A LEXICAL APPROACH TO CAUSATIVES

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I. General Principles[1]

1. Introduction

Lavoisier's principle on the conservation of matter was based on his observation that a quantity of substance in a closed system will remain constant, despite the changes of state that the substance undergoes or the proportions of the substance in its various states at a particular time. A quantity of H_2O can be distributed in a system -- partly as ice, partly water, partly steam -- but the full ammount of H_2O will always be accounted for. Depending on the system, we may prefer one proportion of ice-water-steam to another. But whatever the ratio, we expect the H_2O described as ice to conform to what we know to be the properties of ice; it should be brittle, cold, solid, and so on. The same holds for water and steam.

Lavoisier's conservation principle offers us an appropriate way to think of systems other than the chemical ones he was describing. In an adequate linguistic theory, all of the rule-governed facts will be described in some part of the system, and the properties they exhibit will be best expressed in the component in which we find them.

One problem in trying to propose a correct theory, however, is that we do not know, a priori, in which components particular processes belong. This, for two reasons: First, we cannot be sure that we are aware of all of the properties of the data. As new properties emerge, we may want to describe certain data in a different component: what suddenly feels hard and cold we would not want to continue calling water. The second reason lies in the characterization of the components themselves. While the properties of the data are perceptually available and need merely to be recognized, the properties of the components over which they are distributed are not. Unless we are sure about exactly what various combinations of properties a liquid can have, we may have a liquid on our hands and not know it, not because its properties are hidden, but because we have not adequately defined the notion "liquid."

While we can be sure that Lavoisier's principle will hold for systems of grammatical matter, as it does for chemical, we must look inside to the subsystems, to find properties of both framework and data that will turn out to be empirically sound. Only when these are clear will we be certain of the mapping between the two.

This paper attempts to show how one of the components of the linguistic system, the set of rules in the lexicon, can best be used to adequately express the facts about causatives in English. The paper is in two parts. The remainder of this section will give a brief account of the ice-water-steam debate: the role of the lexicon through the various models of generative theory. Section II presents a new set of facts which can be most neatly handled by the component of lexical rules, along with a few pragmatic principles.

2. Review

In an early conception of transformational grammar, the Aspects model, the lexicon was the repository of words and their meanings, and of their idiosyncratic behavior with respect to rules of the grammar. Each lexical entry was supplied with a set of subcategorization frames and a set of selectional restrictions to establish in what syntactic and semantic contexts the item described could appear. The syntactic transformations could then operate freely; the conditions on their operation would be given, instead, by conditions on the input.

The effort to further free the operation of the syntactic component continued in Chomsky (1970) where more of the work formerly done by the transformational component was moved into the lexicon. The new lexicon was set up to supplant the derivational approach for relating morphologically connected items (destroy and destruction, for example) and to express their relationship by assigning them a single entry. This listing would be neutral between lexical categories (in this case, verb and noun). All of the properties which the two surface forms share needed to be entered only once; the idiosyncratic properties on which they differ were associated with their independent syntactic roles.

This move was advantageous for several reasons: It accounted for restrictions in productivity, allowed for differences in semantic relationships between similarly related sets of forms, and accounted for the similarities of the derived forms to base forms of the same category. The noun destruction, for example, is similar to the base-generated nouns in its complement structure and distributional properties. The transformational approach, in order to capture these generalizations, would have needed additional machinery.

Jackendoff (1975) tried to specify in more detail the lexical component, and compared two possible treatments for deriving surface forms, the "full-entry" theory, in which related forms are given individual listings, and an "impoverished-entry" theory, in which one of several related forms in basic and the others are derived from it. He chose the former system, and proposed a set of "redundancy rules" to relate the items in an economical way, expressing consistencies that hold among large numbers of pairs and triples.

The idea that morphological redundancy-type rules could express more of what were considered syntactic phenomena was put forth by investigators who followed. The kinds of properties that the lexical rules shared were found among rules governing other constructions: one type of passive (Wasow, 1977; Bresnan, 1978), verbal-compound formation (Roeper and Siegel, 1978), and complex-adjective formation (Nanni, 1978). The lexicon has emerged as the component where the class of local, possible idiosyncratic, transformations belongs. The syntactic component remains to express the long-distance post-morphological rules.

What follows is in the spirit of these lexical investigations. The next section begins with a discussion of how causatives were handled in earlier treatments. This interesting, but not quite efficient approach will give way to an analysis benefitting from the new work in lexical processes.

II. The theory.

0. Introduction

Consider a sentence of the type exhibited in (1).

(1) The men twirled the ballerinas dizzy.

This sentence is four-ways ambiguous. On one reading, the ballerinas were dizzy before the men began twirling them. We shall call this the object predicative (OP) reading. On a second, it is the men who were dizzy beforehand. This will be referred to as the subject predicative (SP) reading. On the other two interpretations, the verb is being used causatively, and the adjective refers to the resultant state of the ballerinas. In one case, the verb is transitive (the men twirled the ballerinas, resulting in dizzy ballerinas); in the other, it is intransitive (the men twirled *themselves*, resulting in dizzy ballerina-spectators).

Sentences of this *NP-V-NP-Adj* form do not always exhibit this four-way ambiguity. For example, the adjective in sentence (2) is normally perceived unambiguously, as a subject predication; the adjective in (3) is ambiguous between two interpretations, object predicative and intransitive causative.

(2) The tractor plowed the field rusty.

(3) The dinosaurs ate the trees bare.

In cases like (2) and (3) there seems to be a mechanism blocking some of the four possible interpretations of the *NP-V-NP-Adj* string. Two questions arise: (1) how are the interpretations generated -- the two causative and the two predicative, and (2) how is it, in many cases, that some of these interpretations are blocked?

In section 1, we examine the nature of the causative interpretations.

A treatment of causatives in which individual verbs are lexically marked, proposed by Jackendoff (1975) is discussed. An attempt to extend this approach is examined and put aside in favor of a new account of causatives (section 2). This solution will be seen to alleviate many of the problems of the previous approach, and to be a natural extension of the theory of lexical rules (sections 3, 4, and 5). The new solution proposed for causatives does not affect the predicative interpretations. An account for them has been offered recently by Williams (1980), which is followed here. In section 6, we examine the cases in which one or more of the four readings is absent. A set of pragmatic restrictions is found to be responsible for constraining the productivity of the lexical causative. These same pragmatic factors limit the range of predicative readings as well. We are led to a model of grammar in which very general and productive processes and equally general pragmatic principles are independent but interacting components.

