

Evaluating Competing Linguistic Models with Language Acquisition Data: Implications of Developmental Errors with Causative Verbs

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What relationship should hold between grammatical models proposed by linguists and the language behaviors of speakers in everyday and experimental situations? Formulating a satisfying answer to this question has proved a challenging and elusive goal. For many years the problem was widely assumed to belong properly to students of psycholinguistics. The linguist, working relatively independently, would determine what the speaker must know about language structure to account for his intuitions about grammatical well-formedness, paraphrase relations, ambiguity, etc., and the psycholinguist would then determine how this knowledge is acquired and how it is drawn upon in speech production and comprehension.

As psycholinguistic work proceeded, it became increasingly clear that describing «how» on the basis of the received «what» was going to be difficult, perhaps impossible. Discrepancies between speakers' behaviors and the structures and processes described by linguists demanded explanation. One widely accepted interpretation has been that the relationship between actual performance and the competence linguists seek to characterize is much more «abstract» than was originally supposed (e.g., Fodor & Garrett [1966]). This approach protects linguistic models from potential challenge on psycholinguistic grounds and lessens the motivation of both linguists and psycholinguists to attend to developments in each other's fields.

Only fairly recently has a second explanation been receiving serious attention¹: that apparent discrepancies between competence and performance may be illusions created by faulty models of competence. As Bresnan [1978] puts it, «if a given model of grammar cannot be successfully realized within a model of language use, it may be because it is psychologically unrealistic in

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The author's reply to the commentaries will be published in a subsequent issue.

¹ Although see Schlesinger [1967] for an early proposal along these lines.

significant respects and therefore inadequate in those respects as an empirical theory of the human faculty of language» (p. 2). This way of looking at gaps between performance and linguistic descriptions of competence shifts the burden of accountability from psycholinguists to linguists. As Seuren [1978] warns, «the days are approaching when conflicting general theories of language or grammar will be subjected to comparative tests of psychological, or even neurological, plausibility... It simply is a fact of life that confirmation by neighboring disciplines strongly reinforces a theory, whereas incompatibility creates embarrassment» (p. 205).

LANGUAGE ACQUISITION DATA AS A SOURCE OF EVIDENCE FOR LINGUISTIC THEORIZING

A critical problem for researchers convinced that linguistic theory must build upon a psychologically sound foundation is to determine which kinds of psychological data are relevant. About this problem there is little agreement². However, among the kinds of data that psychologists can offer to psychologically oriented linguists, perhaps none has stronger *a priori* appeal than information about children's language acquisition. Intuitively, it seems plausible that by observing the steps involved in children's construction of the rule system of their mother tongue we should be able to discover something about the structural units and operations that make up (part of) adult linguistic competence. There are important theoretical reasons for looking to children as well. As Chomsky [1965] and others have observed, any universals of natural language can reasonably be attributed to constraints imposed by the characteristics of the child's capacity for language acquisition.

Appeals to order of acquisition: some problems

Unfortunately, the promise that the study of language acquisition holds for linguistic theorizing has proved exceedingly difficult to realize. Which aspects of acquisition hold the desired clues? Most often, appeal is made to the *order* in which given forms appear in children's speech. The assumption underlying such appeals is that what children acquire early must be «more basic» than what they acquire later; there should thus be a linear correspondence between the relative complexity assigned to given forms in a linguistic description and the order in which they are acquired³. The linguist thinking along these lines

² Compare, for example, Fodor, Fodor & Garrett [1975] with Katz [1977] on the relevance of «on-line» processing variables such as reaction times in comprehension tasks.

³ Judgments of relative complexity can be formalized in a grammar in different ways, depending on the structures in question and the kinds of analyses involved: e.g. «unmarked» vs. «marked» and «derivationally less complex» (i.e., closer to the ultimate underlying structure) vs. «derivationally more complex». In recent years comparisons by psycholinguists of the relative complexity of two sentence structures have been limited to cases in which the structures are taken to share a derivational history up to a certain point but further operations are involved in the derivation of one but not the other. This is because it is by now well understood that a psychologically meaningful measure of relative

sees reason to question a linguistic model that analyzes a form that appears early in child speech as more complex than a related form that appears later, and, conversely, is reassured if his/her own analysis is consistent with or at least not in opposition to order of emergence. Thus, for example, Bresnan [1978] concludes her arguments against deriving truncated passives by deletion from full passives by pointing out that truncated passives, the more complex form by this analysis, are acquired earlier than full passives, the less complex form. Her own analysis of the passive, in contrast, makes no specific ordering predictions.

