attempts to present a universal typology of causative verbal morphology. The failure of (8) to account for these various types of causatives is not relevant to my purposes, since I am only interested in the terms "instrumental" and "resultative" to
represent "means-incorporating" and "result-incorporating" verbs, respectively.

Nevertheless, NS did fail to notice the great difference between causatives that take agents and instruments--e.g., cause, make, force, allow--and those that do not--e.g., lead to, result in, result from, necessitate. Apparently, the constituent which refers to the means of causation ($r_1s_1$) in the environment of these verbs must refer to an event rather than a person or a thing:

(9) a. Nixon caused a riot.
    b. Nixon's visit caused a riot.
    c. The riot was caused by Nixon.
    d. The riot was caused by Nixon's visit.

(10) a. *Nixon resulted in a riot.
    b. Nixon's visit resulted in a riot.
    c. *The riot was resulted in by Nixon.
    d. *The riot was resulted in by Nixon's visit.

Although result in lacks a passive, it does have the converse result from:

    b. The riot resulted from Nixon's visit.

Moreover, there are a number of instrumental verbs which are built up on some predicate which has the sense of "result from". For example, there
are verbs like drown, suffocate, hang, starve, etc., which mean "die as a result of X". All these verbs may become causatives by the same process that relates inchoative break to causative break:

(12) a. John [drowned] suffocated
    starved
    hanged

    b. Bill [drowned] John
    suffocated
    starved
    hanged

These verbs contrast with instrumental causatives that necessarily take an agent or instrument as subject—e.g. poison, guillotine, garrote, shoot. Such verbs do not occur as intransitives:

(13) a. *John [poisoned]
    guillotined
    garroted
    shot

    guillotined
    garroted
    shot

In the next chapter, I will defend the position that CAUSE always takes a sentential complement in deep structure and that the agentive and instrumental XP derive from that sentential constituent. If this position is correct, then verbs like result from, result in, necessitate, etc. can be considered causatives which require the subject to represent
an event rather than a participant in that event.

Types of Causation

So far, we have been discussing causal situations in which the antecedent of causation \((r_1s_1)\) is fully responsible for the consequent \((r_js_j)\). However, there are situations in which the consequent has a natural predisposition to occur regardless of the causal influence. When the causer merely facilitates or fails to impede that natural predisposition (assuming that he can impede it), the causation is called "permissive":

(14) a. John let the door close.
   b. John allowed the door to close.
   c. John permitted the door to close.
   d. John aided the door in closing.

According to MS, situations in which the consequent has no such natural predisposition are called "factive".

MS characterize permissive causation in their schema for causal situations by suggesting that the "primary source" (pervolstočnik) of causation resides in \(r_j\) (affected object) rather than \(r_1\) (causer). Verbs like help or aid are classified as "assistive" causation because the force of two causers is needed to overcome some obstacle. However,
I3 recognize that assistive causation is similar to permissive causation in that the "primary source" of causation resides in the person or thing being helped.

All the sentences in (14) presuppose that the door has a natural tendency to close. This tendency has the status of a presupposition, since negation of (14) still presupposes that the door had a tendency to close. (14.a) and (14.c) express situations in which John did nothing to prevent the door from closing. (14.b) may express a situation in which John did something (e.g. removed a door stop) or did nothing such that the natural tendency of the door to close was realized. That is, permissive causation involves the act of removing an obstruction or of creating no obstruction.

The factitive/permissive dichotomy which NS set up may be adequate for the purpose of typologizing causative morphology across languages, but I think that another type of causation--coercive causation--needs to be recognized from a semantic point of view. The notion of "primary source" of causation does little to explain the difference between a neutral verb like cause and "coercive" verbs like force, make, coerce, compel, etc. How-
ever, the complements of coercive verbs are associated with a "predisposition" to occur, just as the complements of permissive verbs are. Consider (15):

(15) a. John caused the door to close.
    b. John made the door close.
    c. John forced the door to close.

(15.a) does not presuppose that the door had a tendency to do something. However, (15.b-c) presuppose that the door had a predisposition to stay open. Thus, I propose that the factitive/permissive dichotomy of NS be replaced by a coercive/neutral/permissive trichotomy. Actually, we shall see below that there is a continuum between coercive and permissive causation.

Besides permissive and factitive, NS distinguish "contact" and "distant" causation. There are many examples of this distinction in the literature. Perhaps the best example is the difference between the lexical causative kill and the expression cause to die:

(16) a. John killed Mary.
    b. John caused Mary to die.

(16.a) is an example of contact causation, and (16.b) is an example of distant causation. The difference between the two types of causation is
not understood very well, but there are languages where contact and distant causation are realized by different morphemes (e.g. Amharic as described in Gragg (1970) and numerous examples given by Medialkov and Silnitskii (1969b)).

NS characterize distant causation as follows (pp. 28-29):

For distant causation there is an indirect link between the causing subject and the caused situation in which the degree of independence in the acceptance (non-acceptance) of the situation s_j is established in the caused subject. This indirectness often manifests itself in the expression of a specific time interval between causing (s_j) and caused (s_j) situations. Permissive causation... is always distant. Factive distant causation usually occurs with animate subjects in the caused situation (r_j):

*I ordered him to leave.*

NS go on to claim that contact causation is always factitive, and it may involve an animate or inanimate r_j (affected object):

(17) a. ja i spugal jevo 'I frightened him'

b. ja otkryl dvor 'opened door'

Thus, it seems that English expresses contact causation as a lexical causative and distant causation as a periphrastic construction.

One of the more important aspects of contact/
distant causation is the time interval between the antecedent of causation and the consequent. Consider (18) and (19):

(18) John killed Mary on Tuesday.

(19) John caused Mary to die on Tuesday.

Fillmore (1971) has pointed out that sentences like (18) must express the fact that John's action as well as Mary's death occurred on Tuesday. (19), however, may express the fact that the whole causal event took place on Tuesday or that only Mary's death occurred on Tuesday. That is, (19) has two readings, only one of which is synonymous with (18). The point of time specified as on Tuesday in (19) may range over $s_i$ and $s_j$ or just over $s_j$. Fillmore suggests that the latter reading blocks the lexicalization of 'cause to die' into kill. Other linguists have taken such examples of syntactic asymmetry between lexical and periphrastic constructions as counterexamples to the theory of generative semantics (e.g. Fodor, 1970, and Shibatani, 1972).

Fillmore also claimed that the location of the participants has to be identical for all the participants associated with a lexical causative. Consider (20) and (21):
(20) John killed Mary in Idaho.

(21) John caused Mary to die in Idaho.

(20) could not be used to express a situation where John fed Mary poison in Ohio, but she failed to die as a result of it until she reached Idaho. (21), however, would be consistent with that reading.

The distinction between contact and distant causation becomes much more interesting when it is discussed in terms of time and place coordinates. If John had fed Mary poison last Tuesday in Ohio, and if Mary had died as a result on Wednesday in Indiana, then we could not say:

(22) a. John killed Mary in Ohio last Tuesday.

b. John killed Mary in Indiana last Wednesday.

However, we could say:

(23) a. John caused Mary to die in Indiana last Wednesday.

b. John killed Mary in the Midwest last week.

That is, the lexical insertion of kill is not blocked as long as we use time and place adverbs that are general enough to cover both the antecedent and consequent of causation. It seems to me that this generalization could simply not be made
in a lexicalist framework, because lexical and periphrastic causatives would fundamentally different constructions in deep structure.

**The NS Typology and Semantic Primes**

The typology presented by NS resembles the contention of generative semanticists that all causative verbs should be broken down into CAUSE (k) plus other parts of the causal situation. Moreover, the lexicalization process is sensitive to the predisposition of the consequent to occur (permissive and coercive causation) as well as the "distance" between the antecedent and consequent of causation. The problem of generative semanticists is to describe how and explain why these various elements come to be part of a lexical node.

In order to illustrate the complexities involved, I will discuss two possible ways of representing the contact/distant dichotomy in semantic structure. One approach is to set up two separate semantic primes—one for contact causation (CONCAUSE) and one for distant causation (DISCAUSE). Under this approach, it would be necessary to show the relationship between CONCAUSE and DISCAUSE either by a meaning postulate or by rules of semantic interpretation. The other
approach would be to set up a single semantic
prime--CAUSE--and attempt to explain the differ-
ences between contact and distant causation by
means of tree structure configuration.

It appears that English blocks the occurrence
of lexical causatives which express distant
causation. Contact causation may be expressed
either by suppletion (kill/die; show/see; teach/
learn; feed/eat; put/be in) or a zero morpheme
(melt$_{tr}$/melt$_{in}$; break$_{tr}$/break$_{in}$; drop$_{tr}$/drop$_{in}$;
dry$_{tr}$/dry$_{in}$). There is no affix in English
which can be used to express distant causation.
Instead, lexical items like cause are used to form
periphrastic constructions.

There are many languages which express distant
causation by means of an affix--e.g. Japanese,
Korean, Hindi, Finnish, etc. In Japanese, the
affix sase is used to mark distant causation (sin-
sase 'cause to die'; tomari-sase 'cause to stop'
oti-sase 'cause to drop'; agar-sase 'cause to raise').
Corresponding contact causatives are realized lexically rather than morphologically (koros 'kill';
tone 'stop$_{tr}$'; otos 'drop$_{tr}$'; age 'raise'). Moreover, distant causatives in Japanese allow many scope
ambiguities that the corresponding contact causatives

The difference between the syntax of English distant causation and that of Japanese distant causation is not as great as it first appears. Languages like Japanese are said to have "double-agent" sentences because two agents may appear in the same surface clause. English is thought to prohibit the occurrence of more than one agent in the same surface clause (see e.g. Fillmore, 1971 and Lee, 1971). This prohibition is often stated as an instance of Fillmore's "one-instance-per-clause" constraint on case roles. In fact, periphrastic constructions with the verb cause violate this constraint in the same manner that Japanese double-agent sentences do. The effect of Subject Raising is to move an agent from an embedded sentence into the matrix sentence, which may already contain an agent. Thus, (24) is a double-agent sentence in English:

(24) John caused Mary to drink the wine.

Japanese would have a single word for 'cause to drink'. Therefore, Japanese allows Predicate Raising with distant causation, but English does not. Beyond this, there is essentially little difference between the syntax of English and Japanese
causatives.

Consider the approach to differentiating contact from distant causation by assigning them different semantic primes. DISCAUSE would be the underlying verb which blocks Predicate Raising in English, but requires it in Japanese. DISCAUSE would be realized as cause in English and sake in Japanese. On the other hand, CONCAUSE would not block Predicate Raising in either language, but it could have a morphological manifestation in some words (e.g. the zero morpheme in English).

The similarities between DISCAUSE and CONCAUSE would be revealed in a logical system that "interprets" semantic primes according to their truth values in possible worlds. This approach is consistent with generative semantics in that semantic predicates are being interpreted and not lexical items.

The approach in which it is claimed that there is only one prime for causation--CAUSE--and that all semantic types of causation involve at least this prime leaves us with the problem of explaining how the lexicon can assign distinct surface morphemes for the two types of causation. Is the difference between contact and distant
causation attributable to the structure of lexical nodes?

The two above choices for representing contact and distant causation illustrate one of the most difficult questions in generative semantics—what is semantically prime? When do we stop decomposing lexical structure? If DISCAUSE and CONCAUSE are semantic primes, then how are they related to each other?

Meaning Postulates

It has been suggested (Lakoff, 1970) that meaning postulates be used to explain the relationships among semantic primes. For example, Lakoff proposes that REQUIRE and PERMIT are two semantic primes which are related by the meaning postulate in (25):

(25) REQUIRE \((x,y,S_1)\supseteq\) PERMIT \((x,y,S_1)\)

In other words, if something is required, it is permitted. The converse is not necessarily true.

It is not clear how CONCAUSE and DISCAUSE could be related by a meaning postulate, but statements like (25) probably do not have a place in linguistic theory anyway. Verbs like require and permit can be treated as causatives:
(26) a. John required Mary to leave.
    b. John permitted Mary to leave.

Since *permit* expresses permissive causation, it presupposes that Mary is predisposed to leave in (26.b). No such presupposition occurs in (26.a). Because *require* does not presuppose any resistance on Mary's part, a meaning postulate like (25) is plausible. However, a meaning postulate like (27) is distinctly odd because the presuppositions associated with \( S_1 \) conflict:

\[
(27) \text{FORCE (}x, y, S_1\text{)} \Rightarrow \text{PERMIT (}x, y, S_1\text{)}
\]

The only way in which (27) could be possible is if one assumed that FORCE and PERMIT did not carry the presuppositional content of their corresponding surface verbs.

Once more, we are faced with two choices regarding semantic primes. On one hand, we could make *REQUIRE* and *PERMIT* into two separate semantic primes. If this is done, then *REQUIRE* and *PERMIT* would have to be interpreted in a "semantic meta-language" which involves causation and predispositions of consequent events. On the other hand, we could decompose *REQUIRE* and *PERMIT* into still simpler units. Then we would have to represent the presuppositions as part of the complex structure.
of the lexical node. Both approaches circumvent the need for meaning postulates of the type that Lakoff suggested. Moreover, meaning postulates obscure the difference between permissive and nonpermissive causation. Therefore, I reject the "meaning-postulate" approach to relating semantic primes.

Interpreting Semantic Primes

David Dowty (1972) has suggested some ways in which semantic primes might be interpreted in a "meta-semantic" system. For example, he suggests that semantic primes involved in causation should be interpreted by a system of tense logic that is similar to that developed by von Wright (1968).