1. Generating causatives: a redundancy rule approach

1.1 The approach and its possible extension

One way in which causatives have been handled has been to encode their interpretations into the lexical entries of particular verbs. This is the tack taken by Jackendoff (1975) for the cases in which a relationship is to be established between an intransitive verb (the glass broke) and a transitive verb (John broke the glass). The two forms of break are assigned the following two lexical entries (his 32):

(5) a. $\begin{bmatrix} /\text{brēk}/ \\ +\text{V} \\ +[\ \text{NP}_1 \underline{\quad\quad}\ ] \\ \text{NP}_1\ \text{BREAK} \end{bmatrix}$ b. $\begin{bmatrix} /\text{brēk}/ \\ +\text{V} \\ +[\ \text{NP}_2 \underline{\quad\quad} \text{NP}_1\ ] \\ \text{NP}_2\ \text{CAUSE}\ (\text{NP}_1\ \text{BREAK}) \end{bmatrix}$

They are related by the following two lexical redundancy rules (his 33)[2]:

(6) a. $\begin{bmatrix} /x/ \\ +\text{V} \end{bmatrix} \longleftrightarrow \begin{bmatrix} /x/ \\ +\text{V} \end{bmatrix}$

b. $\begin{bmatrix} +\text{V} \\ +[\text{NP}_1 \underline{\quad\quad}] \\ \text{NP}_1\ \mathcal{W} \end{bmatrix} \longleftrightarrow \begin{bmatrix} +\text{V} \\ +[\text{NP}_2 \underline{\quad\quad} \text{NP}_1] \\ \text{NP}_2\ \text{CAUSE}\ (\text{NP}_1\ \mathcal{W}) \end{bmatrix}$

According to Jackendoff, these redundancy rules together relate morphologically identical verbs, one of which has a causative reading, the other a simple intransitive interpretation. They express the behavior of a fairly large class of verbs, among them: grow, stop, drop, fly, race, float, fall, open, close, shut, split, wind, stretch. We might try to account for the causatives which appear in the NP-V-NP-Adj configurations by using a system of this sort. For a sentence like (1), there would already exist two entries for the verb twirl, parallel to (5) above.

(7) a. $\begin{bmatrix} \text{/twərl/} \\ \text{+V} \\ \text{+NP}_1\text{\_\_\_} \\ \text{NP}_1 \text{ TWIRL} \end{bmatrix}$ b. $\begin{bmatrix} \text{/twərl/} \\ \text{+V} \\ \text{+NP}_2\text{\_\_\_NP}_1 \\ \text{NP}_2 \text{ CAUSE (NP}_1 \text{ TWIRL)} \end{bmatrix}$

The entries in (7) plus the redundancy rules in (6) would relate the two *twirls* in (a) *The ballerinas twirled* and (b) *Ballanchine twirled the ballerinas*.

Now, in order to incorporate the meaning of the adjective, we would need another entry (or sub-entry) for the transitive *twirl* (*Ballanchine twirled the ballerinas dizzy*):

(8) $\begin{bmatrix} \text{/twərl/} \\ \text{+V} \\ \text{+[NP}_2\text{\_\_\_NP}_1 \text{ ADJ]} \\ \text{NP}_2 \text{ CAUSE (NP}_1 \text{ BECOME ADJ BY (NP}_1 \text{ CAUSE (NP}_1 \text{ TWIRL)))} \end{bmatrix}$

and we would need another entry for the intransitive causative (*Ballanchine twirled the ballerinas dizzy*--the ballerinas are spectators):

(9) $\begin{bmatrix} \text{/twərl/} \\ \text{+V} \\ \text{+[NP}_2\text{\_\_\_NP}_1 \text{ ADJ]} \\ \text{NP}_2 \text{ CAUSE (NP}_1 \text{ BECOME ADJ BY (NP}_2 \text{ CAUSE (NP}_2 \text{ TWIRL)))} \end{bmatrix}$

Furthermore, we would need an entry to account for *The ballerinas twirled dizzy*, but this might be a subcase of (8), in which a coreferent NP has been deleted (*The ballerinas*$_i$ *twirled themselves*$_i$ *dizzy*).

(10) $\begin{bmatrix} \text{/twərl/} \\ \text{+V} \\ \text{+[NP}_1\text{\_\_\_ADJ]} \\ \text{NP}_1 \text{ CAUSE (NP}_1 \text{ BECOME ADJ BY (NP}_1 \text{ CAUSE (NP}_1 \text{ TWIRL)))} \end{bmatrix}$

The fact that the relationship between the intransitive /twərl/ and the causative /twərl/ has been expressed in redundancy rule (6) and lexical entries (7a and b) might lead us to express (8), (9), and (10) as sub-instances of these. Consider (11).

(11) a. $\begin{bmatrix} \text{/twərl/} \\ \text{+V} \\ \text{+[NP}_1\text{\_\_ADJ]} \\ \text{NP}_1 \text{ BECOME ADJ BY} \\ \text{(NP}_1 \text{ TWIRL) \& NP}_1 \end{bmatrix} \leftrightarrow \begin{bmatrix} \text{/twərl/} \\ \text{+V} \\ \text{+[NP}_2\text{\_\_NP}_1 \text{ ADJ]} \\ \text{NP}_2 \text{ CAUSE (NP}_1 \text{ BECOME ADJ BY} \\ \text{NP}_1 \text{ TWIRL) \& NP}_2 \text{ CAUSE (NP TWIRL)} \end{bmatrix}$

The fact that these causative constructions collapse into one should be very encouraging to an advocate of this extension. Given a causative construction of the break-break (or twirl-twirl) type, we could include an optional adjective in the entry. The interpretation for this would be expressible in angled bracket notation and might look like (12):

(12)

$$\begin{bmatrix} \text{/twərl/} \\ \text{+V} \\ \text{+}[\text{NP}_1 \underline{\quad} \langle \text{ADJ} \rangle] \\ \text{NP}_1 \text{ TWIRL } \langle \text{CAUSE} \\ (\text{NP}_1 \text{ BECOME ADJ}) \rangle \end{bmatrix} \longleftrightarrow \begin{bmatrix} \text{/twərl/} \\ \text{+V} \\ \text{+}[\text{NP}_2 \underline{\quad} \text{NP}_1 \langle \text{ADJ} \rangle] \\ \text{NP}_2 \text{ CAUSE } (\text{NP}_1 \text{ TWIRL} \\ \langle \text{CAUSE } (\text{NP}_1 \text{ BECOME} \\ \text{ADJ}) \rangle) \end{bmatrix}$$

1.2 Problems

Consider now the sentences in (13), all of which can be given causative interpretations, but none of which are the type described by rules (5) and (6) (the break-break type); i.e. there are no corresponding intransitives to the sentences of (13a) and no corresponding transitives to those in (13b) which maintain the same meaning.

(13) a. Grandpa kissed my nose wet.
The maid wiped the dishes dry.
The gardener sprinkled the shoots wet.
The workers pumped the swimming pool full.

b. The alarm clock ticked the baby awake.
The jackhammer pounded us deaf.
The dynamite blew the safe open.
The airplanes flew the ozone layer thin.

Clearly, the occurrence of the causative interpretation in a NP-V-NP-Adj sequence is not dependent upon whether the verb is independently of the causative break-break type. Given the fact that virtually any verb[3] can adopt a causative reading in this configuration, it would be a mistake to include this adjectival causative as a subcase of the "simple" causative, i.e. the break-break causative.