Though superficially attractive, linguistic arguments invoking facts about acquisition order are of questionable value. The linguist whose favorite analysis is criticized on grounds of incompatibility with order of acquisition has at least two viable lines of rebuttal. First, even if, as seems undeniable, it is roughly true that more basic aspects of language are acquired before more complex and elaborated aspects, perfect correspondence between order of emergence and relative complexity cannot be assumed in the case of particular construction patterns. It is, rather, a matter for empirical investigation⁴. Studies indicate that inherent linguistic complexity is indeed a determinant of order of acquisition, but that there are other influences as well, such as relative frequency of modelling in adult speech to children (Snow [1977]), relative perceptual salience of different linguistic forms (Brown [1973], Slobin [1973]), and relative degree of surface-structural «compression» (Smith [1970]). This means that order alone cannot be taken as strong evidence either for or against linguistic analyses proposed for given sets of construction patterns.

A second possible objection to order-of-acquisition arguments is that they ignore potential *revision* in the child's linguistic system. It is quite plausible that extensive reorganization takes place in the course of development, such that the earliest knowledge a child brings to a particular kind of sentence pattern bears little resemblance to the later adult knowledge (Schlesinger [1967], Bowerman [1974, 1977, in press], de Villiers *et al.* [1977]). For example, structures that have considerable internal complexity for adults may be produced very early by children, but only because it is possible to produce them on the basis of relatively superficial knowledge (this will be elaborated in subsequent discussions). Furthermore, structures that adults recognize as closely related to each other, and that an optimal grammar might best characterize as different realizations of the same underlying structure, may be learned independently by children and only later integrated under a common set of rules. Finally, the rules children initially follow in the production of a

derivational complexity cannot be obtained simply by comparing the *absolute* number of operations involved in the derivation of sentences, independent of what the operations are (see Fodor & Garrett [1966] and Brown & Hanlon [1970] for discussion).

⁴ Studies investigating specific correspondences include Brown & Hanlon [1970] on tag questions (cf. also «retrospective» introduction to this study in Brown [1970]), Brown [1973] on grammatical morphemes, and Lust [1977] and de Villiers *et al.* [1976, 1977] on sentence coordination.

given type of sentence could in principle drop out without leaving a trace, being completely superseded by other rules (as opposed to simply being supplemented). Because of the potential for reorganization in the child's grammar, the linguist who is skeptical of acquisition-based arguments can quite justifiably protest that grammar-writing and the construction of linguistic theory should be held accountable only to what the *fluent* speaker knows about his language, not to what the learner with only partial knowledge knows.

Spontaneous speech errors

If order of acquisition is an unreliable source of evidence for linguistic theorizing, what aspects of language development might yield more valuable clues? One promising domain of evidence that has as yet been relatively little explored for its potential for linguistic theory is *systematic errors* in children's spontaneous speech — i.e., deviations from modeled adult norms (whether or not «errors» from the point of view of the child's own rule system).

Print-out of underlying structures. There are at least two basic categories of possibly relevant errors. One comprises errors that more-or-less closely resemble surface print-outs of structures hypothesized by a given theory to underlie the fully-derived adult version of the sentences in question. These errors have been or could be interpreted as evidence for the psychological reality of the proposed derivation. For example, Hurford [1975] proposes that errors such as «Whose is that is?» and «Did you came home?», produced by his daughter Eve over an eight-month period, provide support for Chomsky's postulation of an abstract tense marker immediately following the subject of a declarative, which is moved to pre-subject position in interrogatives. According to Hurford's analysis, Eve's errors resulted from her having «internalized an imperfect version of [the] adult rule» (p. 301), whereby instead of moving the tense marker in forming interrogatives she simply copied it in the new position and left the original intact. Mayer, Erreich, and Valian [1978] make related arguments that certain errors, including those presented by Hurford, can best be accounted for within a transformational linguistic theory that credits the child with knowledge of basic transformational operations such as copying and deletion.

Errors with the «look» of putative underlying structures are indeed provocative. However, attention has centered so far on a very limited set of errors and there are still too many uncertainties about the proper interpretation of these to justify firm conclusions about their significance for linguistic theory. For example, Prideaux [1976] and Kuczaj [1976] argue that Hurford's errors can be adequately accounted for by reference to processing problems (e.g., segmentation errors) and surface structure generalizations; no appeal to underlying structures and transformations is called for. The transformational accounts are also weakened by the fact that they predict that children should make certain types of errors that have never been documented (e.g., «What

did I see what?»; see Mayer *et al.* [1978]).

There is still another problem. Even if we should accept that the deviant sentences indeed stem from the hypothesized structures and operations, is it safe to assume that these entities are still somehow «in» the head of the speaker after he develops to the point that he no longer makes the errors? Or could progress to a mature understanding of these sentences involve a reorganization of the mental grammar such that the hypothesized entities no longer play a role?