Von Wright noticed that causal events invariably presuppose something about the state of affairs preceding the causal event. More specifically, the consequent of causation presupposes something about the preceding state of affairs. We can characterize this presupposition with an operator "T", which may be read as 'and next'. This operator represents a relationship between two generic states of affairs that are temporally contiguous. Thus, (28.a) could be represented by (28.b), where p refers to the state "John be ill":

(28) a. John became ill.
   
   b. \( \neg pT_p \)

That is, (28.a) presupposes that John was not ill just prior to the point in time referred to by the sentence. Since the negation of (28.a) does not affect the left-hand side of the \( T \) operator, \( p \) in (28.b) is a presupposition:

(29) a. John didn't become ill.
   
   b. \( \neg pT_\neg p \)

There are four binary combinations possible with \( T \), and I list them in (30), along with some lexical items that represent the formulae:

(30) a. \( \neg pT_p \) come about, begin, become
   b. \( pT_\neg p \) end, stop, cease
   c. \( pT_p \) continue, remain
   d. \( \neg pT_\neg p \) continue not, fail to occur, not become

As far as I can tell, there is no way to distinguish between verbs like begin and become in von Wright's system. Lexical items may have more than a binary interpretation in von Wright's system as, for example, with the verb resume, which has the formula \( pT_\neg pT_p \).

It appears that causatives are well-formed only if they embed propositions that express the above formulae. That is, CAUSE has a verb-verb constraint on it such that the object complement must contain
a predicate that is interpretable by von Wright's T operator. Consider the following causative sentences and their corresponding formulae:

\[(31)\]

a. John brought the fight about. \((\sim p T p)\)
b. John began the men fighting. \((\sim p T p)\)
c. John ended the fight. \((p T \sim p)\)
d. John stopped the fight. \((p T \sim p)\)
e. John continued the fight. \((p T p)\)
f. John kept the men from fighting. \((\sim p T \sim p)\)

If such a verb-verb constraint exists on the predicate \textit{CAUSE}, then it seems logical to ask whether or not the verb directly embedded in the complement of \textit{CAUSE} is 'T' itself. That is, why not treat the tense operator as a semantic prime rather than as an operator in a metasemantic system? The answer to this question requires us to have some principles whereby we can stop decomposing lexical structure.

One problem with making the tense operator a semantic prime is that it relates a presupposition (the left-hand side of T) to an assertion (the right-hand side of T). I am not sure how this would affect our semantics, since scope phenomena like negation are not supposed to affect presuppositions. Therefore, I cannot come to any
conclusion about the status of the tense operator in linguistic deep structure.

The "Counter-Factual Condition"

Von Wright noticed that causatives involve yet another presupposition—the state of affairs which would have obtained had there been no causation. Thus, (32) presupposes not only that the door was open in a previous state, but that it would have remained open if John had not acted:

(32) John closed the door.

Von Wright introduces another operator—the "Instead Of" (I) operator—to indicate the counterfactual state of affairs. (32) would be represented by the formula:

(33) \( \neg p \text{TpI}p \)

The I-operator is only relevant to causal events, whereas the T-operator may refer to any two events which are temporally contiguous.

There are eight \( (=2^3) \) configurations possible with TI calculus:

(34) a. \( p \text{T-pIp} \) cause to cease
    b. \( \neg p \text{T-pIp} \) cause to not happen
    c. \( \neg p \text{TpI-p} \) cause to happen
    d. \( p \text{TpI-p} \) cause to continue
    e. \( p \text{T-wpI-p} \) allow to end
f. \( \neg p T p \) allow to happen

g. \( p T p \) allow to continue

h. \( \neg p T \neg p \) allow not to happen

One could read (34.a) as "p becomes not p instead of remaining p." (34.b) would be "not p remained not p instead of becoming p."

Von Wright's system cannot adequately deal with the category of causation that we call "permissive" causation. (34.e-h) describe situations in which the causer could have interfered with the normal course of events but failed to do so. Recall that there is another type of permissive causation—one in which an obstruction is removed. Von Wright's system only tells us what would have occurred if the causer had failed to take any action.

The real presupposition associated with causation is not what would have happened if there had been no causal influence, but what was "predisposed" to happen. If a door is predisposed to close (e.g., because it is controlled by a spring), then the causer may facilitate that predisposition by failing to obstruct it (von Wright's permissive causation) or by removing an obstruction.

Notice that von Wright's I operator also fails to distinguish between neutral causation...
and coercive causation. There is absolutely no difference between force and cause in von Wright's system, because the counterfactual state of affairs is the same with both verbs. However, force is associated with a negative predisposition, whereas cause is neutral in this respect.

**Force and Counterforce**

An event which is naturally predisposed to occur is one in which there is internal pressure working in favor of its occurrence. The external pressure of causation may work for or against the natural tendency. The following sentences involve causation which favors or opposes a predisposition:

(35) a. John allowed the door to close.
   b. John allowed the stone to fall.
   c. Mary permitted the glass to break.

(36) a. John allowed Bill to leave.
   b. Mary permitted Jim to sit down.
   c. John allowed the doctor to examine him.

(37) a. John forced the door to close.
   b. ?John forced the stone to fall.
   c. Mary forced the glass to break.

(38) a. John forced Bill to leave.
   b. Mary forced Jim to sit down.
   c. John forced the doctor to examine him.
The difference between permissive causation (35)-(36) and coercive causation (37)-(38) lies only in their opposing presuppositions. (37.b) is odd, but not ungrammatical, because it is difficult to imagine how a stone could resist the pull of gravity.

Sentences (35)-(38) illustrate an important dichotomy in the predispositions I have been referring to—the dichotomy between a physical and mental predisposition. (35) and (37) express a physical propensity/resistance for the event to occur. (36) and (38) express an agreeing/resisting force that is the will of the embedded agent. For example, (34.b) may describe a situation where Bill sits down in order to avoid some threat. Thus, "natural predisposition" may refer to a physical or mental force. The important thing to consider linguistically is that allow in (35) and allow in (36) may be considered the same lexical item under this interpretation.

If von Wright were to capture the facts about natural language, he would probably need operators like "in spite of" and "in accord with". The salient property of permissive and coercive causation involves resisting and facilitating forces.
Force not only occurs as a property of events, but it comes in degrees. Therefore, it can be added and subtracted. If we use '+' to indicate force that favors the consequent and '-' to indicate force that opposes the consequent, we can represent the interplay of forces that differentiates the various causative verbs in English.

"External" refers to the force exerted by the causer, and "internal" refers to the force that is inherent in the consequent. '0' (zero) indicates that no force is present:

(39)

<table>
<thead>
<tr>
<th></th>
<th>external</th>
<th>internal</th>
</tr>
</thead>
<tbody>
<tr>
<td>let</td>
<td>0</td>
<td>+</td>
</tr>
<tr>
<td>permit</td>
<td>0</td>
<td>+</td>
</tr>
<tr>
<td>allow</td>
<td>0/+</td>
<td>+</td>
</tr>
<tr>
<td>help⁶</td>
<td>+</td>
<td>+...-</td>
</tr>
<tr>
<td>cause</td>
<td>+</td>
<td>+/-</td>
</tr>
<tr>
<td>make</td>
<td>+</td>
<td>0/-</td>
</tr>
<tr>
<td>force</td>
<td>+</td>
<td>-</td>
</tr>
</tbody>
</table>

The use of '0' in (39) to indicate lack of external force is deceptive. Lack of force can never be said to cause anything. It is important to recognize the presupposition that the subject of causation has the ability to exert force. That is, the causer always has control or ability to interfere. Thus, the sentences in (40) are
nonsensical insofar as we cannot imagine how the subject could influence the consequent:

(40) a. ?My chair permitted the bird to fly.
   b. ?The sun allows Bill to do multiplication.
   c. ?Paper causes suicide.

The presupposition about ability to influence is inherent in von Wright's I operator. A formula like pIπp (allow to continue) expresses the notion that the agent or causee could have interfered but failed to do so.

Summary

At the beginning of the chapter, I set out to explain something about the nature of causative verbs. We can conclude with the following remarks:

(41) a. Causative verbs may express the means and result of causation in addition to causation itself.
   b. Causation can be "contact" or "distant".
   c. Causal predicates may only embed propositions that can be interpreted by the T operator.
   d. Causative verbs may be marked according to the predispositions of their consequents to occur. This allows permissive and coercive verbs to be treated as causatives.
   e. The notion of "force" is inextricably tied to the notion of causation.
f. Causal situations presuppose that the causer can exert force on the consequent.

I am not certain how presuppositions are to be represented in the linguistic deep structure of causative sentences. Perhaps they are to be stated in terms of relations that map deep structures into truth-functional systems as Dowty suggests. In spite of the question about what is semantically "prime", I will continue to use the CAUSE predicate as if it were an underlying predicate that is present in the lexical node of all causatives. The next chapter will deal with the subject complement of CAUSE.

Footnotes to Chapter II


2. Recall that order (valet', prikazat') is not a causative according to Karttunen. However, performatives like order imply that the speech act could be a causal event if circumstances are favorable.

3. Lyons (1968) calls these verb "ergative verbs".

4. Von Wright uses the word "agent" because he means his system to be relevant to deontic modal logic. I prefer to use "causer" so as to avoid confusion between von Wright's terminology and case grammar terminology.

5. (36) and (37?) can be interpreted in a physical sense also. Thus, it is possible to imagine a
situation where Mary physically pushes Jim into a chair for (v):

(v) Mary forced Jim into a chair.

6. The verb help is more complex because it necessarily implies another causal situation. Naturally, the embedded causative has its own predisposition:

(vi) John helped Mary to pry the lid open. (vi) carries the presupposition that the added forces of John and Mary's actions overcame the counterforce exerted by the lid.
CHAPTER III - THE SENTENTIAL SUBJECT OF CAUSE

From an intuitive point of view, causation involves two events \(^1\)--the causing event and the resulting event. Causally related events occur in a temporal sequence such that the causing event precedes or is simultaneous with the resulting event. Some linguists have begun to represent the notion that causation involves two events as a part of the syntactic deep structure. They do this by postulating that the predicate CAUSE takes sentential subjects as well as sentential objects which describe events (cf. Fillmore, 1971; McCawley, 1971; Dowty, 1972; Geis, 1973).

This approach to the deep structure of causative sentences fits in nicely with the classification that RS give for causative verbs. The sentential subject of CAUSE provides a source for the lexical structure of so-called "instrumental causatives". Thus, if kill is derived from CAUSE plus material from the sentential object of CAUSE, then poison is derived from CAUSE plus material from the sentential subject of CAUSE in
addition to the material from the sentential object. That is, Predicate Raising can operate in both sentential arguments of the CAUSE predicate.

Unfortunately, most proponents of the "bisentential approach" to CAUSE have not seen the sentential subject as a source for lexical structure. Lee (1971), Dowty (1972), and J. Geis (1973) use the sentential subject as a source for by-clauses. Since instrumental causatives also occur with by-clauses, there is an apparent conflict between the source of by-clauses and the source of instrumental causatives:

(1) a. The restaurant poisoned its patrons by feeding them contaminated mushrooms.

b. John shot Mary by squeezing the trigger.

It may be that there is no real conflict in deriving both by-clauses and instrumental causatives from the sentential subject of CAUSE. However, the issue of whether or not there is a conflict can be avoided if it is shown that the sentential subject of CAUSE is not the source of by-clauses. I hope to show that there is good reason for deriving by-clauses outside the scope of CAUSE, and I will provide two possible approaches in this direction at the end of the chapter.
The Bisentential Approach

Zeno Vendler (1967)\(^2\) is probably the first generativist to consider the idea that causation involves two constructions in deep structure, each of which may be conceived as sentences. That is, Vendler's approach, couched as it is in the "transformationalism" of Zellig Harris and Robert Lees, lends itself to the proposition that sentences underlie nominals and nominalizations. Unfortunately, the exact mechanism for deriving these surface constituents from underlying sentences is still largely implicit in the writings of generative semanticists.

The following passage (Vendler, 1967, p. 164) characterizes the intuitive force behind Vendler's analysis:

I want to claim that neither causes nor things can be objects or persons. In the matrix X is the cause of Y, the variables do not stand for single nouns but for nominals. Counterexamples like

John caused the disturbance.

can be made harmless by pointing to the possibility of inserting a nominal and producing the fuller form

John's doing something caused the disturbance

following the precedents given above in similar situations. This conclusion, of course, rules out persons of objects from the ranks of causes, and products, works, and so forth, from the class of things that are caused. Tables and chairs are not caused by anything.
The above argument has a serious flaw in it. The subject of cause can only be replaced by a nominal when the action in the main clause is unintentional:

(2) a. John intentionally caused the disturbance.

b. *John's doing something intentionally caused a disturbance.

c. ?John's intentionally doing something caused a disturbance.

Regardless of whether (2.c) is a grammatical sentence in English, it could never stand as a paraphrase of (2.a). Dowty (1972) gives an analysis of agentiveness which accounts for the facts in (2) and still preserves Vendler's observation about the relationship between nominals and the subject of cause.

The source of By-Clauses

Although Vendler did not discuss by-clauses, there is a parallelism between nominal subjects and by-clauses which has led some researchers to claim that both derive from the sentential subject of a CAUSE predicate. Consider the paraphrasability of the following pairs of sentences:

(3) a. John's typing disturbed the baby.

b. John disturbed the baby by typing.
(4) a. John's wearing moccasins prevented him from being heard.
   b. John prevented himself from being heard by wearing moccasins.

(5) a. Harry's striking on the nail drove it into the board.
   b. Harry drove the nail into the board by striking on it.

Of course, the above pairs of sentences only form paraphrases of each other when the action described by the main clause verbs is unintentional.

The mechanism for creating by-clauses involves essentially two independently motivated transformations—Subject Raising and Extraposition.

According to Lee (1971, p. L-78), there is a parallel between the by-clause paradigm and the begin paradigm (cf. Perlmutter, 1968). Thus, (6) would have a derivation like (7)-(9) in the nonintentional sense:

(6) John began drinking (=John's drinking began)

(7)
(8) **Extrapolation**

```
( S
  NP  
    it     VP
    began   NP
          S
            John drink
```

(9) **Subject Raising**

```
( S
  NP  
    John     VP
    began   VP
    drinking
```

Although the statement of Extrapolation and Subject Raising may differ among linguists at present, it can be argued that by-clauses are formed by a similar set of processes:

(10) John amazed Mary by drinking beer.