There is another problem with the accumulation of adjectives in the redundancy rules. As it stands, the expanded redundancy in (12) could be invoked to express a relationship between the paired sentences of (14).

(14) a. The door blew shut.
The pieces broke small.
The grape squashed flat.

b. The wind blew the door shut.
Alex broke the pieces small.
Marvin squashed the grape flat.

The parallelism in the semantic aspect of the redundancy rules would ascribe causativity to both members of each pair. (The main difference between the members is a syntactic one.) Causativity seems inherent in the (b) cases, but not in the (a) cases. In (15), when we try to deny the causativity of the (b) cases, the sentences are semantically odd. And, in contrast, acribing causativity to the (a) cases as in (16) makes these odd.

(15) # The wind blew the door shut but it didn't cause the door to be shut.
Alex broke the pieces small but he didn't cause them to be small.
Marvin squashed the grape flat but he didn't cause it to be flat.

(16) # The door blew causing it to become shut.
The pieces broke causing them to become small.
The grape squashed causing it to become flat.

These problems with an extension of the redundancy rule approach for the productive causatives force us to try to account for these elsewhere in the grammar. The productive class of lexical transformations will be shown to be a successful alternative. For the non-productive class of causatives (the class typified by break-break, represented by the rules in (6) without the accomodation of adjectives in the rule), the redundancy rules will be maintained. In the next section the lexical entries for the related verbs will be examined more closely.

2. The redundancy rule revised

Before proceeding to a discussion of the lexical causative, we will examine a bit more closely Jackendoff's break-type causatives, related by a pair of redundancy rules to inchoative verbs. The redundancy rules (6 a and b), are repeated here.

(5) a. $\begin{bmatrix} /\text{brek}/ \\ +\text{V} \\ +[\text{NP}_1 \_\_\_] \\ \text{NP}_1 \text{ BREAK} \end{bmatrix}$ b. $\begin{bmatrix} /\text{brek}/ \\ +\text{V} \\ +[\text{NP}_2 \_\_\_ \text{NP}_1] \\ \text{NP}_2 \text{ CAUSE } (\text{NP}_1 \text{ BREAK}) \end{bmatrix}$

(6) a. $\begin{bmatrix} /\psi/ \\ +\text{V} \end{bmatrix} \longleftrightarrow \begin{bmatrix} /\psi/ \\ +\text{V} \end{bmatrix}$

b. $\begin{bmatrix} +\text{V} \\ [+\text{NP}_1 \_\_\_] \\ \text{NP}_1\, \mathcal{W} \end{bmatrix} \longleftrightarrow \begin{bmatrix} +\text{V} \\ +[\text{NP}_2 \_\_ \text{NP}_1] \\ \text{NP}_2 \text{ CAUSE } (\text{NP}_1\, \mathcal{W}) \end{bmatrix}$

These rules express several different types of relationships between the two senses of, say, break. Rule (6a) expresses the phonological identity of the two forms. Rule (6b) expresses the syntactic fact that the intransitive subject appears in object position in the transitive form, and also expresses a semantic relationship involving causation.

The morphological and syntactic relationships seem well motivated. The semantic relation, however, does not seem to be accurately expressed.[4] The notion CAUSE is no more appropriate in the sentences of (17) than in those of (18).

(17) The wind blew the trees.
Sally broke the glass.

(18) John kissed Mary.
Frank kicked Fred.

In both cases, the subject (NP_2) is the agent and the object (NP_1) is the theme. The change of state which is supposed to result from a causative verb seems no stronger in (17) than in either of the sentences in (18). For these reasons, as well as those discussed in section 1.2, above, we advocate removing CAUSE from the entry of the transitive forms. We can maintain, however, the syntactic generalization: i.e., there is a class of verbs (<u>break</u>, <u>blow</u>, <u>fade</u>, <u>drop</u>,... (see 1.1 above)) which can be both transitive and intransitive. The rule given as (6b) will, therefore, be replaced by (6b'):

(6b') $$\begin{bmatrix} \text{+V} \\ [\text{+NP}_1 \underline{\quad}\ ] \\ \text{NP}_1\ \mathscr{W} \end{bmatrix} \qquad \begin{bmatrix} \text{+V} \\ [\text{+NP}_2 \underline{\quad} \text{NP}_1\ ] \\ \text{NP}_2\ \mathscr{W}\ \text{NP}_1 \end{bmatrix}$$

Notice that it is just these verbs (Jespersen's "move and change" verbs, also a subset of Visser's "amphibious" verbs) which show up with an adjective in the following construction (repeated from (14a)).

(19) The door blew shut.
The pieces broke small.
The grape squashed flat.

Although these sentences are similar to those in (20), they do not have the causative sense that the transitive verbs in (20) do (repeated from (14b)).

(20) The wind blew the door shut.
Alex broke the pieces small.
Marvin squashed the grape flat.

We could formulate a redundancy rule to relate the verbs in the "move and change" class (which are characterized by the rule in (6b')) to their corresponding forms in (20). We will use the intransitive form.

(21) $$\begin{bmatrix} \text{/blow/} \\ \text{+V} \\ +[\text{NP}_1 \underline{\quad}\ ] \\ \text{NP}_1\ \text{BLOW} \end{bmatrix} \qquad \begin{bmatrix} \text{/blow/} \\ \text{+V} \\ [\text{+NP}_1 \underline{\quad} \text{ADJ}] \\ \text{NP}_1\ \text{BLOW: RESULT NP}_1\ \text{BE ADJ}^5 \end{bmatrix}$$

Notice that not all intransitive verbs will be in this relation. Only those which also fall under 6b' will. Tick, for example, will not. We do not find forms like either of those in (22).

(22) *The baby ticked awake.
     *The baby ticked.

However, we do indeed find forms like (23)(parallel to (13b)):

(23) The clock ticked the baby awake.

Tick cannot subcategorize for an optional adjective, whereas blow (fly, fade, drop, twirl, break,...) can.

(24) tick $[V, \_\_\_]$

$$\text{blow} \begin{bmatrix} V, \_\_\_ \\ \_\_\_ \text{ADJ} \end{bmatrix}$$

Since tick does not have an adjective (or an NP) in its subcategorization frame, there must be another mechanism which allows tick to appear with both, as it does in (23). In this string, tick remains intransitive (the clock does not tick the baby) but it also takes on a causative meaning. Other verbs, both intransitive and transitive, may undergo the same mechanism, including verbs of the blow type. As a result, we find

(25) transitive: The wind blew the trees bare.
     intransitive: The airplane flew the ozone layer thin.

Notice that although tick (and most other verbs) are not of the "causative" class (in Jackendoff's terms), described by the redundancy rules given earlier, the verbs of this "causative" class join with all the other verbs to become causative in the NP-V-NP-Adj construction. As of yet, we cannot account for this. What follows is an attempt to formalize and explain this very general process.