Errors of overregularization. The second major category of children's errors with potential implications for linguistic theorizing, and the one with which the rest of this paper will be concerned, is errors of overregularization. These errors seem to differ in a fundamental respect from those discussed just above. «Print-out-of-underlying-structure» errors can be attributed (at least under the more interesting, if controversial, analysis) to critical gaps in structural knowledge of how to form a given type of construction (e.g., to ignorance of or failure to apply one of the essential transformational operations in deriving a sentence from its underlying structure). In contrast, overregularizations stem from the child's newly attained grasp of a basic structural regularity underlying a class of forms (words, sentences, etc.) of the adult language. What is still missing is not information basic to the construction of the forms, but, rather, more peripheral information about which forms are exceptions to the regularity. The errors result when the child attempts to put his structural knowledge to work to create novel forms cut to the same pattern. Most of the creations are grammatically acceptable and pass unnoticed, but those that violate constraints and exceptions that the child has not yet learned strike adult ears as deviant.

The paradigm cases of overregularization, known to scholars of language and laymen alike, involve inflectional morphology: the familiar *goed*, *breaked*, *foots*, etc. (Ervin [1964], Slobin [1973]). But overregularization is a much more pervasive phenomenon than is often recognized, and can be invoked to explain errors of word formation and syntax such as «Who deaded my kitty cat?» (Bowerman [1974]), «Feels like you're combing me baldheaded» (Bowerman [1977]), «Want me to make my gum undisappear?», «Feel your hand to that», and «Can I fill some salt into the bear?» (Bowerman [in press]). Overregularization of both morphological and syntactic patterns is often — perhaps always — preceded by a period in which the child uses forms belonging to the paradigm in a perfectly correct way. This indicates that before certain structural regularities are grasped it is possible for the child to get along to an extent on the basis of memorized «unanalyzed» forms (Ervin [1964]) and rules for word combination which, although productive, are much more limited in scope than they will eventually become (Bowerman [1977, in press]).

The potential of children's overregularizations for aiding linguistic analyses lies in the fact that they are firmly rooted in structural patterns that characterize the *adult* language. Some of these patterns are exploited freely by

adults as well as children to create new forms — e.g., inflectional morphology and certain word formation rules. Other patterns are only semiproductive for adults. And still other patterns, «live» for children, are essentially dormant for adults — dormant but not extinct, because in moments of distraction, fatigue, humor, or uncertainty or ignorance about the proper morphological or syntactic handling of infrequent words, adults produce errors similar or identical to those of children. Children's overregularizations thus cannot be dismissed as irrelevant to linguistic theorizing on grounds that the processes underlying them later fade out or are superceded. Rather, they can be taken as little windows through which we are afforded an exceptionally clear view of the workings of structural knowledge that later goes somewhat underground.

CHILDREN'S NOVEL CAUSATIVE VERBS

The goal of the following discussions is to explore the relevance for linguistic theorizing of a certain subset of children's overregularizations, those involving the creation of novel causative verbs. Causative verb errors by children are potentially a particularly fruitful domain in which to look for implications of language development for linguistic theory. This is because the proper grammatical analysis of causative verbs in adult language has been a «test» issue over which competing theories have clashed and fundamental differences concerning the representation of meaning, the relationship between syntax and semantics, and the role of the lexicon in a grammar have been rather clearly laid out.

The plan of analysis is as follows. First, the nature of the errors is described and illustrated. Then the ways in which alternative linguistic frameworks handle relevant aspects of English lexical structure are examined and compared for «goodness of fit» with what we can infer children are learning about the structure of causative verbs on the basis of details about the onset, course, and abatement of their errors.

The models to be considered include Fillmore's [1968] case grammar analysis; an approach in terms of a paradigm of correspondences in syntactic positions along lines developed by the French linguist Tesnière and applied to children's causative verb errors by Lord [1979]⁵; generative semantics; the lexicalist approach (which falls within Chomsky's extended standard theory); and meaning postulates. There are clearcut differences in the current strength of these various models, with the lexicalist approach dominating linguistic theorizing in the U.S. today, case grammar and especially generative semantics having few, if any, vocal proponents, meaning postulates as yet not well ex-

⁵ This model is not, strictly speaking, an account of the structure of causative verbs. Rather, it is an explanation for why children create novel causative verbs that embeds the verbs in a wider set of verb errors and regards the fact that some of the novel verbs are causative as incidental. If this were found to be an adequate explanation, the novel causatives would have to be rejected as potential sources of information about the structure of causative verbs.

explored, and the paradigm of syntactic correspondences model, with its emphasis on «valence» (the number and arrangement of the noun arguments accompanying verbs), being more representative of contemporary European than American theorizing (e.g., see Abraham [1978]). Despite these differences, I have attempted to approach each model impartially, under the safe assumption that no currently available framework is as yet completely adequate and that «out of favor» theories might handle certain problems better than preferred theories, even if they are weaker in other respects.