(11)

```
( S
  NP  
    John drink beer  
    CAUSE

  S
    NP
    Mary be amazed
```

(12) **Extrapolation**

```
( S
  NP
    it     VP
    CAUSE

  S
    NP
    Mary be amazed

  S
    NP
    John drink beer
```
I have omitted some of the details from the above derivation—such as the issue of rule ordering, subject formation, and complementizer placement. Geis points out that there is no natural source for the preposition by in these deep structures. She reluctantly proposes that by is inserted by a transformation, even though it is customary for generative semanticists to derive prepositions from underlying predicates. For the sake of argument, I will assume that the derivation outlined in (11)-(13) is at least plausible. We shall see in the discussion below, however, that the above treatment of by-clauses is difficult, if not impossible, to maintain.

The Like Subject Constraint

One of the strongest points in favor of the above approach is that it provides an account of the like subject constraint on by-clauses. That is, the underlying subject in every by-clause must be coreferential with the subject of the main clause:

(14) a. *John amazed Mary by Jim’s drinking beer.
b. *The mayor punished the demonstra-
tors by the sheriff's arresting them.

Whenever a possessive pronoun occurs as the
subject of a by-clause, it must be coreferential
with the subject of the main clause:

(15) a. John upset the audience by his
walking out.

b. *John upset the audience by her
walking out.

The like subject constraint holds even when
the subject of the main clause is a nominal:

(16) John's drinking the whiskey got him
in trouble by convincing everyone
that he lacked savoir faire.

The Subject Raising analysis of by-clauses accounts
for the like subject constraint since the subject
of the main clause originates from the by-clause
in deep structure. There is no necessity to state
it as an ad hoc constraint in the grammar.

Passive sentences with underlying nominal
subjects give the appearance of being counter-
examples to the like subject constraint:

(17) a. John's kissing Marsha made Alice
angry.

b. Marsha was made angry by John's
kissing Alice.

(18) a. Jim's passing the test pleased the
instructor.

b. The instructor was pleased by Jim's
passing the test.
Nevertheless, these sentences do not contain by-clauses. Besides creating a by-prepositional phrase, the passive transformation marks the verb for passive voice. True by-clauses do not affect the voice of the verb. Moreover, as Lee points out, by-clauses may be used as an answer to the question word how. But (17. b) and (18. b) cannot be used as an appropriate response to questions like "How was Mary made angry?" and "How was the instructor pleased?"

The Causative Condition

In fact, by-clauses seem to resist occurring with a passive main clause:

(19) a. Mary killed John by stabbing him.
    b. *John was killed by Mary by stabbing him.

(20) a. Bill angered the crowd by burning the wrong flag.
    b. *The crowd was made angry by Bill by burning the wrong flag.

(21) a. The natives sacrificed John by stabbing him.
    b. *John was sacrificed by the natives by stabbing him.

Moreover, passive by-clauses are generally unacceptable also:

(22) a. *Mary upset her mother by being seen outside past curfew.
b. *Tom made Alice rich by being shot.

c. *John increased his status by being invited to a party.

The unacceptability of the above sentences appears to be due to the fact that by-clauses only co-occur with causative verbs in the main clause:

(23) a. *Harry died by drinking too much Alka Seltzer.

b. *John knew the answer by using the slide rule.

c. *Mary was strong by eating lots of protein.

Moreover, it seems that the verbs inside by-clauses must also be causative:

(24) a. *Harry amazed his teacher by knowing all the answers.

b. *John made Marsha unhappy by being tall.

c. *Jim stopped the party by having a fit.

The sentences in (23)-(24) are fairly acceptable to some speakers. However, this acceptability is usually contingent on a reading that is compatible with the causative constraint. That is, many speakers can paraphrase "x allowed himself to be verbed" by the expression "x was verbed."

Consider (25):

(25) a. *John was killed by standing in front of a truck.
b. John allowed himself to be killed by standing in front of a truck.

I find (25.a) marginally acceptable as a paraphrase of (25.b). In other words, it is possible for me to incorporate an abstract VP ALLOW ONESelf into passive verbs when they are embedded as complements.

I also find inchoative verbs acceptable in this type of interpretation. Consider (26):

(26) a. Socrates died by taking poison.
   b. Socrates caused himself to die by taking poison.
   c. Socrates \{ killed himself \} by \{ committed suicide \} taking poison.

I have found that a majority of my informants find (26.a) as acceptable to marginally acceptable. The point is that everyone who finds (26.a) acceptable interprets it as a suicide. In view of this, I suggest that something like (26.b) underlies (26.a) and that this allows us to maintain that there is a causative constraint on the main clauses that are associated with by-clauses.

Dowty's Agent

David Dowty (1972) extended the sentential subject derivation of by-clauses to explain the dichotomy between agentive and nonagentive causers.
Sentences like (28) are ambiguous with respect to volition:

(28) John caused an accident by crossing against the light.

(28) could have either of two readings: that John intended the accident to happen, or that he caused the accident unintentionally.

Dowty adopts the position that agentiveness is associated with the underlying predicate DO. I will not attempt to justify his approach now, but I will take it up in chapter IV. Assuming that agents are associated with underlying DO, then the ambiguity in (28) can be captured in deep structure with respect to the position of DO. The volitional sense of (28) would be:

(29)

```
(29)  S0
     /    \
    V     NP
   DO    x
  /\      \N
 /  \    /  \np
CAUSE S1
     /\     \N
    V     /  np
   DO    S2
          /\      \n         /  \    /  \np
        x    /  np
            /  S3
            /  \  \
            x  cross against the light
```

The DO in S0 ranges over the entire sentence, but that in S2 only ranges over the by-clause. In
fact, this is an entirely necessary constraint on the deep structure in (29) because one cannot intentionally cause an accident by unintentionally crossing against the light. In other words, when the action in the main clause is intentional, the action in the by-clause must by intentional also.

The non-volitional sense of (28) would be:

(30)

\[
\text{V CAUSE} \quad \text{NP} \quad \text{NP} \quad \text{NP} \\
\text{DO John_x} \quad \text{S_1} \quad \text{S_2} \\
\text{x cross against the light} \\
\text{an accident occur} \\
\]

In (29), John intends an accident to occur; in (30), he only crosses against the light intentionally. If the embedded DO in S_1 of (30) were removed, then we would have the source of a third ambiguity—one in which John's action of crossing against the light was unintentional.

Sentences with nominal subjects never allow the agentive reading—i.e., they never derive from a deep structure like (29), where the DO ranges over the entire sentence. Thus, the sentences in (31) would have to come from a source
like (30):

(31) a. John's crossing against the light caused an accident.

b. John's intentionally crossing against the light caused an accident.

The fact that by-clauses do not have overt subjects is accounted for by Equi-NP Deletion rather than Subject Raising in Dowty's analysis. Equi-NP Deletion eliminates the $x$ variable in $S_3$ of (29) and that in $S_2$ of (30). The like subject constraint on by-clauses is actually a function of the like subject constraint on DO in $S_2$ and $S_1$ of (29) and (30).

**Possessive Subjects in By-Clauses**

Consider the "agentive" sense of (28), which is represented by the structure in (29). The surface subject in the main clause is derived from $S_0$. Therefore, it is necessary to delete '$x$' in $S_2$ and $S_3$. Dowty has already argued that '$x$' in $S_3$ is eliminated by Equi-NP Deletion, but '$x$' in $S_2$ cannot be deleted in this way because it is embedded two sentences down from the controller NP.

Dowty suggested that the highest instance of the agent in (29) would delete the coreferential embedded subject by Super-Equi NP Deletion. Since
Super-Equi is optional. Dowty predicts that by-clauses which take an overt possessive subject as in (32) must be strictly agentive sentences:

(32) John caused a disturbance by his walking out.

Unfortunately, Dowty only looked at intransitive verbs with overt subjects. Transitive verbs seem to require an of preposition when there is an overt subject:

(33) a. “John caused a disturbance by his shooting Mary.

b. John caused a disturbance by shooting Mary.

c. John caused a disturbance by his shooting of Mary.

The occurrence of the preposition of in a Poss-Ing nominal is an indication that the nominal is more "nounlike" according to Vendler (1967). Nominals without of take only adverbs--John's viciously shooting the baby, but *John's vicious shooting the baby. Nominals with of take only adjectives--*John's viciously shooting of the baby, but John's vicious shooting of the baby. Since overt subjects in by-clauses are correlated with the occurrence of of, as (33) shows, I suggest that they are a function of the "nouniness" of the by-clause and not Super-Equi NP Deletion.
Vandler has made a detailed study of the behavior of nominals in causative expressions. It is presently beyond my understanding to deal with the data that he has presented, so I will try to limit my discussion to by-clauses which do not have overt possessive subjects. I assume that there is some process or set of processes which converts sentences into nominals, nominalizations, and, ultimately, nouns. Note that the preposition with, in contrast to by and from, only takes nominals with of:

(34) a. *John caused a disturbance with shooting Mary.
    b. *John caused a disturbance with his shooting Mary.
    c. John caused a disturbance with his shooting of Mary.

Problems with the Sentential Source Analysis

The three principal proponents of the claim that by-clauses originate from the deep structure subject of CAUSE—Lee, Dowty, and Geis—overlook several problem areas. Much of the force of their claim rests on a parallel between by-clauses and subject nominals. However, they did not consider the similarity between from-clauses and by-clauses, nor did they look at negation in main clauses that are associated with by-clauses. Moreover,
there are a large number of cases where by-clauses simply have no parallel with a nominal subject.

From-clauses are problematic because they only cooccur with noncausative verbs, yet their surface structure is quite parallel to by-clauses. For example, there is a like subject constraint on from-clauses:

(35) a. *John died from Harry's giving him too many pills.
   b. John died from taking too many pills.

The Subject Raising approach cannot be used to account for the like subject constraint because there is no underlying sentential subject from which to carry out Raising.

From-clauses also provide counter-evidence to Dowty’s proposal that Super-Equi might account for the existence of overt subjects in by-clauses.

From-clauses exhibit the same pattern as by-clauses:

(35) a. John became ill from eating the mushrooms.
   b. *John became ill from his eating the mushrooms.
   c. John became ill from his eating of the mushrooms.

If Dowty’s observation were correct, then the subject of the main clause in (36.c) would have to be an agent. However, any test for agentiveness
will show that it is not.

Greg Lee has pointed out that only agents can occur as the subject of the complement of persuade, but (36.c) cannot be embedded as the complement of persuade?

(37) a. *Harry persuaded John to become ill from eating tuna fish.

   b. Harry persuaded John to become ill by eating tuna fish.

(37.b) is grammatical because the underlying constituent ALLOW ONESELFF is incorporated in become (see above).

Since from-clauses appear to require the same type of like subject constraint as by-clauses, there is nothing to be gained by appealing to the Subject Raising analysis above. Inchoatives do not take nominal subjects:

(38) a. *John's eating poison died.

   b. John died from eating poison.

Therefore, there is little reason to believe that the surface subject in (38.b) is derived from an underlying sentential complement.

**Causatives with No Nominal Subject**

The sentential subject analysis of by-clauses is also thrown into doubt by virtue of the fact that some verbs take by-clauses but not nominal subjects.
Sentences with these verbs also hold strictly to the requirement that the subject of the by-clause be coreferential to the subject of the verb:

(39) a. John shot Mary by pulling the trigger.
    b. *John's pulling the trigger shot Mary.

(40) a. John obtained the photos by stealing them.
    b. *John's stealing the photos obtained them.

(41) a. Mary murdered the foreman by stabbing him.
    b. *Mary's stabbing the foreman murdered him.

(42) a. John became a millionaire by selling phony stock.
    b. *John's selling phony stock became a millionaire.

In fact, those verbs which Medialkov and Slinitski have called "instrumental causatives" all prohibit nominal subjects but allow by-clauses. In chapter VI, I will show that they prohibit nominal subjects because their lexical structure involves an incorporation of the underlying sentential complement of CAUSE.

(39)-(41) are causatives, and they entail (43)-(45), respectively:

(43) John caused Mary to be wounded by pulling the trigger.
(44) John caused the photos to come into his possession by stealing them.

(45) Mary caused the foreman to die by stabbing him.

Naturally, (43)-(45) have paraphrases with subject nominals:

(46) John's pulling the trigger caused Mary to be wounded.

(47) John's stealing the photos caused them to come into his possession.

(48) Mary's stabbing the foreman caused him to die.

The important fact to notice is that the occurrence of subject nominals is limited to those causative verbs which do not express anything about the means of causation.

Coreferentiality Constraints

The like subject constraint is actually far more complicated than it looks at first. It appears that other NP besides the subject of the main clause must be coreferential with NP in the by-clause (and from-clause). Consider the instrumental NP of the main clause in the following sentences:

(49) a. John hurt Mary with a rake by throwing it at her.

b. Jim wounded the conductor with a knife by stabbing him with it.
The acceptability of (49) contrasts with the unacceptability of (50):

(50) a. *John hurt Mary with a rake by throwing something at her.

b. *Jim wounded the conductor with a knife by stabbing him with something.

Obviously, the Subject Raising approach cannot be invoked in these cases to explain coreferentiality. It is clear that the by-clause is intimately associated with the main clause, and the reasons for this have yet to be explained.

**By-Clauses and Negation**

Negation in the main clause presents yet another difficulty for the sentential subject approach to by-clauses. There are two readings possible when the main clause contains a negated verb. The sentence may be a denial that the by-clause expresses the action that brought about causation, or it may be a denial that causation took place. Thus, (51.a) is ambiguous, and it is synonymous with (51.b) on one of its readings.

(51) a. John didn't bruise Mary by beating her.

b. John's beating Mary didn't bruise her.