3. The productive causative as a lexical transformation

Recent work on the lexicon has posited a class of lexical transformations which are distinct both from the lexical redundancy rules of the type proposed by Jackendoff and from syntactic transformations. The properties of these lexical transformations have been summarized by Roeper and Siegel (1978) and are repeated below.

(26) a. They involve no phrasal categories.
     b. They shift syntactic category.
     c. They involve no medial variables.
     d. They are not extrinsically ordered.
     e. They involve semantic compositionality.
     f. They permit statement of idiosyncratic information.

We have seen that the lexical redundancy rule approach, although well suited for the inchoative-transitive verbs of the break-break type, is insufficient in accounting for the productive causatives, wherein ordinary transitive verbs which are not members of this type (tick, water, kiss, slam) are interpreted causatively. The interpretation, we have seen, is signalled by the presence of a post-verbal adjective.

The causative rule, if stated as a lexical transformation, will have to conform to the properties listed above. The next section will be devoted to formulating the rule for the productive causative, and examining its potential as a member of the class of lexical transformations.

3.1 The rule

The rule that we need to derive causative verbs is given in (27).

(27) Lexical causative rule:

$$V \longrightarrow V_{[+caus]} \; [\quad _{NP}] \; [\quad _{Adj}]$$

The effect of this rule is to give any simple intransitive or transitive verb a causative meaning. Obligatorily, the subcategorization of the verb is changed to provide the new causative verb with an adjective, or, in the case of the intransitive, an NP and an adjective. The adjective, in both of these cases, is predicated of its sister NP. The rule will operate on intransitive verbs as in (28) and on transitive verbs as in (29).

(28) The joggers ran → The joggers ran the pavement thin.
The clock ticked → The clock ticked the baby awake.
The rooster crowed → The rooster crowed the pigs batty
The planes flew → The planes flew the ozone layer thin.

(29) Grandpa kissed my nose → Grandpa kissed my nose wet
The maid ironed the sheets → The maid ironed the sheets smooth
The rhino kicked the hippo → The rhino kicked the hippo black and blue

Notice that in (28), the NP and the adjective must be added simultaneously, as the verb remains intransitive (the joggers do not "run the pavement"). Notice, further, that this causative rule operates on simple transitive and intransitive verbs but not on verbs with obligatory complements. Put, therefore, which takes an obligatory PP; word, which requires an adverb phrase, and the complex verb teach a lesson should all result in ungrammatical causative sentences when input to this rule.

(30) a. *The farmer put away the tomatoes ripe.
*The farmer put the tomatoes away ripe.

b. *The President worded the speech diplomatic sincerely.
*The President worded the speech sincerely diplomatic.

c. *The principal taught the boy sullen a lesson.
*The principal taught the boy a lesson sullen.

The verbs teach a lesson, and put away, if paraphrased as scold and greenhouse, (neither of which requires a complement) can undergo the causative rule.

(31) The farmer greenhoused the tomatoes ripe.[6]
The principal scolded the boy sullen.

The fact that the causative rule is limited in its application to verbs without complements is just what we would expect if the rule were a lexical transformation, since lexical transformations may (by 26c, above) operate only locally. The other properties of the lexical rules further delimit the operation of the causative rule, as we shall see below.

3.2 Exclusion of phrases[7]

The lexical causative may not operate on phrases. For instance, verb + particle complex verbs cannot undergo the causative rule.

(32) The man beat the dog bloody.
*The man beat up the dog bloody.

Lilly yanked the drawer loose.
*Lilly yanked out the drawer loose.

The campers patted their sleeping bags flat.
*The campers patted down their sleepings bags flat.

It is only the verb which is restricted from being complex, however. The post-verbal elements may be complex.

(33) Lilly yanked the drawer to my antique dresser completely loose from its casing.
The campers can pat their brand new down sleeping bags flatter than their old fiberfill ones.
The dentist Novocained Wynn's left mandible completely insensitive.

3.3 Category shifting

The causative rule is unlike those lexical rules (compound formation, passive) which change syntactic category. But it is not required that lexical rules change category. In that it merely changes the subcategorization of a verb, it resembles the out- prefixation rule, which adds an affix to a verb, outputting another verb and adding an obligatory object NP.

(34) John ran.
*John ran Bill.

*John outran.
John outran Bill.

3.4 No extrinsic ordering

The causative rule can serve as input to a number of other lexical rules. The final output can be found in already-existing lexical entries as well as in newly-generated ones.

3.4.1 <u>Verbal compound rule</u>

The lexical rule for forming verbal compounds may take as its input a causative produced by rule (27). The causative meaning will show up within the compound.[8]

(35) short-cropped hair
a clean-shaven face
a red-painted barn
thin-sliced cheese
a white-washed fence

3.4.2 <u>Complex adjective rule</u>

A causative meaning is also evident in the output of the complex adjective rule, proposed in Nanni (1978), another lexical rule.

(36) a hard-to-get clean pot
an easy-to-pull-open drawer
Romaine is a hard-to-spin-dry kind of lettuce.
Fontina is an easy-to-slice-thin type of cheese.

3.4.3 <u>Lexical passive</u>

Passives formed from causatives can occur in environments reserved for adjectives. Wasow (1977) has convincingly argued that these passives are lexical. In each case, the passive retains its causative interpretation.

(37) a. prenominally

The <u>watered-flat</u> tulips got stepped on by the dog.
John's <u>blown-dry</u> hair glinted in the sun.

b. as complements to verbs such as seem, appear, look.

The detective said the safe looked <u>forced open</u>.
The jeweler said the silver pendant looked <u>hammered shiny</u>.

c. in <u>un</u>- passives

The sleeping bags were <u>unzipped flat</u>.
The sheets were <u>unfolded open</u>.

Since these passives must be lexical, and the verbs retain their causative sense, we must conclude that the causatives have been input to the lexical passive rule. The causative rule, therefore, must be a lexical rule.

3.5 <u>Semantic compositionality</u>

Lexical rules are extremely productive: the lexical causative rule is no exception. As with other rule-governed processes, the meaning of each new form is accessible through its decomposition. Its interpretation will parallel the meanings of existing, lexicalized, forms which have also been produced by the rule. Both child and adult grammars reflect the creativity of the lexical causative. A recently lexicalized form in children's speech is gross me green. Although this form may seem opaque at first, children recognize it as a variant of gross me out, which it resembles semantically.

3.6 Idiosyncracy

Idiosyncracy is one property of lexical rules which distinguishes them from syntactic rules. Despite the fully productive nature of the lexical causative rule, certain instances of its application must be idiosyncratically interpreted. For example, there are NP-V-NP-Adj strings which have undergone semantic drift and are no longer literally compositional.

(38) You drive me batty
crazy
nuts

Joan's children run her ragged.

There is another property of the lexical causative rule which appears to be idiosyncratic. Notice that sentences in which the adjectives are verbal past participles do not allow causative readings. They contrast with identical sentences in which the adjectives are not participles.