The focus in the discussions is on the implications of the error data for evaluating two major areas of theoretical conflict: 1. whether an adequate account of the structure of causative verbs requires an appeal to *semantic compositionality*; this is assumed by both the generative semantics and lexicalist analyses but it is explicitly rejected by both the case grammar and meaning postulates approaches and it is at least not necessary within the paradigm of syntactic correspondences model, although not necessarily ruled out; 2. whether the knowledge children draw upon in forming novel causative verbs is best characterized as a *syntactic rule* or a *lexical rule*; this is the issue over which the generative semantics and lexicalist analyses, although both compositional, are divided. The reader should be forewarned that no one theory will emerge in the end as a triumphant winner in terms of its ability to deal satisfactorily with the developmental data. Rather, areas of success and failure cut to an extent across party lines, which suggests that constructing a grammatical theory that accounts optimally for what speakers know about causative verbs will require significant integrative efforts.

The errors

Children learning English begin to create novel causative verbs between the ages of about 2 and 3. They do this by using a predicate that is normally noncausative (usually an intransitive verb or adjective, but sometimes also a transitive verb or a locative particle) to mean roughly «cause the state of affairs normally referred to by this word to come about». A representative example comes from my daughter Christy, who at age 2;9 held a piece of paper over her baby sister, said «I'm just gonna *fall* this on her», and then dropped the paper. This and other examples are presented in Table 1, grouped for the convenience of subsequent discussion⁶. Some examples from adults are

⁶ Most of the data in this and the following tables come from my daughters, Christy and Eva, whose language development I have followed closely by note-taking and tape-recording from the time of first words at about 12 months. I also collected the data from Kendall (also followed longitudinally, see Bowerman [1973]), Marcy, «Boy», Jennifer, and Emily. For additional sentences I am grateful to Ginny Gathercole (Jaime and Rachel), Robin Chapman (John), Cynthia Park (Hilary), Sonja Payne (Robert), Mabel Rice (Mindfly), and Charlotte Ruder (Scott.). Sentences from Stevie and Girl, are given by Braine [1971] and that from Girl, by Ingram [1971], citing Lukens [1896]. For a fuller presentation of the data from Christy and a discussion of the implications of the errors for the relationship between cognitive and linguistic development, see Bowerman [1974].

also included to indicate that the potential for making these errors continues indefinitely⁷.

The problem to be pursued in this paper is to account for these errors as fully as possible. A first step is to determine whether the errors indeed reflect the child's grasp of structural regularities in the adult language or can instead be interpreted in a simpler but theoretically less interesting way.

Part-of-speech problems?

An obvious explanation that does not invoke the notion of overregularization is that the errors stem from children's initial uncertainty about the part-of-speech membership of the words in question. Perhaps, according to this hypothesis, the child does not yet clearly differentiate adjectives from verbs; further, he has noticed that some verbs occur with direct objects and others without but he is still uncertain about which verbs belong to which category.

This hypothesis can be ruled out easily. First, in the case of the subjects for whom longitudinal data are available (Christy, Eva, Kendall), the onset of the errors (at 24, 23, and about 27 months, respectively) was preceded by a period of several months in which the relevant verbs and adjectives had already been consistently used in a syntactically appropriate way in spontaneous speech. Moreover, as noted, the errors continue to occur indefinitely, although they become relatively infrequent by adulthood. Most of the errors listed in Table 1 are from children between about three and eight years who are obviously well past the early stage of language acquisition in which their basic knowledge of part-of-speech membership might be deficient.

Second, the «part-of-speech problems» hypothesis is inadequate because it does not explain the *regular semantic relationship* that holds between the erroneous use of the verb or adjective and the normal use. Thus, it provides no account of what is wrong with sentences that involve the transitive use of verbs that normally (even for the child) *are* in fact transitive, e.g., (36) «No, Mommy, don't *eat* her yet, she's smelly» and (84) «I'm gonna *guess* it to him».

A model for the errors

The fact that the errors occur among relatively old children and are preceded by a period of correct usage is a strong clue that they stem not from structural ignorance but from the attempt to apply new structural knowledge

⁷ Readers might be tempted to argue that one or another example listed in Table 1 is in fact acceptable, thus not an «error». This is to be expected; as Lyons [1968: 384] notes, «it is doubtful whether the 'ergative' verbs of English constitute a determinate and closed class» (where «ergative» refers to those verbs that, like *move*, occur in both intransitive contexts and transitive contexts, with the subject of the intransitive («*the stone moved*») becoming the direct object of the transitive («*John moved the stone*»). However, dubious cases are not at issue here; it is sufficient that there be general agreement that some of the examples are distinctly peculiar.

TABLE 1. Errors involving use of noncausative predicate as transitive causative verb.

C=Christy
E=Eva

M=Mother
D=Daddy

Age given in years; months
...: utterance-medially, indicates a pause; utterance initially, indicates that first part of sentence is not included. —: indicates broken-off sentence.