On this reading, both sentences presuppose that John beat Mary, but they deny that his beating
caused her to be bruised.

On the other hand, (51.a) could be used as a denial that John's method of bruising Mary was a beating. (51.b) receives this interpretation only when beating is contrastively stressed.

There is no consensus on how assertion and presupposition is to be represented in underlying structure. However, the negative particle not is normally taken to be a sentential operator in generative semantics. By following this approach, the reading of (51.a) where causation is being denied would by (52):

(52)

\[
\begin{array}{c}
\text{S0} \\
\text{V} \\
\text{NOT} \\
\text{S1} \\
\text{V} \\
\text{CAUSE} \\
\text{S2} \\
\text{John beat Mary} \\
\text{S3} \\
\text{Mary BECOME} \\
\text{bruised}
\end{array}
\]

(52) is perfectly consistent with the analysis of by-clauses as underlying subjects.

On the other hand, it is difficult to account for the reading of (51.a) where it is only being denied that John's method of bruising Mary was by beating her. If NOT occurs anywhere in the scope
of CAUSE, then the meaning of the sentence changes:

(53) a. John's not beating Mary bruised her.
    b. ?John's beating Mary caused her not to be bruised.

The structure in (52) simply does not allow a place for negation to remain outside the scope of CAUSE and still apply to the by-clause. Therefore, the sentential subject analysis of by-clauses fails to account for both readings of (51.a).

I think that I have given enough evidence to show that by-clauses are not derived from the underlying subject of CAUSE by means of Extrapolation or any other movement rule. Parallel syntactic properties between subject nominals and by-clauses are not adequate to support such a claim because there exist verbs that take by-clauses but not subject nominals. Moreover, from-clauses have no corresponding subject nominals, but they behave like by-clauses with respect to the like subject constraint. Finally, there is no way to account for the ambiguity of sentences which contain by-clauses that cooccur with negated main clauses. That is, the reading in which the action expressed by the main clause is presupposed
and the action expressed by the by-clause is denied presents a problem for the above analysis. I will conclude this chapter by making two tentative proposals for how this latter problem might be solved in a grammar that derives by-clauses from outside the scope of CAUSE.

**Relative Clause Approach**

The problematic reading of (51.a) has an assertive force that is parallel to the assertive force in clefts and pseudo-clefts:

(54) a. It wasn't by beating her that John bruised Mary.

b. The thing that John did which bruised Mary was not beating her (it was...)

Both (54) and the problematic reading of (51.a) presuppose that John bruised Mary, but they deny that he did it by beating her.

Assuming that clefts and pseudo-clefts come from the same or very similar deep structures, one might offer the following source for (54):
In order to convert a structure like (55) into a surface sentence like (51.a), at least two rules would be necessary—one to delete IS in \( S_1 \) and one to delete the head NP \( \text{it}_1 \), which is the subject of IS. Michael Geis (1970) has proposed a rule of "antecedent deletion" which has the effect of deleting head NP in the underlying structure of pseudo-clefts. Thus, (56.a) and (56.b) are derived from the same underlying structure:

(56) a. The thing that John did was tattle on Mary.

b. What John did was tattle on Mary.

Therefore, at least one of the rules necessary to convert (55) into (51.a) may be independently moti-
vated.

Unfortunately, (55) only accounts for one of the readings of (51.a). In order to get the other reading, one would have to appeal to an underlying structure like (52), where CAUSE is directly embedded in the complement of NOT. (55) does not allow CAUSE to be directly embedded in the complement of NOT, because the negation would have to occur inside a relative clause. Anything inside a relative clause would have to be part of a presupposition:

(57) a. ?It was by beating Mary that John didn't bruise her.

    b. ?The thing that John did which didn't bruise Mary was beat her.

The sentences in (57) are not only a little strange, but they do not capture the correct assertive force of (51.a).

The Abstraction Operator

There is another way to analyze the ambiguity in (51.a) which involves creating a new bisentential operator. This operator is similar to the abstraction operator in logic. Although I am borrowing some terminology from logic, I am not necessarily adopting the abstraction operator as it is conceived by logicians. All I am claiming is
that the grammar of by-clauses might require that there be an underlying two-place predicate \( \exists x \), which means roughly 'is an \( x \) such that'. This predicate has the job of relating some NP (sentential or simple) to all other NP in the tree which have the same referential variable. Thus, (51.a) might be represented as:

\[
\text{(58)}
\]

This approach allows us to represent the other reading of (51.a) merely by switching the scope of NOT and \( \exists \):

\[
\text{(59)}
\]
Although the \( \hat{x} \) predicate might ultimately turn out to be a necessary element in the underlying structure of the sentence, I introduce it here only as a suggestion for the way in which the ambiguity in (51.a) might be handled. The main purpose of this chapter has been to show that by-clauses and nominal subjects of CAUSE do not originate from the same deep structure source. Having done this, I can discuss the sentential subject of CAUSE as a source for lexical material without having to worry about the derivation of by-clauses. Moreover, I can show why subject nominals do not cooccur with instrumental causatives, whereas by-clauses do.

**Footnotes to Chapter III**

1. I am using events here to refer to situations which occur in time, as opposed to propositions that are timeless. Thus, a sentence like (i) probably has something like (ii) underlying it:
   
   (i) The fact that Mary lives next door disturbs me.
   
   (ii) My realization of the fact that Mary lives next door causes me to be disturbed.

2. I do not wish to go into Vendler's distinction between facts and events, since it would take too much time. However, Vendler's observations about the way in which language distinguishes between nominalizations, nominals, and sentences is well worth closer scrutiny. Vendler seems to attach some kind of semantic significance to the "squish" between sentences and nouns (cf. Ross, 1972).
3. Jonnie Gels proposed a rule called "Agent Creation", which has the same effect as the above analysis. Her new transformation is not only unnatural, but its name suggests that nominals cannot be the subjects of by-clauses (cf. (16)).

4. (15.a) seems to me to be a counterexample to the hypothesis that by-clauses have Subject Raising in their derivations. Dowty tries to explain the occurrence of overt subjects in by-clauses as a function of the optionality of Super-Equi NP Deletion. I will show below that overt subjects in by-clauses must be attributed to something else.

5. Many of these sentences are only marginal for some speakers. For example, (24.b)--John caused Marsha to be unhappy by being tall--is acceptable to some speakers when it describes a situation where Marsha was hoping for a short man (e.g. as a blind date). I think that speakers who accept thesesentences are simply using by as a substitute for because.

6. Ross (1972) discusses the "squish" between nouns, verbs, and adjectives in terms of the transformations that are associated with them. He suggests that transformations become less active as a constituent becomes more nounlike.

7. In the next chapter, I discuss some tests for agentiveness.

8. I believe that this approach supports some of the claims made by the philosopher Donald Davidson. He has suggested that events should be treated as individuals which can have more than one description.
CHAPTER IV - AGENTS

In the last chapter, I suggested that by-clauses do not originate as the deep subject of CAUSE, but that they identify the event which serves as the subject of CAUSE. In this chapter and the next one, I will be examining the deep structure source of two other constituents which are associated with CAUSE—the agentive NP and the instrumental NP. This chapter is devoted to showing that agentive NP are associated with an underlying verb that accounts for intentional/nonintentional ambiguities associated with causative verbs, and that this approach is superior to one which merely labels NP for case roles. That is, I will try to show that the approach taken by generative semanticists is superior to that taken by case grammarians. Finally, I will discuss the way in which generative semanticists must handle Fillmore's observation that only one agentive NP may be associated with a verb.

The Definition of Agent and Instrument

There has always been confusion about the
meanings of the terms 'agent' and 'instrument' in case grammar. Both terms refer to NP which name "causers" of an action, but they necessarily represent different types of causers. The agent is usually characterized as an animate causer, and the instrument is an inanimate causer. Moreover, the agent is usually associated with volition.

Fillmore (1968, p. 24) gives the following definitions for agentive and instrumental NP:

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

Fillmore further qualifies his definition of the agentive NP with the following statement:

The escape qualification 'typically' expresses my awareness that contexts which I will say require agents are sometimes occupied by 'inanimate' nouns like robot or 'human institution' nouns like nation. Since I know of no way of dealing with these matters at the moment, I shall just assume for all agents that they are 'animate'.

Fillmore's statement foreshadows some of the confusion that has since arisen over the notion of agentiveness. It is not clear whether vegetable life, animal life, forces of nature, human institutions, or machines should be classified as pos-
sible agents in case grammar. This problem can be cleared up only after the grammatical status of agentive and instrumental NP is established.

Case grammar arose as a reaction to the Aspects (Chomsky, 1965) view of the lexicon, in which verbs were subclassified according to the surface NP that occurred in their environments. Thus, the verb break in the following sentences would have three different lexical entries in the Aspects lexicon:

(1) John broke the window with a rock.
(2) The rock broke the window.
(3) The window broke.

The Aspects approach is counterintuitive because all speakers of English recognize that the verbs in (1)-(3) are the same lexical item. When a with prepositional phrase cooccurs with break, the subject must be animate. If no such prepositional phrase occurs, then the subject must be inanimate. Moreover, when no direct object occurs, the subject must have the property of "brittleness"—exactly the same property of the direct object in (1) and (2).

Fillmore tried to show that verbs like break have a single lexical entry in the lexicon by
subclassifying verbs at a "deeper" level than the subject or direct object. He tried to devise a system whereby grammatical relations such as the subject and direct object could be derived from underlying categories called "cases". Case roles are supposed to be invariant from language to language, and each language would have its own method for marking underlying case roles in the surface structure. In English, prepositions are used to represent underlying cases—e.g. the preposition with typically represents the instrumental case.

Subjects and direct objects are derived in case grammar by means of transformations which delete the associated case markers and move the IP into the correct surface position. Subject selection is based on a universal hierarchy among the case roles, which may be overridden by transformations such as Passive and Psych Movement. The hierarchy can be represented in linear order, with the leftmost case being the most favored for subject position—agent, instrument, experiencer, object, goal, source, etc. The agent always becomes the surface subject, unless it is absent or downgraded by some transformation like
Passive. Instruments may assume subject position only if the agent is absent from deep structure. Otherwise, they are marked by the preposition with. As for the selection of the direct object, I have never seen any work which has given it a great deal of attention. However, the direct object is selected by some means that also depends on the case hierarchy.²

The above hierarchy "explains" why sentence (2) has an inanimate subject and does not take an instrumental case. Since there is no agent in its deep structure, the instrument automatically becomes the surface subject. In the absence of both agent and instrument in underlying structure, the next case role present in the hierarchy becomes the subject—i.e., the "object" window in (3).

The above sketch of case grammar should clarify some of the goals which Fillmore had in mind. He wanted to make the deep structure more abstract than in *Aspects*, which treated subjects and direct objects as deep structure categories. However, he did not want to abandon the concept of a lexicon in which lexical items are subclassified according to NP and other elements in their environments. Therefore, the case grammar lexicon subclassifies verbs according to case roles rather than subjects.
and direct objects. 3

The verb break would have the following "case frame" feature: [+ ___ (agent)(instrument)object], where elements enclosed in parentheses are optional in the environment of the lexical item. In chapter VI, I will show that this type of cross-classification feature is still not abstract enough. That is, I will present evidence that even some of the case roles must be derived in Fillmore's system.

Tests for Agentiveness

Problems in defining agents and instruments have persisted up to the present (cf. Fillmore, 1971). One of the reasons for this is that the two case roles are often confused with each other. Animate beings can serve as instruments sometimes. Thus, the subjects of (4) could be either agents or instruments in underlying structure:

(4) a. John broke the window.
   b. John struck Mary.
   c. John frightened the baby.

The instrumental reading of (4.a) would be paraphrased by something like "John's body broke..." That is, (4.a) might describe a situation in which John's body came crashing through the window, not necessarily as a result of his own will-
power. (4,c) could have a reading in which John is frightening the baby by doing something (agentive) or in which John's appearance is frightening the baby (instrumental). Moreover, it has never been made clear whether John should be considered an agent in sentences like (4) when his action is unintentional or accidental.

Because of the confusion between agent and instrument, some researchers have devised tests for agentiveness. See (1971, p. L-8) provides a battery of tests for determining whether or not something can be an agent. In the last chapter, I used the complement of persuade as a test to show that become can take an agentive subject under certain circumstances. Thus, the complement of persuade is a "pro-agentive" context. Lee gives six examples of pro-agentive contexts, and I repeat them here (my numbering):

(5) The sentence is the object complement of command, or the infinitival object complement of persuade.
   a. John commanded Mary to leave.
   b. *John commanded Mary to have red hair.

(6) The sentence is the object complement of having.
   a. John was having everyone leave.
   b. *John was having everyone be tall.

(7) An instrument phrase is added to the sentence.
   a. John opened the door with some instru-
ment.
b. *John was tall with some instrument.

(8) Cleverly, 

Cleverly, avidly, enthusiastically, or

on purpose is added to the sentence.

a. John opened the door cleverly.
b. *John was tall cleverly.

(9) In order to...is added to the sentence.

a. John opened the door in order to

amaze his grandfather.
b. *John was tall in order to amaze his

grandfather.

(10) A nominalization of the sentence occurs

with by in a higher sentence which is in

a pro-agentive context.

a. John cleverly frightened the baby by

opening the door.
b. *John cleverly frightened the baby by

being tall.

These are also tests for non-stative verbs because

causatives are non-statives.

Lee also gives a number of tests that reject

agents ("non-agentive contexts"): 

(11) The sentence is the complement of

such intransitive verbs as strike as,

prove to, turn out to (except in the

sense of 'turn out in order to'),

grow to. In these cases the subject

of the complement becomes the main

subject by subject-raising, while

the verb phrase comes after the main

verb.

a. John strikes me as being tall.
b. *John strikes me as assassinating

the premier.