(39) a. Mary folded the pages crinkly
*crinkled

b. The sopranos sang us sleepy
*bored
*tired

c. The jockies raced the horses sweaty
hungry
*perspired
*starved

While this may be an example of idiosyncracy, another explanation is available.

Recently, a rule of participle formation has been proposed by Lieber (1980) which operates on verbs such as crinkle to form participles such as crinkled. Another rule, adjective-participle conversion (Bresnan, 1980) changes the verbal participle, $[\text{crinkled}]_V$ into an adjective, $[\text{crinkled}]_A$.[9]

If it were the case that the process of causative formation had to apply before participle-adjective conversion,[10] no adjectival participles would be available to fill the Adj slot in the causative rule. Only these forms that are underlyingly adjectives would be available. This would explain the absence of participle adjectives in causatives.

An interaction such as this one would not be surprising -- in fact, it is expected. Though lexical rules may not apply to the output of syntactic operations, they do apply to the output of other lexical rules. Whereas we would have an ordering conflict if the causative rule were syntactic and applied before participle-adjective conversion, there is no conflict if its status is lexical.

The question which emerges is whether the causative may follow operations which are truly syntactic. If so, we have an ordering paradox to resolve.

3.7 Interaction with the syntax

We will examine here how the causative rule interacts with certain syntactic processes. The structure of the components requires that lexical rules precede syntactic ones: we expect, therefore, that a lexical rule of causative formation will feed but never be fed by syntactic operations. A string formed by performing a rule such as wh-movement on the output of the causative rule ought to be grammatical and retain its causative meaning. The sentences in (40) and (41) are examples.

(40) How flat did John water the flowers?
How shiny did the maid polish the silver?
How dizzy did Ballanchine twirl the ballerinas?

(41) Which flowers did John water flat?
Which pieces of silver did the maid polish shiny?
Who did Ballanchine twirl dizzy?

Another interaction of the causative rule with the syntax can be seen in tough-movement examples.[11]

(42) This pot is easy for me to scrub shiny.
This piñata was hard for the children to break open.
The hubcap was difficult for the mechanic to hammer flat.

These, too, allow a causative reading, suggesting that the lexical causative produces structures which are input to the syntactic rule component.

We have clear evidence in one direction, namely, that the rule of causative may precede syntactic processes. This is consistent with the claim that the rule of causative formation is lexical. We should also find, if this hypothesis is correct, that structures created by syntactic rules cannot serve as the input for the causative rule. Cases of syntactic operations whose output conforms to the V-NP-Adj sequence necessary for the application of the causative rule are difficult to find. One possibility is a case in which there is an obligatorily subcategorized-for element intervening in the V-NP-Adj sequence, which is moved out.

Consider the cases in (43), which take obligatory PPs.

(43) Susan put the maps into the drawer flat.
The maid stood the broom against the wall askew.

Notice that when the PP has been fronted, a causative reading on the V-NP-Adj sequence which remains is ruled out.

(44) *Into which drawer did Susan put the maps flat?
*Against which wall did the maid stand the brooms askew?

These contrast with sentences in which there is no PP obligatorily intervening between the NP and the adjective. Here a causative reading is allowed.

(45) In which drawer did Susan squash the maps flat?
Against which wall did the maid knock the brooms askew?

These PPs have been fronted from positions after the adjective; since the V-NP-Adj sequence existed before as well as after the fronting, there is nothing preventing the preposing rule from applying. In (44), the fronted constituent had to come from a position between the NP and the adjective. Since there was no sequence V-NP-Adj before the application of preposing, a lexical causative rule could not apply. The fact that the sentences in (44) are ungrammatical while those in (45) are well-formed is evidence that the causative rule could not follow a syntactic rule, and is consistent with its status as a lexical operation. This gives us the evidence we needed in the other direction; not only are cases in which causative has been followed by a syntactic rule grammatical, but cases in which causative has operated on strings derived by a syntactic rule are not. This is consistent only with a lexical treatment of causative.

3.8 Summary

The lexical causative has been seen to exhibit each of the properties (a-f) characteristic of lexical rules. It can only operate locally (c); it excludes phrases (a); it shifts the obligatory subcategorization of its input (b); it is not extrinsically ordered with respect to other lexical rules (d); it obeys compositionality requirements (e); and it displays some idiosyncracy (f). This evidence strongly favors its inclusion in the class of lexical rules. In addition, we have seen the way in which it interacts with syntactic operations. The only way to account for its behavior in this regard is to consider it as part of the lexical component. The evidence, thus, converges on a lexical account of causatives.

4. The productivity of the lexical causative

The causative rule, (27), is repeated below.

(27) $V \longrightarrow V_{[+caus]} \; [\;\; _{NP}] \; [\qquad _{Adj}]$

It has been claimed that the rule, like other lexical transformations, operates in a productive manner. Notice that the input verb is not restricted as to transitivity. We have already seen cases of both transitive and intransitive verbs undergoing the rule. In the transitive case, the NP following the verb is the direct object of the verb. But in the intransitive case, the object of the verb is unspecified. Consider (46).

(46) The ballet master twirled the mothers dizzy.

The sentence has a transitive causative reading, in which the mothers are physically being twirled by the ballet master. But in the intransitive case, the mothers are becoming dizzy by watching someone else twirl, either the subject (the ballet master) or an NP outside the sentence, for example, a dancing class full of their children, which he is directing.

We have seen also that rule (27) can operate on a string which is subject to other interpretive rules.[12] Sentences (1) and (38c), above, have, in addition to subject and object predicative readings, causative readings. The rule will even operate on sentences such as (47) and impose an active (and causative) reading on an otherwise stative, cognitive verb.

(47) The magician thought the woman beautiful.[13]

The lexical causative is, as we have argued, a productive lexical transformation, and not the result of subcategorization or lexical feature marking on particular verbs or verb classes. This claim, however, by no means restricts the appearance of causatives in other components in the grammar; in fact, there are at least two other occurrences of causatives, inherent causatives and morphological causatives. These will be discussed below.

4.1 Inherent causatives

There is a small set of verbs in English which seem to be obligatorily causative. This set includes, among others, make, render, and turn.[14] That these verbs exhibit this seemingly idiosyncratic behavior appears to be an arbitrary fact. But when considered in the light of rule (27), this fact becomes predictable.

Consider the lexical entry for render, which includes the following information.

(48) $\begin{bmatrix} \text{render,} & \underline{\quad\quad} \text{ NP Adj} \\ +\text{V} & \end{bmatrix}$

In that the lexical form for this verb meets the structural description of the causative rule, it can, optionally, be input to the rule. The output will be a string with a causative interpretation, for example, (49).

(49) The collision rendered the bicycle useless.

The same will be true for make, whose lexical form appears in (50).[15]

(50) $\begin{bmatrix} \text{make,} & \underline{\quad\quad} \text{ NP Adj} \\ +\text{V} & \end{bmatrix}$

In this case, the causative rule will apply to (50), and give the causative reading we find in (51).