A. Morphological modification (-en, -ize) required

- 1) C, 2;11: I'm gonna *sharp* this pencil. (=sharpen. Sticking pencil into pencil sharpener).
- 2) C, 2;11: How would you *flat* it? (=flatten. Trying to smooth down paper on magic slate).
- 3) C, 4;5: I'll *straight* these out 'cause you don't know how they went, did you? (=straighten. Arranging disposable diapers that were jumbled in box).
- 4) E, 2;4: Don't *tight* this 'cause I *tight* this. (=tighten. Screwing nipple on her bottle).
- 5) Jaime, 3;11: I'll put you in two cages and *fat* you up. (=fatten. Telling what witch in «Hansel and Gretel» says).
- 6) John, 2;3: You *sad* me. (=sadden).
- 7) C, 3;8: You'll see what's *stabilizing* it. (=stabilizing. As C teeters on tippy stool, trying to balance).

B. Morphologically unrelated form required

COME/BRING, TAKE, OTHER (see also Table 2, No. 38)

- 8) C, 2;9: I *come* it closer so it won't fall. (=bring. Pulling bowl closer to her as she sits on counter).
- 9) C, 3;4: She *came* it over there. She brought it over there. (Watching dog take piece of food to next room. See Bowerman, 1978, for mutual substitutions in C and E's speech of *bring*, *take*, and other cause-change-of-location verbs).
- 10) Rachel, 5;5: *Come* me out. (R in bathtub. Repeats several times since M doesn't understand, finally): Bring me out.
- 11) E, 5;5: *Come* back on the light. (=make come back on, turn. Request to M).

GO/TAKE, PUT, SEND, Specific Motion+Manner Verb⁸ (see also Table 2, No. 7-9 in conjunction with Footnote 23, and Table 3, No. 2)

- 12) C, 3;6: Until I'm four I don't have to *be gone*. (=be taken (to the dentist)). Just after C has a dental check-up; thinking about her next visit).
- 13) C, 3;10: Go me to the bathroom before you go to bed. (=take. To M who is tucking C into bed; she wants midnight trip to the potty. The following A.M. C says «you didn't take me to the potty before you went to bed»).
- 14) E, 4;3: Why didn't you want to *go* your head under? (=put. To C, in tub).
- 15) E, 5;1: Go it over here so it will be more better. (=put. Instructing friend where to put a Lego piece).
- 16) E, 4;11: Do you have anything else you'd like to *go* to China? (=send. E pretending to drive train carrying freight to China; to M who is to stay behind).

⁸ See Jackendoff [1976] and Talmy [1976] for analyses of causative verbs such as these as composed of or conflating CAUSE, GO, and a manner element (see also p. 43 below).

- 17) C, 2;8: Daddy *go* me around (=spin, turn. C sitting in toy chair that can be rotated; wants D to turn her).
- 18) C, 2;9: You *go* it in. (=push. Request for M to push chair up against table).
- 19) C, 3;2: How came she *goes* on the bathtub, Mommy? (=turns on (the water). Hearing guest start tub faucet in the bathroom).

STAY/KEEP, LEAVE⁹

- 20) C, 2;6: Mommy, can you *stay* this open? (=keep. C having trouble with refrigerator door).
- 21) C, 3;7: I want to *stay* this rubber band on. (=keep, leave. C looking at herself in mirror, she has a pony-tail held with rubber band).
- 22) C, 4;3: Why is the laundry place *stayed* open all night? (=kept. Re: local laundromat).
- 23) C, 4;5: Eva won't *stay* things where I want them to be. (=leave).
- 24) E, 3;2: I'm *staying* it in the water. (=keeping. E playing with toy in tub).
- 25) E, 5;0: I want to sleep with it 'cause they'll *stay* me warmer. (=keep. Protesting when M tries to take her pants off at bedtime).

FALL/DROP, KNOCK (see also Table 3, No. 6, 7)

- 26) C, 2;9: I'm gonna just *fall* this on her. (Holding piece of paper over E's head, then drops it).
- 27) E, 3;8: And the doggie had a head. And somebody *fell* it off. (Shortly): And the doggie had a head and then no head. (Telling about something seen on TV).
- 28) Kendall, 2;3: Kendall *fall* that toy. (After K drops a toy on the floor).
- 29) Stevie, 2;2: Tommy *fall* Stevie truck down. (Complaining about brother's actions).

DIE DEAD/KILL

- 30) Hilary, 4+: He's gonna *die* you, David. (Turns to Mother): The tiger will come and eat David and then he will be *died* and I won't have a little brother any more.
- 31) C, 5;0: O.K. If you want it to die. Eva's gonna *die* it. She's gonna make it die. (E is about to touch a moth).
- 32) Girl, 9;+(?): What is the reason you want dead that fly?... to *die* that fly... to make it dead? (After seeing interlocutor kill fly).
- 33) E, 4;10: Don't *dead* him. (As M picks up a spider).
- 34) John, 2;6: Who *deaded* my kitty cat?