(12) The sentence is the object complement

of prove or believe.

a. They proved John to have red hair.
b. *They proved John to assassinate the

premier.
(13) The sentence is in the aorist present, and no special interpretation as a title, headline, or primer English is required.
   a. John has red hair.
   b. John eats the fish. (not aorist, but rather habitual or repeated action.)

(14) If the sentence is active, its subject is inanimate.

(15) The sentence is in the perfect (have+en) or the progressive (be+ing).

Notice that the criteria given in (13) and (15) make it impossible for any verb to be subclassified as taking an obligatory agent, since any verb may occur in these contexts. In fact, (13) and (15) contradict the pro-agentive context expressed in (7). That is, verbs that occur in the aorist present, perfective, or progressive may also co-occur with an instrumental AP:

(16) a. John eats fish with a fork.
   b. John has eaten fish with a fork.
   c. John is eating fish with a fork.

We shall discuss the reason for this inconsistency below.

Lee also noticed that some sentences may occur in both agentive and nonagentive contexts:

(17) a. John frightened the baby.
   b. Harry proved something.
   c. The Russian spy broke the window.

I shall call the agentive sense of these sentences
"volitional" and the nonagentive sense "nonvolitional".

It seems to me that tests like the above sometimes add to the confusion about agents and instruments. Not only are some of the tests contradictory, but they obscure the relevant properties of agentiveness. Agents can be clever, but cleverness is not a necessary property of agents. Therefore, while it is true that the adverb cleverly always cooccurs with an agent (cf. criterion (8)), it is also possible that some agents will not be able to cooccur with cleverly.

An example of the way in which tests like (5)-(10) can lead to confusion is exemplified by the following passage from Dowty (1972):

A frog cannot generally be ordered or persuaded to produce croaks, and it cannot be said to produce croaks deliberately, carefully, studiously, etc. Some people might claim that the act of croaking is in some sense intentional, but I have no strong intuitions about this. Animals, especially brighter pets, do seem to represent some intermediate stage between agents and non-agents insofar as they can sometimes be ordered and persuaded to do things. I am not sure whether to regard this as a serious problem for the concept of agent or not.

Thus, some of Lee's tests not only select agents, but human agents as well. Dowty takes the tests
too literally.

There is quite a difference between the types of actions that humans and animals can do deliberately (depending on one's view of animals), but there is no problem in constructing sentences with frog-subjects and instrumental NP:

(18) a. The frog frightened Mary with a loud croak.

b. Frogs croak with their mouths.

c. The frog caught a fly with its tongue.

Test (7)--cooccurrence with instrumental NP--seems to give the broadest possible context for agents.

Chains of Causation

Agents and instruments are best regarded as participants in a chain of causation. The best characterization of agents and instruments which I have seen is to be found in "Some Problems for Case Grammar" (Fillmore, 1971, p. 43):

The model allows only two cases for noun-phrases that can appear in subject position in simple caused-event sentences, requiring both a special account of the analysis of sentences that say something about things caused by natural forces and a special explanation of situations in which there is a chain of causation. To take the second issue first: there are many events in the world which involve chains of causation. If my claim about the case structure of sentences is right,
it should follow that where there is a causation chain, with one thing leading to another, the grammar of simple sentences allows mention of only the principal cause and the immediate cause, and does not allow mention of any of the intervening elements. I believe this is so, and I'll use an example offered by Donald Davidson to illustrate it. Suppose a man swings a baseball bat and the bat hits a baseball, suppose the baseball moves through the air and impinges on a window, and suppose that as a result the window breaks. The grammar of simple sentences in English allows us to say The man broke the window or The baseball broke the window, but not, as a description of the situation I just described, The bat broke the window. The nouns that can appear as the subject of the transitive verb break name either the principal cause, the agent, or the immediate cause, the instrument, but not any intervening cause. Furthermore, if we wish to express the role of both agent and instrument in the sentence, we can say The man broke the window with the baseball but not, as a description of this situation, The man broke the window with the baseball bat.

This discussion of agents and instruments does not make any reference to animacy and inanimacy, but to "principal" and "immediate" cause. That is, agents and instruments constrain the way in which simple clauses can express chains of causation. One might go on to say that the "principal" cause can be attributed only to events that involve volition and the "immediate" cause only to events that involve physical interaction. This is somewhat different from saying that the principal causer
must be animate and the immediate causer inanimate. The important issue is not the type of participant that is doing the causing, but the type of activity that the participant is engaged in.

Fillmore made a very interesting point about physical causation—that it must involve an "immediate" cause. In chapter VI, I will discuss verbs which lexicalize chains of causation, and it will be seen that more than one type of instrument is possible. The principle of "immediate cause" plays an important role in deciding how surface constituents are assigned prepositions (case markings) when more than one NP is a possible instrument.

Rodney Huddleston (1970) has discussed a class of causers which appear to be an exception to the agent/instrument dichotomy. He pointed out that forces of nature can quite often be independent of any agent. According to Huddleston, sentences like (19.c) should be considered fundamentally different from those like (19.b):

(19) a. John opened the door with a key.
    b. The key opened the door.
    c. The wind opened the door.

To make matters worse, forces of nature can occur
with instrumental NP:

(20) a. The wind opened the door with a strong gust.
    b. The storm destroyed the roof with hail.
    c. The sun melted the wax with its heat.

Huddleston proposed that such subjects be assigned the case "force".

However, the subjects of (19.c) and (20) are instruments in Fillmore's sense of the term. This is so because they cannot take instrumental NP freely:

(21) a. *The wind opened the door with a rock.
    b. *The storm destroyed the town with a river.
    c. *The sun melted the wax with a magnifying glass.

Moreover, agent-instrument chains can be paraphrased with the verb cause, but force-instrument chains cannot:

(22) a. John caused the door to open with a key.
    b. Bill caused the door to open with a key.

(23) a. *The wind caused a strong gust to open the door.
    b. *The storm caused its hail to destroy the roof.
    c. *The sun caused its rays to melt the wax.
In fact, force-instrument chains are not really chains of causation. The instruments in such sentences are always part of the subject. That is, they are "inalienably possessed" by the subject. Huddleston's arguments fail to take into account the fact that agent-instrument expressions are constraints on the way in which a chain of causation may be expressed in the surface structure.

**DO as the Predicate of the Agent**

Generative semanticists do not label NP for case roles, but they capture case relationships in terms of underlying predicates. The current practice is to associate surface agentive NP with an underlying predicate 'DO'. The reason for choosing this particular symbol to represent the agentive predicate goes back to a paper called "Act" (Ross, 1972b), in which Ross claimed that all activity sentences are embedded as the object of the predicate DO. Thus, (24) would have an underlying structure like (25):

(24) Frogs produce croaks.
The "activity DO" is sometimes lexicalized as do, but it is not to be equated with auxiliary do. Thus, activity do may cooccur with auxiliary do:

(26) a. John did do it.
    b. John didn't do it
    c. Did John do it?

According to Ross, the activity do is normally eliminated by a rule called "Do-Gobbling", which is probably the same rule as Predicate Raising. The surface realization of DO only comes about as a result of the application of a reduction rule which leaves the underlying DO stranded.

Ross presents a large number of examples to support his claim, and I will provide only representative samples for some of them. All of the examples show that do occurs in contexts that are compatible only with nonstative activity verbs.

The pro-form do so does not replace statives:

(27) a. John drank beer, and Harry did {it} too.
b. *John knew the answer, and Larry did it too.

Statives do not strand do in appositive relative clauses:

(28) a. That Bill stole the money, which he shouldn't have done, amazed me.

b. *That Bill had the money, which he shouldn't have done, amazed me.

Statives do not allow do in pseudocleft formations:

(29) a. What Mary did was cry her eyes out.

b. *What Mary did was seem upset.

Statives do not strand do with Topicalization:

(30) a. Waxing floors I've always wanted to do.

b. *Knowing karate I've always wanted to do.

Statives do not strand do with Tough Movement:

(31) a. Solving English crosswords is difficult to do.

b. *Having lots of money is difficult to do.

Statives do not occur in passive expressions like (32):

(32) a. Wearing miniskirts isn't done anymore.

b. *Seeing knowledgeable isn't done anymore.

Ross suggested that DO might be considered the underlying predicate of agency. However, he
admitted that this is unlikely because do occurs with nonanimate subjects:

(33) a. What do statives do, anyway?
   
b. This report does a study on birth control.
   
c. What the tornado did was rip up half the town.
   
d. Watergate exposed Nixon too late, which I was afraid it might do.

Worst of all, do replaces inchoatives:

(34) a. John died, but he wouldn't have done so if the ambulance had arrived earlier.
   
b. The plank broke, which I didn't want it to do.
   
c. For us to win, all the pointer has to do is stop on a red square.

Therefore, no justification exists for claiming that activity do is, in fact, an exclusive surface realization of the agentive predicate.

The Scope of the Agent

Dowty did not abandon the practice of using an underlying DO to signify agentiveness, even though he was aware that activity do is not always associated with an agent. He merely suggested that activity do be treated as a polysemous lexical item which could represent an underlying COME ABOUT as well as DO.

The strongest reason for believing that the
agentive NP corresponds to an underlying verb is to be found not in the morphology, but in the fact that volition can range over an entire sentence or be confined to the means of causation. That is, agentiveness seems to be associated with scope. Recall from the last chapter that a sentence like (35a) is ambiguous with respect to whether John caused the accident on purpose or not:

(35)  a. John caused the accident by crossing against the light.
      b. John accidentally caused the accident by crossing against the light.
      c. John intentionally caused the accident by crossing against the light.

(35a) may be used either in the sense of (35b) or (35c). Dowty attributed this ambiguity to the position of underlying DO in the phrase marker. If DO merely dominates the underlying subject of CAUSE, then we get the non-volitional sense of (35a). If it dominates the entire causative construction, then we get the volitional sense.

Using DO as the agentive predicate, there are three types of possible trees for causal chains according to Dowty (1972, p. 135):
The case grammar approach to agentive NP--treated as labelled NP in deep structure--does not allow a principled way to distinguish between the volitional and non-volitional senses, but Dowty's approach does.

Looking back at Lee's criteria for agentive contexts, we see that some contexts only allow
volitional agents, whereas others may allow both volitional and nonvolitional contexts. For example, the complement sentences of persuade and command (criterion (5)) only allow volitional agents:

(39) a. *John persuaded Mary to accidentally water the plants.

b. *John commanded Mary to unintentionally frighten the baby.

On the other hand, criterion (7)—cooccurrence with an instrumental NP—allows both volitional and nonvolitional agents:

(40) a. John\{accidentally\}struck his neighbor\{intentionally\}
    with a rake.

b. John\{unintentionally\}shot his brother\{purposely\}
    with a pistol.

Thus, (7) is a better criterion for determining agentiveness.

Notice that the lexicon needs to mark verbs like persuade and command for the information that only volitional agents can occur in their complements. It is, of course, possible to invent a feature \[\text{volitional agent}\], but Dowty's approach seems to provide a more natural method for marking the required information. We could simply mark persuade and command as verbs that directly embed
the predicate DO. That is, the selectional restriction on these verbs would be in the form of a verb-verb constraint.

Agents and Derivational Constraints

Agents cannot merely be represented in the grammar as NP which are associated with an underlying DO in deep structure. Recall that Fillmore has described agents and instruments in terms of a constraint on the way in which causal chains are realized in surface structure (cf. p. 92 above). There are really two roles which agentive NP express—the volitional causer (at some level of structure, not necessarily of the entire sentence) and the principal causer. As volitional causer, the agent acts as if it were associated with an underlying predicate. It participates in scope ambiguities and selectional constraints. As principal causer, the agent acts as if it were associated with a global constraint on the derivation.

Only one agentive NP may occur with a verb in English. It is no simple task to translate this constraint from case grammar to generative semantics. One cannot simply say that the grammar contains a statement such as (41):
(41) Only one underlying DO per surface clause.

Dowty has shown that there can be more than one underlying DO per surface clause (cf. 38).

Moreover, one cannot patch up (41) by stating that the subjects of DO must all be coreferential in deep structure. Non-coreferential agents may be conjoined in surface clauses:

(42) John and Mary chopped the tree down with their hatchets.

Suppressed Agents

There are also a number of verbs whose lexical entries must attribute DO to more than one participant. That is, some verbs require that more than one participant in a situation is willfully causing something to happen.

There are at least two classes of verbs that express what I will call "suppressed agents". These are verbs which express voluntary transfer—bore, lend, buy, sell, exchange, etc.—and verbs which are causatives of agentive verbs—walk, feed, water (said of animals), etc.

Verbs of voluntary transfer often come in pairs which express the converse of each other:

(43) a. John bought a book from Mary.
    b. Mary sold a book to John.
(44) a. John lent a book to Mary.
   b. Mary borrowed a book from John.\(^5\)

These pairs have exactly the same truth values, and they can be used to describe the same state of affairs. Notice the redundancy of (45):

(45) a. ?John bought a book from the person who sold it to him.
   b. ?John borrowed a book from the person who lent it to him.

The fact that either John or Mary can be agents in (43)-(44) accounts for the possibility of having conversely related verbs to describe the same situation. In fact, a number of people have suggested that these converses should derive from exactly the same semantic structure (e.g. Gruber, 1965; Kal'chuk and Zhokovskii, 1969).

Notice that verbs which describe the transfer of goods only allow converses when both participants are engaged in a voluntary action:

   b. Mary stole a book to John.

There is no converse for steal, since theft does not require the voluntary participation of the victim.

Causatives of agentive verbs also attribute voluntary action to non-agents. Verbs like eat,
drink, and walk are agentive actions in that it is impossible to attribute nonintentional adverbs to them:

(47) a. *John accidentally walked across the room.

b. *Mary accidentally drank something.

c. *The men accidentally ate the cake up.

However, the causative counterparts to these verbs do not allow the same NP to be expressed as agents:

(48) a. Mary walked the dog reluctantly.

b. Mary watered the horse reluctantly.

c. Mary fed the guests reluctantly.