(51) John made the flowers wet.

The causative interpretations are not directly expressed in the lexical entries for each of these verbs. Instead, the presence of the adjective in the lexical forms (the *only* lexical form for *render*; a frequently chosen form for *make*) allows the verb to be input to the causative rule. The verb will in this way receive a causative interpretation.

Notice, however, that the causative rule is optional, not obligatory. We must explain why there seem to be no other interpretations for sentences like (49) and (51) as there were for sentences we looked at earlier, (1), (2), and (3), for instance. To see this, consider the consequence in which the causative rule, optional, is not chosen. Another interpretation must be given to the *NP-V-NP-Adj* sequence. Now, we have seen that there are predicative readings possible for adjectives in these strings. Consider (52).

(52) John ate the taco empty.

In addition to an optional causative reading, this sentence also has an interpretation in which *empty* is predicated of the object NP, *the taco*. The rule for object predication, then, is another possible way to get an interpretation of the *NP-V-NP-Adj* sequence.

The object predication rule operates on transitive verb forms like *eat*, in (53), and where the form appears with an optional adjective, it assigns the adjective a predicative reading on the NP direct object. Unlike the causative rule, it does not affect the verb.

(53) $\begin{bmatrix} \text{eat, } \_\_\_ \text{ NP} \\ \text{+V} \end{bmatrix}$

(54) Output of object predicative rule.

$\_\_\_\_ \quad \text{NP} \quad \text{(Adj)}$

Verbs like *eat*, which have transitive lexical forms, can in this way receive a predicative interpretation on their post-verbal adjectives.[16]

This leads us to expect that a verb like *make*, which has a transitive entry similar to *eat*, will also allow predicative readings, derived from (55) and a predicative adjective.

(55) $\begin{bmatrix} \text{make, } \_\_\_ \text{ NP} \\ \text{+V} \end{bmatrix}$

Now consider (51) again, which at first glance seems obligatorily causative.

(51) John made the flowers wet.

The fact is that (51) is *not* obligatorily causative. Imagine the following scenario. John is making crepe paper flowers for the school dance. He is hurrying to finish them on time. Bill comes over and, jokingly, dumps a bucket of water on John and his crepe paper. With no time to dry the crepe paper off, John had to make the flowers wet.[17]

With the possibility of this interpretation, we can see that the causative rule is indeed optional, and that sentences like (49) and (51) which seemed obligatorily causative are not. They seem to be, perhaps because of the frequency with which the subcategorization for make NP Adj is input to the causative rule.

What are the possibilities for render? Render differs from make and eat in that it does not have a simple transitive reading. We do not have strings such as The collision rendered the bicycle, parallel to John made the flowers, or John ate the taco. A rule of predication, therefore, which depends on the existence of a transitive subcategorization for a verb will not be able to operate on render. Therefore, if the causative rule is not chosen in a derivation of a sequence of V-NP-Adj which contains render, the sequence will end up uninterpreted, since the rule for object predication will not be applicable. Hence, although we have the semblance of an obligatory causative rule in the case of render, the rule is not obligatory in fact. The seemingly idiosyncratic behavior in this case is explained by render's unusual lexical form, which lists a subcategorization for [___NP Adj] but not [___NP].

4.2 Morphological causatives

In English, as in many other languages (Turkish, French, Thai, among them) causatives can be formed by affixation. The formation of morphological causatives in English is distributed over a number of affixes. The prefix en- (enlarge) is a non-productive example. The suffixes -ate, (invalidate, sublimate); -ify (liquify, codify, intensify); -en (blacken, straighten), and -ize (sterilize, Americanize, or intransitively, crystalize) each have a causative use, though they are used elsewhere as well (enjoin, enchain; oxygenate, orchestrate; emulsify, glorify; heighten, hearten; soliloquize, mesmerize). In each of these cases, separate lexical redundancy rules will express the morphological and semantic relations (see Jackendoff, 1975). It is interesting to notice that many of the causatives from this group participate in the transitive-inchoative relation expressed in redundancy rule (6) above. Flatten, straighten, and liquify are among these.

5. Summary

We began by examining the lexical redundancy rule approach to causative verbs. This system was originally proposed by Jackendoff (1975) to account for the behavior of the inchoative-transitive class of verbs, which includes break, melt, grow, twirl, etc. Given the existence of sentences with verbs of this class which also contain post-verbal adjectives, e.g. The ballerinas twirled (themselves) dizzy, we were led to propose an extension of the redundancy rule approach, in which an optional adjective was allowed, using the angled bracket convention.

Although the expanded rule worked for these cases, there were other sentences which it could not accurately describe. These sentences, both with transitive verbs, e.g., <u>Grandpa kissed my nose wet</u> and intransitive verbs, e.g., <u>The alarm clock ticked the baby awake</u>, are indeed causative, but they do not have a corresponding transitive (or intransitive) form, since verbs in these sentences are not members of the inchoative-causative class.

In section 2, the redundancy rules were examined more closely, and it was found that what was originally claimed to have been a causative meaning was, in fact, a simple transitive relation. The class of verbs described by Jackendoff's original redundancy rules were not inchoative-<u>causatives</u>, they were inchoative-<u>transitives</u>.

The solution proposed in section 3 treated the true causatives as distinct from the inchoative transitive verbs. The redundancy rule approach was retained for the latter class, including instances with optional adjectives, as in <u>The door blew shut</u>. The former class, the true causatives, were examined in the framework of lexical transformations.

We formulated a rule of causative verb formation (rule (27)), which operates productively to output all of the sentences describable by the extended redundancy rule approach as well as those for which that approach was abandoned. This rule displays all the characteristics of lexical rules, both in its independent properties and in the way in which it interacts with syntactic operations.

In section 4 we examined instances of inherent causatives. Causative, like other semantic notions (negative, for example), is distributed throughout the grammatical components, and turns up in the output of simple affixation rules. We also found, however, that verbs which appear to be obligatorily causative (and seem to be evidence in favor of either obligatory subcategorization features or an obligatory causative rule) are only optionally so. Their idiosyncratic behavior was found to be a result of the interaction of the causative rule and the rule for deriving object predicatives.

In the following section, we take up the issue of productivity. If the causative rule is a member of the class of productive lexical rules, why should there be instances in which it is unable to apply?

6. <u>Explaining the absence of a causative reading</u>

A number of factors interfere with the productivity of the lexical causative. These will be examined below, and a set of pragmatic principles will be formulated which will turn out the account for the array of unacceptable utterances of this kind.

6.1 <u>Redundancy</u>

The sentences in (56) are structurally identical to the lexical causatives we have discussed so far.

(56) a. *The gardener watered the tulips wet.
b. *The maid cleaned the porch clean.
c. *The teacher sharpened the pencils sharp.
d. *The scientists starved the mice hungry.

These sentences, however, seem to be excluded from having a causative interpretation. It is neither the verb nor the adjective alone, but the conjunction of the two, which interferes with this reading. The examples in (57) show that this is so.