EAT/FEED (see also Table 3, No. 8)

- 35) C, 3;3: C: See, she can't eat. (Poking spoon at doll's closed mouth).
M: Just pretend, honey.
C: But I can't *eat* her!
- 36) C, 3;8: No, Mommy, don't *eat* her yet, she's smelly! (As M is about to put E, who has a soiled diaper, into her highchair).
- 37) Rachel, 2;0: Don't *eat* it me. (As M feeds Rachel cottage cheese).

⁹ See Jackendoff [1976: 105] for an analysis of *keep* as CAUSE STAY and *leave* as LET STAY.

FULL/FILL

- 38) C, 2;3: Full it up! (Looking with dissatisfaction into her bottle, which M has only partially filled).
 39) E, 3;9: They should *full* up her basket with peaches and pears and... (lists more fruit).

HOT/HEAT

- 40) Jaime, 6;8: This'll *hot* it up. (Putting bread into toaster).
 41) E, 5; 2: The equator and the sun *hot* our planet up?

REMEMBER/REMIN (see also Table 2, No. 30)

- 42) C, 6;11: Will you please *remember* me what I came in for? (C, after entering a room, has forgotten her mission).
 43) E, 4;11: I keep have to *remember* you. (=I keep having to *remind* you).
 44) Mindy 6;7: I have to *remember* my daddy... Saturday Winnie the Pooh is on. (Must tell D so she can watch it).

HIGHER, RISE, (GO)UP/RAISE

- 45) C, 5;0: My daddy lowered the seat and lowered the handlebars and *highered* the wheels. (Re: new bike).
 46) E, 4;4: I'm gonna *higher* myself up with this pillow and with this pillow.
 47) Boy, 5;11: Who *highered* the swing?
 48) Marcy, 6;4: Why do we have to *rise* it? (Re: crossbar of baby swing).
 49) C, 6;8: It's *rising* me. (C in tub, warm water is making her float up).
 50) C, 3;1: Up your legs! (Pushing baby sister E's legs up as E lies on stomach).

(GO) DOWN/LOWER

- 51) C, 3;3: C: Down your little knee. (To E, pushing down on E's flexed knee).
 M: What?
 C: Down her little knee. (To M).

(GO) ROUND/ROTATE, TURN

- 52) C, 3;0: I wanta... wanta... wanta *round* it. (Watching M use egg beater; stretching out hand towards handle).

(GO) OFF/Specific motion+manner verb. (See footnote No. 8 above).

- 53) C, 5;3: C: I *offed* it. (=sucked it off).
 M: Offed what?
 C: The juice. (After C sucks juice off end of banana she has dipped in cup of juice).

HAVE, TAKE/GIVE

- 54) C, 4;0: Will you *have* me a lesson? (Request to adult friend in swimming pool).
 55) C, 4;2: How do you write «Marc», 'cause I want to *have* it to Marc. (C drawing picture for a friend; later gives it to him).
 56) C, 4;6: Would you like me to... *have*... you some? (Re: piece of gingerbread C is holding, to M).

- 57) C, 3;8: You feed me. *Take* me little bites. Give me little bites.
 58) Robert, 11+: We *took* him a bath yesterday and we *took* him one this morning. (Reporting on bathing baby brother).
 59) Julie, 5+: When we go home I'm gonna *take* you a bath with cold water. (To her doll).
 60) Hilary, 4+: M: Would you like to take a bath?
 H: Oh yes, c'mon, David, let's take a bath.
 M: You have to clean up your room first.
 (After she cleans it up):
 H: C'mon, Mama, *take* me a bath. C'mon, David, Mama's gonna *take* us a bath.
 61) C, 3;9: You better not *take* me a quiet time, you better *take* me a quiet time. (C paraphrasing for D's benefit a protest she'd made earlier when M said she should have a nap: «You better not give me a quiet time, you better give me a quiet time». (NB change from *give* to *take*). After original sentence she'd laughed when she realized she'd made a mistake, intending to say «you better not give me a *nap*, you better give me a quiet time».)
 62) C, 3;5: A nice nurse lady *took* me a ride. (Reporting that nurse in hospital had pushed her in a wheel chair).
 63) Hilary, 4+: (On park merry-go-round)
 H: Turn it, Mama, turn it, faster, faster! O.K. now you get on. David, let's *take* Mama a ride.
 M: Oh, you're gonna give me a ride?
 H: Yes, we're gonna *take* you a ride, Mama.
 64) Rachel, 4;6: I want you to *take* me a camel ride over your shoulders into my room.
 65) Jaime, 5;10: I'm *taking* my babies a walk. (Pushing dolls in buggy around house).