In (48), the agentive adverb reluctantly can only modify Mary's action, even though the other NP participants are engaged in volitional actions.

In generative semantics, verbs like eat, drink, and walk would take the predicate DO in their lexical representations in order to represent volitional agentive activity. The causatives of these verbs do not cease to denote volitional action, even though the doer of the action is a direct object in surface structure. Therefore, some principle that does not limit the number of DOs in deep structure is needed.

I propose, therefore, that there is no limit
on the number of DO predicates in the deep structure of a surface clause. The agentive NP actually represents the "highest" DO in the underlying structure. Thus, the DO predicate is not a sufficient condition for agentiveness, but it is a necessary condition.

Before leaving the topic of agentiveness, I would like to raise one final question about the nature of DO. The DO predicate itself is supposed to signify volitional causation. This suggests that it is somehow related to the CAUSE predicate. One might speculate that DO is not semantically prime, but a complex predicate which involves the semantic prime CAUSE. I have in mind paraphrasing 'John DO S' with something like '(John WILL S) CAUSE (S COME ABOUT)'. However, the answer to this problem requires an answer as to the exact nature of semantic primes (cf. chapter II).

Footnotes to Chapter IV

1. Although I am mainly concerned with the instrumental and agentive case roles, here is a brief description of the other cases: The experiencer case refers to the entity which is experiencing a mental state. The object case refers to the entity which is undergoing a change of state. The goal case refers to the physical destination or result of a change of state. The source case refers to the origin of movement or the initial state. For more information on these case roles, see Fillmore, 1971.
2. Consider sentences like (1) and (11):
   (1) John beat the carpet.
   (11) John beat dust from the carpet.
(11) shows clearly that the direct object of the verb beat is derived in some way that has yet to be explained. I will discuss a problem like this with respect to the verb shoot in Chapter VI.

3. Lakoff (cf. Lakoff, 1971) presented another alternative to Aspects which utilized abstract verbs in underlying structure. "Abstract syntax" developed several of the techniques which are now used by generative semanticists in their research—most notably the technique of representing semantic scope by means of higher verbs. This is basically the approach that I advocate in this dissertation.

4. Fillmore (1968) gives a detailed discussion of the way in which case grammar might represent inalienable possession in deep structure.

5. I am excluding here the facetious sense of borrow, in which it is taken to mean 'steal'.

Notice that lend can be used in the same way:
(111) The vice squad "lent" Jim some dope so that they could arrest him.
(iv) John "lent" the extortionist his money, since he had no choice.
CHAPTER V - INSTRUMENTS

In this chapter, I will examine the treatment of instrumental NP in some previous work—particularly that of George Lakoff's "Instrumental Adverbs and the Concept of Deep Structure" (Lakoff, 1968). Generative semanticists have made little attempt to integrate the treatment of agentive and instrumental NP, and Lakoff fails to show how the two types of NP are related.

What is the Instrument?

In case grammar, the instrumental case signifies the role of the immediate, physical causer. Whenever there is an agent in the clause, the instrument is realized as a with-phrase. If no agent is present, then it must become the subject:

(1) a. The soldiers destroyed the town with mortars.
   
   b. The mortars destroyed the town.

(1,a) describes a complex chain of causation in that the agent (soldiers) is causing the instrument (mortars) to cause the destruction. (1,b) expresses a less complex situation in that only the instrument is causing anything to happen.

The two sentences in (1) may be passivized:
(2) a. The town was destroyed with mortars by soldiers.
   
b. The town was destroyed by mortars.

Notice that the transformation Agent Deletion gives rise to sentences like (3):

(3) a. The town was destroyed with mortars.
   
b. The town was destroyed.

(3.a) contrasts with (2.b) in that the presence of an instrumental with-phrase always implies the presence of an agent in deep structure. (3.b) shows that the name "Agent Deletion" is misleading. The deleted element in (3.b) may be either an agent or an instrument. That is, (3.b) might have an underlying structure similar to that of (2.b).

The with of instrumental phrases always implies some conscious manipulation by an agent. Even in the sense where an agent causes something to happen accidentally or unintentionally, the presence of with implies manipulation:

(4) a. John accidentally struck Bill with a rake.
   
b. John unintentionally shot Mary with a rifle.

(4.a) could not describe a situation where John bumped into a rake and it struck Mary as a result. Similarly, (4.b) could not describe a situation where John threw his gun on the ground and it
accidentally went off.

The condition that the presence of with implies manipulation is important because it clarifies the nature of the way in which causal chains are expressed in clauses. A sentence like (5) does not mean the same thing as (4.a):

(5) John caused a rake to strike Jill.

(4.a) can only arise when John is handling the rake in some way. (5) can be used in much wider contexts.

In order to insure that the above condition on instrumental with-phrases is met, I suggest that the following statement needs to be captured by the grammar of English:

(6) Instrumental with-phrases originate from the object complement of DO in deep structure.

Thus, both the agent and the instrument originate in the deep sentential subject of the predicate CAUSE. Of course, (6) does not apply to instrumental NP which become the surface subject, because they are not associated with agents.

Other With-Phrases

Not all with-phrases are instrumental NPs.

For example, there are manner and comitative with-phrases. Manner with-phrases often have a para-
phrase with a _ly_ adverb:

(7) a. John chopped the wood with vigor.
    b. John chopped the wood vigorously.

Some verbs incorporate the manner of causation in their meanings:

(8) a. Bill murdered the captain.
    b. Bill killed the captain with malicious intent.

Unlike verbs like _shoot, hang, strangle_, etc., _murder_ does not specify how the death comes about, but it does specify something about the circumstances under which the death comes about.

Comitative _with_-phrases seem to be related to conjunction (cf. Lakoff and Peters, 1969):

(9) a. John and Mary fought.
    b. John fought with Mary.
(10) a. John chopped wood with Mary.
    b. John and Mary chopped wood.

There seems to be a strong morphological similarity across many languages between instrumental, comitative, and manner phrases (cf. Milsen, 1973, p. 71). No researcher has been able to explain this similarity in terms of semantic structure. The sentential subject approach to _CAUSE_ seems to be the most promising lead to explaining this phenomenon, since it provides a common source for
manner, instrumental, and comitative phrases. However, I will confine this chapter merely to a discussion of the instrumental NP.

Another type of with-phrase which I will avoid discussing is the with of inalienable possession:

(11) a. The car broke the window with its fender.
   b. The car's fender broke the window.
(12) a. Jim broke the window with an axe.
   b. Jim's axe broke the window.

(11.a) is clearly a paraphrase of (11.b), but (12.a) is not a paraphrase of (12.b). The with-phrase in (11.a) is not an instrumental NP and it does not participate in a chain of causation. Notice that the situation described by (11.a) cannot be paraphrased with the verb cause, but the situation described by (12.a) can:

(13) a. *The car caused its fender to cause the window to break.
   b. Jim caused the axe to cause the window to break.

Lakoff's Instrumental Adverb

In "Instrumental Adverbs and the Concept of Deep Structure" (Lakoff, 1968), George Lakoff set out to show that two surface morphemes which differ in grammatical category—i.e. with and use—
could have the same source in deep structure. That is, Lakoff tried to show that the grammatical categories of verb and preposition are not distinct at the level of deep structure. His work seems to be the only attempt in the literature of generative semantics to develop a source for instrumental use.

According to Lakoff, the following sentences derive from a common deep structure:

(14) a. Seymour sliced the salami with a knife.

b. Seymour used a knife to slice the salami.

Lakoff based his claim largely on the fact that with and use have parallel cooccurrence properties. However, he did not actually give explicit transformational rules to relate (14a) and (14b).

Lakoff noticed from the beginning that sentences like those in (15) do not always have an identical reading with those in (16):

(15) a. John cut his finger with a knife.

b. John broke the window with a bat.

(16) a. John used the knife to cut his finger.

b. John used a bat to break the window.

Lakoff therefore isolated the "accidental" sense from the "purposive" sense of with. He limited his
discussion to the purposive sense, since use cannot be used in an accidental sense:

(17) *John accidentally used the bat to break the window.

Lakoff was not working with a CAUSE predicate that takes sentential subjects, so he had no way to represent purposive and non-purposive (volitional and nonvolitional) actions. However, Dowty has shown us how this dichotomy can be represented with the scope of DO. A verb like cause may or may not have the predicate DO as the highest predicate in its lexical node. However, use must always have DO as its highest predicate (i.e. DO is optional for cause and obligatory for use). Therefore, use will not always have a paraphrase with other causatives. Dowty's analysis allows us to solve at least this dilemma for Lakoff's proposal.

In general terms, Lakoff argues that (18.a) and (18.b) derive from the same deep structure:

(18) a. NP₁ - V - NP₂ - with - NP₃
    b. NP₁ - use - NP₃ - to - V - NP₂

He gives eleven arguments ((19)-(29) below) to show that (18.a) and (18.b) are related:

(19) In (18), V must be an activity verb.
    a. Albert used a slide rule to compute \{ *know \}

    the answer.
b. Albert computed the answer with a slide rule.

(20) In (18), NP₁ must be animate.
   a. The explosion killed Harry with dynamite.
   b. John used dynamite to kill Harry.

(21) NP₂ cannot be coreferential with NP₂.
   a. *I scratched the wire with itself.
   b. *I used the wire to scratch itself.

(22) NP₁ cannot be coreferential with NP₂.
   a. James Bond broke the window with the Russian spy himself.
   b. James Bond used the Russian spy himself to break the window.

(23) NP₁ can be coreferential to NP₂ in both constructions if an as-phrase occurs.
   a. Paul analyzed the English passive with himself as an informant.
   b. Paul used himself as an informant to analyze the English passive.

(24) Both constructions have the same ambiguities in questions—they question the entire proposition or merely the instrument.

Did Seymour slice the salami with a knife? (use a knife to slice the salami)

(25) Both constructions have the same ambiguities with negation.

Seymour didn't slice the salami with a knife. (use a knife to slice the salami)

(26) Neither the complement of use nor the object of with can be negated. That is, one cannot use an instrument in an action that does not occur.
   a. *I used the knife not to slice the salami.
b. *I sliced the salami [not with] a knife.
    {with not}

(27) The with-phrase is outside the VP as shown by the behavior of 'do-so'.
This shows that the V + NP is a single constituent apart from the instrumental NP, just as the use paraphrase predicts.
Max slices salami with a knife and
Denny does so with a cleaver.

(28) There are no instrumentals of instrumentals.
a. *Melvin broke the window with a chisel with a hammer.
b. *Melvin used a hammer to use a chisel to break the window.

(29) Parallel structure with do-so.
a. I slice salami on the front porch more often than Sally {slices salami} {does so}
in the living room.
b. I slice salami on the front porch more often than Sally {slices salami} {*does so}
    with a knife.
Lack of parallelism among adverbs blocks do-so from occurring in (29.b), but use and with are treated as parallel constructions with respect to this rule:
c. John uses a knife to slice salami more often than I {slice salami} with
    {do so a cleaver.
d. John slices salami with a knife more often than I use a cleaver to
    {slice salami.} {do so.}

Objections to the Use/With Hypothesis

Chomsky (1971) and Eresman (1968) have brought numerous counterexamples against the claim that use and with have identical selectional properties.
For example, Eresman points out that (14.a) is
present as an embedded structure in (14.b), as shown by (30):

(30) Seymour used a knife to slice the salami with.

That is, (30) comes from an underlying structure like (31):

(31) *Seymour used a knife to slice the salami with a knife.

The repeated NP is obligatorily deleted, and the with preposition is optionally deleted.

Chomsky also pointed out that there are expressions with use that support the above analysis:

(32) a. John used the table to lean the chair against.
    b. John used the table to write on.
    c. John used the car to escape in.

Moreover, adverbs behave differently with use constructions than with with constructions:

(33) a. John carelessly broke the window with a hammer.
    b. John broke the window carelessly with a hammer.
    c. John carelessly used a hammer to break the window.
    d. John used a hammer carelessly to break the window.

It is not at all clear how Lakoff could account for the non-synonymy in (33).
I believe that there are even better grounds for rejecting Lakoff's hypothesis—the assertions made by (14.a) and (14.b) are different. (14.a) asserts that the salami got sliced, but (14.b) only asserts that Seymour intended to slice the salami but may have failed in his attempt to do so. This difference is brought out more clearly in the following examples:

(34) a. John failed to start the car because he used the wrong key (to start it).

   b. *John failed to start the car because he started it with the wrong key.

(35) a. John used the wrong example to get his point across.

   b. *John got his point across with the wrong example.

The biggest failing in Lakoff's approach is that he does not account for the relationship between (36.a) and (36.b):

(36) a. John broke the window.

   b. John broke the window with a bat.

In other work (e.g. Lakoff, 1971), Lakoff analyzes sentences like (36.a) as a simple causative, however, (36.b) would have a radically different underlying structure with the predicate USE.

Another problem area for Lakoff is the relationship between (36.b) and (37):
(37) The bat broke the window.
(36,b) entails (37), but it is not clear how this entailment relationship would be captured in the Use/With hypothesis. The sentences in (36)-(37) show that instrumental NP are strongly associated with the predicate CAUSE. Therefore, the verb use and the preposition with should be related to CAUSE in deep structure. In the next chapter, I will propose an approach to instrumental NP which does this.