(57) a. The gardener watered the tulips flat.
The gardener sprinkled the tulips wet.

b. The maid cleaned the porch spotless.
The maid mopped the porch clean.

c. The teacher sharpened the pencils pointy.
The teacher whittled the pencils sharp.

d. The scientists starved the mice skinny.
The scientists worked the mice hungry.

The restriction which rules out the sentences of (56) is not structural, but pragmatic. In each of these sentences, the verb is contributing enough information to render the information given by the adjective redundant. Since the verbs in these causatives encode the resultant state of their objects, an adjective which restates the same information (or a subpart of it) is ruled out. It is for this reason that the sentences in (56) are unacceptable while those in (57) are fine.[18,19]

The restriction can be stated as follows:

(58) Redundancy restriction: In order for a sentence to be acceptable, no two constituents may merely repeat the same information. Some amount of new information must be contributed by each sentential component.

Sometimes strings which are redundant on one reading have another reading in which there is no redundancy. In this situation, the sentence will be interpreted only in the non-redundant way. For example, two of the four sentences in (56), unacceptable as causatives, are acceptable when given predicative readings.

(59) a. The gardener watered the tulips wet.
d. The scientists starved the mice hungry.

In both of these examples, the adjectives can be predicated of the subjects, describing the state of the subject at the time of the action described by the verb. The gardener watered the tulips while he was wet, and the scientists, who hadn't eaten breakfast, starved the mice. (Example (d) may still be questionable since it probably takes longer to starve mice than the amount of time for which people usually tolerate being hungry, say from one meal to the next.) Perhaps The scientists starved the amoeba

<u>hungry</u> is a clearer case. Example (a) is also acceptable as an object predication; that is, the tulips were already wet when the gardener watered them. He may not have noticed.

The <u>redundancy restriction</u>, in addition to its role in causatives, plays a part as a general restriction on the information content of sentences. We can see a similar limitation in the subject and object predications in (60).

(60) a. *The drunk farmer plowed the field $\left\{\begin{array}{l}\text{drunk}\\ \text{looped}\\ \text{tipsy.}\end{array}\right\}$

b. *The policeman ate the hamburger $\left\{\begin{array}{l}\text{raw}\\ \text{uncooked}\\ \text{without cooking it.}\end{array}\right\}$

Sentences like these are only acceptable if the prenominal adjective has a "habitual" or "usual state" interpretation. This is apparent in the contrast between the sentences in (60) and those in (61).

(61) That $\left\{\begin{array}{l}\text{drunkard}\\ \text{drunken farmer}\end{array}\right\}$ plowed the field $\left\{\begin{array}{l}\text{drunk}\\ \text{smashed}\\ \text{tipsy}\\ \text{looped}\end{array}\right\}$ again.

The habitualness of a state is only one of several pragmatic factors which may contribute to redundancy. We also find the temporariness or permanence of a state to be important. In the sentences in (62), the postsentential adjectives are interpreted as denoting permanent states of the NPs of which they are predicated; in (a), it is the subject NP, in (b), the object NP.[20]

(62) a. *The ballerina ate her lunch $\left\{\begin{array}{l}\text{tall}\\ \text{Russian.}\end{array}\right\}$

*The maid mopped the floor $\left\{\begin{array}{l}\text{charming}\\ \text{friendly.}\end{array}\right\}$

b. *The ballerina ate the hamburger $\left\{\begin{array}{l}\text{tasty}\\ \text{nutritious.}\end{array}\right\}$

*The maid wore her apron $\left\{\begin{array}{l}\text{white}\\ \text{imported.}\end{array}\right\}$

These contrast with the temporary states in (63).

(63) a. The ballerina ate her lunch $\left\{\begin{array}{l}\text{dizzy}\\ \text{drunk.}\end{array}\right\}$

The maid mopped the floor $\left\{\begin{array}{l}\text{hungry}\\ \text{giddy.}\end{array}\right\}$

(63) b. The ballerina ate the hamburger $\left\{\begin{array}{l}\text{raw}\\\text{fatty.}\end{array}\right\}$

The maid wore her apron $\left\{\begin{array}{l}\text{wrinkled}\\\text{dirty.}\end{array}\right\}$

"Temporary" should be more clearly defined. In this context, a state will be referred to as "temporary" if it fits one of the following descriptions: (1) a state which an object has achieved, that is, not the state which characterizes or defines an object, for example, dead; (2) a state which is a "usual" state of an object but is not a necessary state for the object once it has arrived in it (as is dead). The state will be "escapable from", for example, bubbly, with respect to ginger ale. Given this, sentences like (64) will be acceptable.[21]

(64) The cannibals ate the humans $\left\{\begin{array}{l}\text{dead}\\\text{marinated.}\end{array}\right\}$

The vacationers boiled the lobsters $\left\{\begin{array}{l}\text{alive}\\\text{dead}\\\text{frozen.}\end{array}\right\}$

Lexical causatives, whose verbs entail a change of state, can have their adjective positions filled only with an adjective which can be interpreted as temporary. Or, stated another way, the adjective in a lexical causative will be interpreted as denoting a temporary state. So, in (65), we assume that the plant is not one which is by definition brown or droopy.

(65) The gardener watered the mysterious plant $\left\{\begin{array}{l}\text{brown}\\\text{droopy.}\end{array}\right\}$

And (66) can only be interpreted as a causative if it means that the gardener somehow brought the plant back to life. The adjective must denote a state that the NP changes into.

(66) The gardener watered the mysterious plant alive.

6.2 Completeness

Anderson (1971) points out that the paired sentences in (67) and (68) (his (1) and (31)) differ with respect to completeness.

(67) a. John smeared paint on the wall.
b. John smeared the wall with paint.

(68) a. Bees are swarming in the garden.
b. The garden is swarming with bees.

In each pair, the second sentence has a completive reading, i.e., the wall was completely covered, not painted in one isolated spot, and the bees are swarming all over the garden, not in a corner, as the first sentence would allow.

The notion of completeness is the basis of another restriction on the lexical causative. Notice that the sentences in (69) are unacceptable.

(69) *Grandpa kissed Letitia wet.
*The mule kissed the elephants red.

while their counterparts in (70) are fine

(70) Grandpa kisses Letitia's nose wet.
The mule kicked the elephants black and blue.

It is not a constraint on any of the lexical items that is making the sentences in (69) odd, but a pragmatic restriction based on completeness. In (69), the NP objects are not "completely" in the state described by the adjective; under normal circumstances, this would be difficult. In (70) when the NP refers to a smaller part of Letitia, or when the NP need only be spottily covered to be called "black and blue", the completive meaning is plausible.

This "completeness" is an aspectual marker signalled by certain constructions (those above, among them) and can show up, in addition, in morphological ways. We see it in the prefix un-. Consider the sentences in (71).

(71) The workers loaded the truck.
The workers unloaded the truck.

Load differs from unload with respect to the state of the object NP. Unload is completive; load is not.