BE/PUT, MAKE¹⁰, KEEP (see also Table 2, No. 35)

- 66) E, 5;0: E: Be a hand up your nose.
 M: What?
 E: Put a hand up to your nose.
 67) C, 3;1: I wanta *be* it off. I wanta put it off. (=take. C struggling with sweater. After utterances, leans over so M can help her take it off).
 68) C, 5;0: C: Why do you have to *be* it smooth before you put it in a pony tail?
 M: What?
 C: Why do you have to put it smooth before you put it in a pony tail? (As M brushes C's hair).
 69) C, 3;5: Be a picture of Emily and me. (=cause to be/exist; *make*. After climbing onto couch to pose with cousin as M is taking polaroid pictures. *Take* would be appropriate here, but is idiomatic).
 70) C, 5;5: I meant to *be* it like this. (=make it, have it *be*. Showing M with her hands how she had intended to orient cut-outs in picture that had turned out wrong).

¹⁰ According to Binnick [1971a], *put* and *make* are both causative forms of *be*. *Put* corresponds to *be* plus a locative phrase, and *make* to *be* plus a stative phrase. Anderson [1969] argues that the notion encoded by *be* («exist») also underlies *make* in single-clause sentences (John made a cake=John caused a cake to be/exist). See Bowerman [1978] on occasional substitutions in C's and E's speech of *put*, *make*, *take* and other cause-change-of-state/location verbs for each other. This took place only after an initial period of correct usage.

- 71) C, 2;1: (M and C playing on couch).
M: Close your eyes.
C: No! I want *be* my eyes open.
(=*keep/make* stay open).
C's later rendition of this type of structure involved the causative use of *stay* (cf. No. 20).
This early version suggests that *stay* has *be* as a component («continue to be», although see Jackendoff, 1976, for arguments against such an analysis).

HAPPY/CHEER UP

- 72) E, 4;8: You can't *bappy* me up. (E determined to stay angry).

C. Lexical causative unlikely or impossible on semantic grounds

- 73) C, 3;1: I'm *singing* him. (C pulling string that used to make broken music box cow play; M has just said «The cow would like to sing but he can't»).
- 74) E, 2;11: Do you want to come watch the mans *sing* their guitars? (Invitation to M and D to come see guitar players in restaurant).
- 75) E, 2;11: M: How do you use a piano?
E: You *sing* it.
- 76) E, 2;2: I'm *talking* my birdie. (E, pulling string on bird-shaped music box).
- 77) E, 4;0: Polly and Vicky aren't real. We just hold them up and *talk* them by themselves. We talk for them. (Re: her and C's dolls).
- 78) E, 3;0: Don't *giggle* me. (as D tickles E).
- 79) E, 5;3: You *cried* her! (After M drops E's doll and it squeals. See also Table 2, No. 37).
- 80) C, 4;6: *Spell* this «buy». *Spell* it «buy». (Wants M to rotate blocks on toy spelling device until word «buy» is formed).
- 81) C, 4;3: Andrea. I want you to watch this book. Andrea. I want to *watch* you this book. (Shortly): I just want you to watch this book. (C trying to get A's attention so she will look at the book).
- 82) E, 2;11: *Watch* your faces! (Trying to get parents' attention so their faces will «watch» something).
- 83) E, 2;1: I wanta *swim* that. (Holding an object in the air and wiggling it as if it were swimming).
- 84) C, 3;4: (M and C have been drawing puzzles for each other): Do you think Daddy can guess that one? (Turns towards D): I'm gonna *guess* it to him.
- 85) E, 3;7: Yawny Baby — you can push her mouth open to *drink* her. (Showing M how her doll can take a bottle).
- 86) C, 3;1: *Drink* me. Uh... put it in. (Yesterday M had squeezed an orange half directly into C's mouth. Now handing M an orange half under similar circumstances; waiting expectantly).
- 87) Jaime, 6+ : It *sounds* you like a mouse. (When parent makes a noise).

D. «Accidental gaps»: Causative verb theoretically possible, but none exists

- 88) E, 3;2: Will you *climb* me up there and hold me? (Wants M to help her climb pole).
- 89) E, 3;7: I'm gonna put the washrag in and *disappear* something under the washrag. (E playing in tub).