I do not wish to deny that Lakoff's approach to instrumental NP has merit. I think that he has shown a strong relationship between the preposition with and the verb use. But his arguments do not show that (14,a) and (14,b) are derived from the same deep structure. At best, he shows that the semantic representation for with and that for use must be very similar. To a generative semanticist, this means that both words might be decomposed into the same semantic primes. It seems that the agentive predicate DO is necessary to both words. It is impossible to use something accidentally, and, as I pointed out at the beginning of the chapter (cf. (6)), the instrument has to be under the control of the agent in order for it to be expressed as a with-phrase.
CHAPTER VI - INSTRUMENTAL VERBS

This chapter will examine verbs which incorporate the means as well as the result of causation. It will be seen that a number of "inchoative" and "activity" verbs must be analyzed as representing a causal chain. There are also orthodox "causative" verbs which specify the means of causation. (An orthodox causative is one that always requires the presence of an agent or instrument in surface structure—e.g. kill, teach, persuade). It will be necessary to discuss the conditions under which lexical nodes are formed in order to determine if the rule called 'Predicate Raising' is adequate enough to explain means-incorporating verbs.

We have seen that the deep subject of CAUSE as well as the object is a sentential argument. Moreover, the subject of CAUSE may itself represent a causal chain. In chapter III, I concluded that by-clauses do not originate in the subject position of CAUSE. If by-clauses were to be derived from that source, then it would be very difficult to provide a source for means-incorporating verbs.
That is, I wish to maintain that material for the lexical node of an instrumental verb is Predicate Raised out of the deep subject of CAUSE, and that we cannot suggest exactly the same source for by-clauses.

Agents and instruments are NP which derive from the deep subject of CAUSE. Agents are the subject of the highest DO predicate, which stands for volitional causation. Whereas the agent represents the principal, volitional causer, the instrument represents the immediate, physical causer. In the last chapter, I showed that the instrument should not be analyzed as the object of the predicate USE, because instruments represent all types of physical causers. Some types of physical causers do not presuppose the presence of an agent, but lexical items like use and with do. In this chapter, I will discuss the deep structure source of instrumental NP.

**Instrument Types**

Instrumental verbs are those which express the means of causation. Instrumental NP express a participant in the means of causation. Since instrumental verbs may represent a rather complex chain of causation, they may take more than one type of
instrument. Consider the verb shoot, which I will discuss in more detail later on. Shoot allows at least two types of instrument—what I will call the "launcher" and the "projectile" (recall the discussion in chapter I). Either type may become a surface instrumental NP:

(1) a. Napoleon shot the troops with a cannon.
    b. Napoleon shot the troops with grapeshot.

However, both instrument types may not assume the role of surface instrument simultaneously:

(2) a. *Napoleon shot the troops with a cannon and grapeshot.
    b. *Napoleon shot the troops with a cannon with grapeshot.

Case grammar does not explain the ungrammaticality of (2.a), since it is possible to conjoin NP that have the same case role (Fillmore, 1968, p. 22). In other words, there is not only a prohibition against conjoining different case roles, but also one against conjoining different types of the same case role. Therefore, it is possible that Fillmore's constraint on conjoining case roles has nothing to do with the cases themselves, but takes place at a much more abstract level.

Another important fact which the verb shoot reveals is that one of the instrument types—
launcher and projectile—takes precedence over the other in the assignment of case prepositions. That is, both "launcher" and "projectile" can be expressed in the same surface clause when the "launcher" is assigned the preposition from:

(3) a. Napoleon shot the troops with grapeshot from a cannon.

b. *Napoleon shot the troops from a cannon.¹

Sentence (3.b) only has a grammatical reading when the troops assumes the role of "projectile" with respect to shoot—i.e. when the troops are being shot out of the cannons. Therefore, the preposition from is only assigned to the "launcher" NP when a "projectile" NP is expressed in the same clause. I will propose a hypothesis below that can explain these surface distributional facts.

Selectional Restrictions

Many instrumental verbs place selectional restrictions on their instrumental NP. Instrumental verbs like stab and poke, for example, require that the instrument be a pointed object. If we compare stab, poke, and shoot to a noninstrumental causative like kill, it is obvious that the instrumental verbs restrict the nature of their instruments much more than noninstrumental verbs:
(4) John killed the robber with \{ 
\begin{align*}
\text{a gun} \\
\text{a banana} \\
\text{a knife} \\
\text{poison} \\
\text{a thought wave}
\end{align*}
\}

(5) John stabbed the robber with \{ 
\begin{align*}
\text{?a gun} \\
\text{?a banana} \\
\text{?a knife} \\
\text{*poison} \\
\text{*a thought wave}
\end{align*}
\}

(6) John poked the robber with \{ 
\begin{align*}
\text{a gun} \\
\text{a banana} \\
\text{a knife} \\
\text{*poison} \\
\text{*a thought wave}
\end{align*}
\}

(7) John shot the robber with \{ 
\begin{align*}
\text{a gun} \\
\text{?a banana} \\
\text{?a knife} \\
\text{*poison} \\
\text{*a thought wave}
\end{align*}
\}

The stars and question marks, of course, have nothing to do with grammaticality but with the difficulty of imagining the situation that the sentence describes.

In order to explain this dichotomy between instrumental and noninstrumental verbs, we need to examine the way in which generative linguistics handles selectional restrictions. By now, most researchers have rejected the position that selectional restrictions are stateable at the syntactic level. The 

Aspects model, borrowing from the semantic theory proposed by Fodor and Katz (1963), assumed that violations of selectional restrictions
could be treated as syntactic violations. That is, the grammar should be constructed so as not to generate sentences that contained selectional violations.

Jackendoff (1973, pp. 17-20) lists a number of reasons for stating selectional restrictions in the semantic component. I will present only three of his arguments here. First of all, there are perfectly grammatical sentences which contain selectional violations:

(8) It's crazy to talk about rocks eating.

Secondly, all sentences with selectional restrictions should be meaningless according to the Aspects model. However, there is a difference between sentences like (9.a) and (9.b):

(9) a. *The rock slugged Bill.
   b. *The boy elapsed.

Finally, Jackendoff points out that pragmatic factors can produce the same intuitive unacceptability as lexical factors. Thus, (10.b) is just as unacceptable as (10.a) when pointing to a man:

(10) a. *That man is pregnant.
   b. *That person is pregnant.

Although Jackendoff claims that selectional restrictions are semantic, he also claims that lexi-
ocal items are subclassified according to the case roles of IP in their environment. However, we have seen (cf. chapter IV) that such an approach requires one to distinguish between the categories "intentional agent" and "nonintentional agent"—two categories that do not act like separate case roles. Moreover, we have just seen that instruments may come in several different types (e.g. those associated with shoot), and there is a constraint against conjoining instruments of different types. Since the conjoining argument is one of the strongest reasons for setting up cases as linguistic primitives, Jackendoff's whole approach to lexical structure is considerably weakened.

McCawley (1970) also argues that selectional restrictions are semantic. He makes the point that Chomsky should have been more faithful to the Katz and Fodor approach, which stated selectional restrictions in terms of full NP rather than nouns. This is necessary because the feature specifications of NP are sometimes different from those of the nouns they contain. For example, the noun neighbor is neutral in gender, but the NP pretty neighbor is feminine. Verbs pay attention to the entire NP rather than the noun:
(11) a. My neighbor is pregnant.
   b. My pretty neighbor is pregnant.
   c. *My handsome neighbor is pregnant.

McCawley went on to show that the acceptability of sentences with selectonal violations is not dependent on the language, but on one's imagination. (11c) is not grammatically unacceptable, because it is possible to imagine a pregnant male.

Logical contradictions like (12) can be generated by the grammar of English, even though it is impossible to picture the meaning of (12) mentally:

(12) That square is round.

Contradictions should not be blocked by the grammar of English, because they also occur in grammatical sentences:

(13) John believes that this square is round even though his belief is contradictory.

Selectonal restrictions involve more than just NP—they refer to actions as well. Consider a sentence like (14), where there is no selectonal restriction on the instrument:

(14) John killed Harry with a rifle.

The two following sentences can be used to describe situations which (14) can describe:

(15) a. John shot Harry to death with a rifle
b. John clubbed Harry to death with a rifle.

(15.a) and (15.b) cannot be used to describe the same situation even though their instrumental NP are identical. In fact, the difference in meaning can only be ascribed to the verb.

Notice that whenever either sentence in (15) is true, (14) is true. Both sentences in (15) seem to entail (14). However, (14) does not entail either sentence in (15). The lexical analysis of verbs like kill, shoot, and club should explain these entailment relationships, and the analysis I present below will do this.

Lakoff's Means Incorporation

Lexical items like club and shoot suggest that Predicate Raising should be possible from the means as well as the result side of CAUSE. It is well known that result-causatives like kill, break, drop, melt, etc. are formed by Predicate Raising from the result side, but few linguists have paid attention to the means of causation as a source for lexical structure. Some linguists have proposed a means-incorporating operation, but their proposals have been limited mainly to causal situations that result in movement.

Lakoff (1970, p. 217 ff.) argues for Means-
Incorporation in order to simplify the lexicon. \(^{3}\) He points out that sentences like (16.a) and (16.b) are paraphrases of each other:

\[(16)\]
\[a.\] Sam kicked the door open.
\[b.\] Sam caused the door to come to be open by kicking it.

According to Lakoff, if (16.a) were to have a deep structure like (17), then the verb *kick* would have to be treated as a sentential operator in the lexicon:

\[(17)\]

Since *CAUSE* is already a sentential operator, and since (16.b) paraphrases (16.a), Lakoff reasons that (16.b) should underly (16.a). This would save us the counterintuitive proposal that *kick* is a sentential operator, and it would simplify the lexicon. There are many other examples of the same process:\(^{4}\)

\[(13)\]
\[a.\] Sam scrubbed the floor clean.
\[b.\] Sam beat Barry into submission.

Lakoff did not discuss the source of by-clauses,
although his analysis implies that they underly this type of Means Incorporation. Moreover, his discussion fails to explain why a sentence like (19) cannot become (20):

(19) John caused the door to come to be open by kicking the secret lever.

(20) John kicked the door open with the secret lever.

It turns out that KICK cannot be Predicate Raised onto CAUSE unless the deep object of KICK is the same as the object of cause in (19). This identity condition is crucial to the Means Incorporation process.

McCawley's Means Incorporation

McCawley arrives at a similar analysis, but for different reasons. He bases his reasoning on the inchoative analysis of motion verbs which was first proposed by Binnick (1970, p. 284 ff.). According to Binnick, prepositions like those in (20) can be analyzed into an inchoative predicate—BECOME—and a stative predicate of location:

(20) a. He ran into the kitchen. BECOME IN
    b. He ran out of the garage. BECOME NOT IN
    c. He jumped onto the table. BECOME ON
    d. He jumped off of the roof. BECOME NOT ON

McCawley noticed that the same prepositions may
cooccur with verbs like hammer:

(21) a. He hammered the nail into the board.
   b. He hammered the dent out of the fender.
   c. He hammered the gold onto the sign.
   d. He hammered the shine off of the fender.

McCawley set up an underlying structure for

(21.b) in order to account for the inchoative analysis

of motion prepositions:

(22)

\[
\begin{array}{c}
\text{V} \\
\text{NP} \\
\text{SYNC} \\
\text{S1} \\
\text{V} \\
\text{NP} \\
\text{NP} \\
\text{CAUSE} \\
\text{he} \\
\text{S3} \\
\text{V} \\
\text{NP} \\
\text{RECOME} \\
\text{S4} \\
\text{NP} \\
\text{OT} \\
\text{S5} \\
\text{IN} \\
\text{the dent} \\
\text{the fender} \\
\end{array}
\]

\text{V} \\
\text{NP} \\
\text{NP} \\
\text{HAMMER} \\
\text{he} \\
\text{the fender}

McCawley (p. 31) gives a rough idea of how (22)

can be converted into (21.b):

Predicate-raising combines \text{IN} with \text{OT}
and then combines \text{OT-\text{IN}} with \text{RECOME},
the resulting combination being realizable as the preposition \text{into}. Subject-
raising raises the dent into \text{S1}, thus
making it the derived object of \text{CAUSE},
\text{EQUIP-Deletion} (as in He made the}
metal smooth by hammering it) deletes the subject of HAMMER, a highly suspect transformation deletes the object of HAMMER under God knows what identity condition with S3, Predicate-raising combines CAUSE with BY, and a transfor-
mation hereby christened Means-incorporation replaces BY-CAUSE by the remaining ver (HAMMER) of S4.

Unlike Lakoff, McCawley explicitly derives the means of causation from a by-clause, although, like Lakoff, he does not justify such a derivation. Moreover, McCawley does pay lip service to the identity condition on Means Incorporation, although he does not claim that the "highly suspect" deletion transformation must take place in order for Means Incorporation to occur.

Actually, the identity condition is a bit more complicated than McCawley realized. Consider (23):

(23) The policeman hammered the shine off of his club.

(23) may describe either of the following situations:

(24)  
a. The policeman hammered the shine off of his club by striking demonstrators with it.

b. The policeman hammered the shine off of his club by striking it with a mallet.

That is, the club in (23) may play the role of something being struck or of something doing the striking, but it must play one of these roles. Sentence (23) cannot describe the same situation
as (25):

(25) The policeman caused the skis to come off his club by hammering the table with a mallet.

Sentence (25) is odd only insofar as it is difficult to imagine a situation where its use would be appropriate. However, (25) could be used to describe a situation where the policeman is performing a magic trick. The important fact is that either the object or the instrumental NP of hammer must be coreferential with an NP in the object complement of cause. Otherwise, Means Incorporation is blocked.

**Fillmore's Means Incorporation**

Fillmore (1971) rejected the lexicalist position and adopted a type of Means-Incorporation process for still other reasons (Fillmore, 1971, p. 45 ff.). In fact, the reason for his change of heart stems from the identity condition on Means Incorporation, which Lakoff fails to mention and McCawley only mentions in passing.

The object and goal cases play a key role in Fillmore's decision to adopt more abstract deep structures. The object case is the case assigned to the NP which undergoes a change of state, and this includes motion. The goal is the NP towards which movement occurs. Verbs of impingement like
hit and strike, and verbs of pressure like push and shove take a goal preposition:

(24) a. John hit a stick against the fence.
    b. John struck a cane against the fence.
    c. John pushed the chair against the table.
    d. John shoved the chair against the door.