We can see the interactions of the morphological completeness anf completeness signalled by the causative in (72).

(72) The workers loaded the truck full.
*The workers unloaded the truck empty.

The campers zipped their sleeping bags shut.
*The campers unzipped their sleeping bags open.

The two occurrences of completive markers, one provided by un-, the other by the causative, result in redundancy. The sentences in (72), are unacceptable by virtue of the redundancy restriction, (45), above. Completeness is being redundantly specified. The same pattern occurs with the intransitive verbs.

(73) The sleeping bags zipped shut.
*The sleeping bags unzipped open.

Notice, that it is not the mere presence of any adjective after un- that makes the sentence unacceptable. A non-redundant adjective is fine.

(74) The campers unzipped their sleeping bags flat.
The sleepings bags unzipped flat.

Similarly, when the adjectives in (72) and (73) are modified with adverbials, the redundancy disappears.

(75) The workers unloaded the truck completely empty.
The campers unzipped their sleeping bags wide open.
The sleeping bags unzipped wide open.

7. Conclusion

This paper has argued that causatives in English are best handled by a productive lexical rule. We have seen that this account is superior to a redundancy rule approach, and is consistent with what we know to be the properties of rules in the lexical component of the grammar.

We saw, further, that what looked initially like an inadequacy of this treatment, the absence of causative readings in strings where we might have expected to find them, could be explained by some basic pragmatic principles, based on redundancy and completeness. These principles could not only explain these holes in the causative paradigm, but accounted for many other contrasts throughout the grammar.

Footnotes

[1]I would like to thank many people for their patience, and several for some very helpful suggestions. The prime number many; among them, Emmon Bach, Lyn Frazier, Barbara Partee, Tom Roeper, Mark Stein, and Steve Weisler.

[2]This set of rules is marginally productive: the class of verbs seems to be extendable to (a) form intransitives when the causative verb involves a change of state of the object, e.g., bleach, inflate, and (b) to form transitives when there already exists an intransitive verb involving a change of state, e.g., fade, collapse (as rules), and no agent. Blink (transitive) would be possible in the case in which someone blinks a plastic model of an eye, but not in the case in which one causes another person to blink. (This may be an example of how Jackendoff's lexical entries are too underspecified.)

[3]Section 6, below, is a detailed discussion of exceptions. Even for the productive cases, though, it is clear that speakers differ in their judgements on exactly how productive the rule is. The judgements here reflect those of a fairly tolerant speaker. The exceptions, however, are ungrammatical even in the most liberal of dialects.

[4]See also section 1.2, above.

[5]This line is written informally, as a suggestion. We will not argue for it here.

[6]This example was suggested to me by Emmon Bach.

[7]In Bach's treatment of passive (1980), he distinguishes between transitive verbs and transitive verb phrases. A lexical account like the one proposed here could make use of this distinction rather than a distinction like "exclusion of phrases" to define the domain of the lexical causative. We would not expect to find a transitive verb, which is not a transitive verb phrase but which is composed of more than one word, which could undergo the causative rule. It is not clear that this is the case; most instances resist grammaticality, despite synonymy with one-word verbs.

i. They $\left\{\begin{array}{l}\text{dynamited}\\ \text{*blew up}\end{array}\right\}$ the rock pebbly.

But these seem to have a completive sense (discussed below, in section 6.2). Two-word verbs which don't convey completeness or resultant states are difficult to find. Perhaps cases like (ii) are the kind we need.

ii. They spray-painted the barn white.

[8]For reasons unknown to me, this combination of rules is not very productive.

[9]The distinction between these two forms shows up in the two passives, discussed in Bresnan (1980).

[10]This may, at first, appear to contradict the requirement that word formation rules may not be extrinsically ordered. But we may, in fact, be dealing not with two rules of word formation, but instead, one of word formation and one of category conversion. It is possible that these two types of operations may be ordered within the lexicon. Further work on the question of lexical rule types and their interaction is certainly needed before we can sort out these issues.

[11]Nanni (1978) convincingly argues for two sources for tough-movement sentences, one lexical (see section 3.3), the other syntactic. It it the latter type to which we refer here.

[12]Interpretive rules of predication are given a formal treatment in Williams (1980). We will address predication briefly in the next section.

[13]This is sometimes described (Lyons, p. 706) by saying that the verbal character of <u>think</u> is stative. A tension is set up here between this verbal character and the interpretation imposed by the causative rule. This tension may account for the variability of acceptance of sentence such as (47).

[14]Bolinger (1971, chapter 6) gives some other examples. There are, of course, ordinary transitive uses of each of these, as in <u>Lucy made a pudding</u>; <u>Grandma rendered the chicken fat</u>; <u>Dad turned the roast</u>. We are not discussing these forms here.

[15] Make can also take a NP complement. Ballanchine made Barishnikov (a) star. There are other verbs of this type, e.g., elect. Presumably there is another interpretive rule (similar to or perhaps an extension of the causative rule) operating in these cases, but we will not work out the details in this study.

[16] In Williams (1980), predication is a rule which operates on surface structures, and not on lexical forms. It is clear from this discussion that the rule of object predication, at least, must have access to lexical structure. If not, a string with the form render NP Adj will not be differentiable from eat NP Adj, since they are structurally identical, and both will be available for predicative interpretations at surface structure. Williams' theory, elegant as it is, won't be sufficient to distinguish the predicative possibilities of render from those of eat, as it does not have direct access to lexical entries. This is evidence that a theory such as his may need elaboration.

[17] Note that the object predicative reading doesn't work all that well here, for the following reason. The adjective of the predicative reading denotes the state of an NP at the time of the verbal action. In (51), the flowers did not exist until after John made them, and so could not really have been wet at the time of making. The problem with the object predicative reading lies in the meaning of the verb make. Notice that a sentence parallel to (51), with turn, can be given both subject and object predicative readings, and is not necessarily causative. The subcategorization of turn is similar to that of make. In this case, the line ___ NP can be chosen.

(iii) John turned the pancakes wet.

Here, the pancakes are turned before they are cooked long enough, i.e., wet.

[18] Notice also, that The gardener made the tulips wet by watering them, and The gardener wet the tulips with water are both acceptable.

[19] An apparent counterexample to this claim, pointed out to me by Edwin Williams, is the sentence The sheriff killed him dead. Here dead is not providing new information, but the sentence still seems to be acceptable. This is due to the fact that dead is being used here not to give new information, but emphasis. Another emphatic expression which gets around redundancy is "good and." The gardener watered the flowers good and wet is perfectly acceptable.

[20] Notice that the reason that the NP of predication differs in these two groups is based on selectional restrictions and world knowledge. We have seen that an adjective in this position is open to more than one unique interpretation.

[21] There is a seeming counterexample in (iv):

(iv) The priest sacrificed the baby alive.

But this is not a violation of the temporariness restriction; it is a problem with redundancy. The verb sacrifice denotes that its NP object is going from alive to dead. Hence the adjective is redundant.

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