In (24), the direct object of the verb represents the object case, and the prepositional phrase with against represents the goal. The sentences in (25) present a dilemma for lexicalist case grammarians because the direct object is both the goal of the verb and the object of movement:

(25) a. John hit the ball over the fence.
    b. John struck the ball out of the park.
    c. John pushed the table across the room.
    d. John shoved the table across the room.

Fillmore resolved the dilemma by rejecting the lexicalist hypothesis (p. 46):

In I hit the ball over the fence we would have to posit something like (clause 1) I hit the ball and (clause 11) The ball went over the fence, the two clauses embedded to a higher predicate that has a meaning suggested by the word cause, predicating the event-cause relation between the two clauses.

Thus, Fillmore arrives at a position that is quite similar to that of Lakoff and McCawley,
although the pressures which led him to that position are quite different.

Fillmore uses the word "conflation" for what I have been calling "Means Incorporation". Conflation differs from Predicate Raising in that clauses to be conflated must share a coreferential argument. That is, conflation is a cover term for lexicalization which fulfills the identity condition on Means Incorporation.

The Derivation of Shoot

So far I have mentioned three different writers who have developed or posited a rule for incorporation of the means of causation in lexical nodes. None of these writers has yet taken a verb like kick, hammer, or hit and broken it down into components which cannot be related to the lexical item itself. All three writers have related some verb 'V' to the same morphological entity 'V' with the meaning 'cause to X by V-ing'. Moreover, the X has almost exclusively stood for movement, except for Lakoff's proposal, where the result of causation was not incorporated into the verb at all.

In this section, I will take a close look at the lexical structure of the verb shoot. I will show that this verb is derived from a series of
embedded causative sentences which are collapsed by the process called Conflation. The purpose of this approach is to explain the NP complements that accompany the verb shoot.

Three different types of direct object are possible with shoot—the victim (pierced object), the launcher, and the projectile:

(26) a. John shot Mary with a gun.
     b. John shot the gun at Mary.
     c. John shot a bullet at Mary.

As I mentioned earlier, the projectile and the launcher may show up as instrumental NP:

(27) a. John shot Mary with a gun.
     b. John shot Mary with live bullets.

Moreover, the launcher NP becomes a prepositional phrase with from when the projectile NP is mentioned in the same clause:

(28) a. John shot a bullet from the gun.
     b. John shot Mary with a bullet from the gun.

Notice that the weapon may assume an instrumental role only when the projectile is not expressed as an instrumental NP:

(29) a. John shot a bullet with the gun.
     b. *John shot Mary with a bullet with the gun.
The verb *shoot* exhibits an elaborate precedence hierarchy for assigning direct object position and prepositions. This precedence hierarchy seems to work just like the so-called case hierarchy which Fillmore sets up for selecting subjects. The verb must choose one of three possible roles for the direct object—victim, weapon, or projectile. The choice is based on which roles are present in the clause, and (30) represents the possible surface forms that each role may assume:

(30) | victim | projectile | launcher |
-----|--------|------------|----------|
Direct Object | +      | +          | +        |
Instrument    | -      | +          | +        |
Ablative      | -      | -          | +        |

Case roles, as Fillmore conceived them, are not abstract enough to explain the above hierarchy. It is permissible in case grammar to derive the subject and the direct object transformationally, but the precedence hierarchy associated with *shoot* suggests that instruments are also derivable by transformation. This notion is completely alien to case grammar, but perfectly consistent with generative semantics.

One might be inclined to treat the hierarchy in (30) as a lexical idiosyncracy of *shoot* and
thereby preserve the universal autonomy of case
grammar. If we did this, we would expect that (30)
would be capable of varying from language to language.
However, (30) is not an accidental property of the
lexicon. I know of no language which violates this
hierarchy in a significant way for verbs meaning
'shoot' or 'fire'.

Another reason for believing that the preced-
dence hierarchy is not a mere lexical idiosyn-
cracy is that it holds for a wide variety of verbs
in English:

(31) a. John \{killed
murdered
hit
struck
{winged
wounded
from the gun.

b. John \{killed
murdered
hit
struck
{winged
wounded
Mary with a bullet.

\c. John \{killed
murdered
hit
struck
{winged
wounded
Mary with a gun.

However, none of these verbs allows the same
choice for direct object as shoot:
(32) *John [killed, murdered, hit, struck, winged, wounded] the bullet from a gun.

If (30) were just a property of the lexicon, then we would have to mark all of the verbs in (31) for the hierarchy in the instrumental NP.

The verb fire is parallel to shoot, except that it does not allow mention of a target or victim which is pierced by the projectile:

(33) a. John fired the bullet.
    b. John fired the gun.
    c. John fired a bullet from the gun.
    d. John fired a bullet with the gun.
    e. John fired at Mary with a bullet from the gun.
    f. *John fired Mary with a bullet from the gun.

Note that (33,e) does not entail that the bullet hit Mary. Thus, fire differs from shoot only in that it cannot be used to express a hit.

Before proposing a deep structure for these sentences, I would like to counter one proposal which might be made to explain the from phrase in sentences like (33,c) and (33,d). One might be tempted to claim that it derives from a rela-
tive clause in (34):

(34) a. John shot Mary with a bullet which was from the gun.

    b. John shot Mary with a bullet which was from my gun.

Notice that the sentences in (34) do not entail that the bullet was fired from the gun mentioned in the relative clause. However, (33.c) can have this interpretation. In fact, other points of origin besides guns may be mentioned in relative clauses:

(35) John fired a bullet which was from the Acme Munitions Factory.

(33.c) is ambiguous with respect to whether its source is a reduced relative or not. Note that the passive distinguishes between the two senses:

(36) a. The bullet from the gun was fired by John.

    b. The bullet which was from the gun was fired by John.

(36.a) shows a passivized sentence with a reduced relative. (37.b) shows that Extraposition from an IP cannot move the relative clause into the position of the from-phrase in (37.a). Therefore, the from-phrase cannot be a reduced relative.

I would now like to propose that a sentence like (38) should be derived from a source like
(39): 

(38) John shot Mary with a bullet from a gun.

(39)

Thus, I am claiming that shoot in (38) lexicalizes an interlocking chain of causation that makes reference to a target (Mary), a launcher (gun), and a projectile (bullet).

Although (39) is only a rough approximation of the structure underlying (38), it allows one to explain the precedence hierarchy associated with shoot, fire, etc. For example, the S2 level represents the agential sentence (40):

(40) John fired the gun.

Notice that gun is already in the object position of the abstract predicate OPERATE, and no extra
apparatus is needed to account for its surface position in (40).

Conflation operates at the $S_1$ level, giving a sentence like (41):

(41) John {fired} a bullet from the gun.$^8$

The predicate LEAVE is lexicalized as the preposition from in this sentence. The direct object, a bullet is derived by Subject Raising from $S_4$. Finally, Conflation operates at the $S_0$ level to give (38).

The direct object hierarchy of shoot can be explained by a structure like (39). If the target of shoot turns up as a direct object, then all the rest of the structure is implied even though it is not always mentioned in the surface:

(42) John shot Mary.

Sentence (42) implies that John used some weapon to eject a missile and that this missile struck Mary.

In (31), I listed several verbs which follow the hierarchy in (30) except for the direct object—kill, murder, hit, strike, wing, wound. These verbs differ from shoot in that they have a fixed result—death or wounding. While a verb like shoot may express many different results, a verb
like *kill* may express various means. For this reason, *kill* has a fixed direct object, but *shoot* has a variable one. The direct object of *shoot* may vary depending on the amount of causal chain that is incorporated into the lexical node.

**The Instrumental Hierarchy**

In generative semantics, prepositions always derive from an underlying predicate, and my analysis is consistent with this position. The preposition *from* in (41) is derived from the predicate *LEAVE (=COME TO BE NOT IN)* in S_b of (39). However, it is also possible to replace *from* in (41) with the instrumental preposition *with*:

(43) John {fired} a bullet with the gun.

When the direct object of *shoot* is the projectile NP, the conditions for assigning *with* or *from* to the launcher NP are both present. That is, *from* can occur because the projectile is mentioned in the clause (cf. sentence (28)), and *with* can occur because the projectile NP is not expressed as a with prepositional phrase (cf. sentence (29)).

If *LEAVE* is the source of *from*, then what is the source of *with*? It seems to me that the most obvious source for *with* in (39) is the predicate *CAUSE*. Notice that the most likely candidate for
becoming an instrumental NP—bullet—occurs at the highest point in the phrase marker which I have constructed. The second choice for instrumental NP—gun—occurs in a lower sentence. There are two possible sources for with. I therefore propose that

(44) The with preposition lexicalizes the highest CAUSE in the sentence.

Principle (44) is not unlike the principle for determining which NP becomes the agent (cf. chapter IV). In the case of agentiveness, the highest DO determines the agent; in the case of instrumentalness, the highest CAUSE becomes the with preposition. Of course, (44) only applies when the sentence contains an agent.

Since (41) and (43) derive from an underlying structure which is no greater than the level of $S_1$ in (39), the only choice for the instrumental NP would be the gun. One may optionally choose to use the preposition from, since LEAVE also occurs in the underlying structure.

Principle (44) suggests not only that there can be more than one type of instrument associated with verbs, but that with may be interchangeable with prepositions other than from. That is, there should be other types of instrumental hierarchies.
based on chains of causation:

(45) John crossed the river \{in\} a boat, \{with\}

(46)

Because of the interchangeability of \textit{in} and \textit{with} in (45), I would assign (45) an underlying structure like (46). (47) contains some more examples of \textit{in/with} interchangeability:

(47) a. Mary dries her clothes \{with\} an automatic drier. \{in\}

b. We cooked the meat \{with\} wine. \{in\}

c. John drives to school \{with\} a new Chevy. \{in\}

d. The state executed Harry \{with\} the gas chamber. \{in\}

In effect, I am claiming that prepositions other than \textit{with} can derive from the subject of \textit{CAUSE}. I have shown some instances where \textit{with} may replace \textit{in} or \textit{from}; now I will show that the preposition \textit{by} also alternates with other prepositions in passive sentences:

(48) a. John was killed \{by\} a train accident. \{in\}
b. Mary was caught \{by\} a traffic jam. \{in\}

c. John was cooled off \{by\} the shade of \{in\} a tree.

My analysis accounts for the fact that it is possible to answer the question "How?" with a locative prepositional phrase sometimes:

(49) a. How was John killed?
    b. In an avalanche.
    c. *In Los Angeles.

(50) a. How did John get here so quickly?
    b. On Interstate 70.
    c. In a commuter train.

I am assuming here that the word how questions the constituent that is the deep subject of CAUSE. This accounts for the fact that how-questions can be answered by causative prepositions (e.g. with, by), conjunctions (because), and by-clauses. Sentences like (49.c) are bad because it is difficult to imagine how being in Los Angeles could cause somebody to die. On the other hand, it is easy to imagine how accidents, natural catastrophes, gas chambers, death camps, etc. can kill people. If Los Angeles were continuously plagued by killer snails, then perhaps (49.c) would become more felic-
Sentences like (51) are systematically ambiguous with respect to their locative phrases:

(51) John was killed in a train accident.

The two different readings of (51) correspond roughly to (52) and (53):

(52) John was killed while he was in a train accident.

(53) John's being in a train wreck killed him.

When (51) is used in the sense of (52), it has undergone Passive Subject Deletion. Thus, an instrument can occur when the deleted element was an agent:

(54) John was killed with a knife in a train accident.

But I do not believe that (51) has undergone Passive Subject Deletion when it is used in the sense of (53).

Conclusion

In this chapter, I have attempted to show the way in which parts of the causing situation (represented by the deep sentential subject of CAUSE) are expressed in surface clauses. Prepositions such as by, with, in, and from are directly related to predicates in the deep structure, as is normal in the generative semantics framework.
Moreover, the pattern of NP complements and their accompanying prepositions is explained as a consequence of the semantic structure—it is not merely listed in the lexical entry of the verb. The fact that instruments are regarded as the "immediate" cause is represented in my analysis by a derivational constraint that lexicalizes the highest CAUSE as the preposition with.

Footnotes to Chapter VI

1. Russian does not allow the "launcher" to be in any case but the ablative.
   (i) *Ivan vystrelil pistolet
       'shot'  'gun'
   (ii) *Ivan vystrelil pistoletom.
       'with a gun'
   (iii) Ivan vystrelil ot pistoleta
       'from'

2. Green (1972) has noted that the resulting state (death) is redundantly expressed sometimes:
   (iv) They hanged Bill to death.
   (v) The murderer strangled his victim to death.
   This may be evidence that Predicate Raising is a copy-deletion process.

3. Lakoff makes no distinction between contact and distant causation (cf. chapter II). However, this does not vitiate his claim, because at least one reading of (16.b) is a paraphrase of (16.a).

4. This process is actually mentioned by Medzalkov and Silnitskii (1969a) as an example of the way in which languages can derive instrumental causatives morphologically.

5. I will not be considering the intransitive motion verb shoot as in
   (vi) The shark shot straight at the diver.
   This use of shoot does not imply that the pro-
jectile was in any sense "launched" from some other instrument.

6. For an interesting account of the way in which Panini deals with this problem, see Singh (1970).

7. See note 1.

8. Some deletion process like "Unspecified Object Deletion" is needed here to delete from the X in (vii):
   
   (vii) John fired the bullet.

   Notice that (vii) is elliptical in that it implies the use of a weapon with which to launch the bullet. However, (viii) is not elliptical in this sense:
   
   (viii) John fired the cap gun.

   That is, firing a gun does not presuppose that a bullet issued from the gun, but firing a bullet does presuppose that some type of gun (instrument) was used to launch the bullet.

9. Gregory Lee (1971) points out that how may question by-clauses, but this amounts to the same thing as saying that how questions the subject of CAUSE (cf. chapter III).
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