- 90) C, 4;2: C: He's not here, he disappeared.
M: Where'd he go?
C: He *disappeared* himself. (A moment later): He just keeps *disappearing* himself in different places. (Telling M about actions of clown on TV. See also No. 28, Table 2).
- 91) Jennifer, 6+ : Do you want to see us *disappear* our heads? (Then, with a friend, ducks down behind couch).
- 92) Scott, 5;0: I *disappeared* a bear in the back of the car; that's why you can't see him. (After hides toy bear).
- 93) C, 7;8: Did they *vanish* «knock-knock» cups? (Noticing Dixie cups in new pack no longer have knock-knock jokes on them).
- 94) C, 6;4: It'll warm up to be colder. It'll *colder* it up! (*make hot=heat* (cf. No. 40, 41 above), but there is no single word for *make cold*).
- 95) E, 3;8: I'm gonna *round* it. (Rolling up piece of thread into ball. See also Table 2, No. 32, 33, 39).
- 96) C, 5;1: First you *round* it, then you put some tape on. (Later): Don't circle it. I forgot. First you might circle it; that'll make it bendier. (Instructing M on how to bend cardboard rectangle to make a train car).
- 97) Andrea, 4;6: Well, you just *round* them. (Giving friend instructions on how to make play-dough beads).
- 98) Rachel, 2;7: Are you gonna *nice* yourself? (Watching M put on eye shadow. Cf. *beautify, neaten, pretty* (yourself) up, etc.).
- 99) C, 4;3: It always *sweats* me. That sweater is a sweaty hot sweater. (Doesn't want to wear sweater).
- 100) Rachel, 3;8: That one always *sweaties* me. (Doesn't want to wear knit hat because it makes her sweaty).
- 101) C, 3;6: Did she *bleed* it? (After E falls and hits head on edge of table).
- 102) E, 3;3: Carrie *bleeded* a tree and we put a bandaid on it. (After child at school makes sap ooze from tree).
- 103) Mindy, 5;8: Min: These are nice beds.
M: Yes, they are.
Min: Enough to *wish* me that I had one of those beds.
- 104) C, 3;6: *Unstuck* it. (Handing M a baby bottle with clogged nipple. «Stuck» is M's and C's routine word for «clogged» in this context).
- 105) C, 2;3: Bottle *feel* my feets better. (= *make feel better*; causative use of *feel* in this sense was standard in C's speech for months. C's feet swollen; M and D concerned and discussing medicine; C protesting here that she doesn't need medicine, just a bottle).
- 106) E, 4;11: I'll have to sit and *comfy* myself right here. (= *make myself comfy*).
- 107) Rachel, 5;9: I want to *comfortable* you.
(R lying on sofa with M, cuddling her).
- 108) E, 5;3: This is *aching* my legs. (As climbs long flight of stairs).
- 109) Rachel, 4;1: You *ached* me. (R lying on the floor; her brother has just pulled one of her legs up and dropped it).
- 110) Mindy, 6;6: When you do that log roll it kind of *dizzies* you. (Describing gymnastic exercise).

E. Novel causative verbs in adult speech or writing

- 111) UL- approved outdoor lighting sets are weatherproofed so that water will not *deteriorate* the sockets. (Safety official's advice on purchase of Christmas lights, quoted in Lawrence (Kansas) «Journal-World», 12-8-1976).

- 112) He said that the Agnew and Watergate affairs have tended to *deteriorate* confidence in the American system. (Article in Lawrence (Kansas) «Journal Worlds», date not available).
- 113) The relatively steep nose-up attitude after take-off *climbs* the airplane quickly to decrease noise on the ground. (On United Airlines on-board map. Compare with No. 88 above).
- 114) *Sparkle* your table with Cape Cod classic glass-ware. (B. Altman advertisement quoted by Edwin Newman in article deploring bad language, «Esquire», 12-1975).
- 115) Zia *conforms* Pakistan law with Islam (Headline in International Herald Tribune, 2-12-1979, p. 1).
- 116) Mr. Castellito simply disappeared permanently in 1961, but the jury apparently believed the testimony of other figures who said Mr. Provenzano had arranged to *disappear* him. (Newspaper story, reference not available; compare with No. 89-92 above).
- 117) At the end of the week, «Here little doggie, here is your bone, now *last* it until next week». (In «Mother Jones», Sept/Oct., 1976).
- 118) We're gonna splash and we're gonna spin ya. We're gonna *scream* and we're gonna *grin* ya. (In promotional brochure for Worlds of Fun, an amusement center near Kansas City).
- 119) I suspect I was *offed* for some of the things I said but I don't have a shred of evidence. (Nicholas van Hoffman, discussing nonrenewal of his CBS contract, reported in Lawrence (Kansas) «Journal-World», 10-29-1976, p. 3. Compare with No. 50, 51, 53, above).
- 120) I thought I was crazy. (Intervening sentences). I took acid. It *saned* me right up. (Richard Pryor on Tonight show, 1-8-77).
- 121) Don't *die* the note on me then! (Intervening sentences). Don't die on me. (Orchestra conductor leading rehearsal. Compare with No. 30-32 above).
- 122) The aspirations have been *risen* again (=have been raised. Male student. Compare with No. 48, 49 above).
- 123) They've *grown* it to where it's a large company. (Business school graduate).
- 124) That experience *grew* me up in a hurry. (Letter to Ann Landers).
- 125) What's *fussing* her? (a Grandpa wondering why baby is crying).
- 126) But I think Mom would just as soon *stick* us around — have us stick around. (Son describing plans for going home at Christmas).
- 127) He just *popped* it up out of the clear blue sky. (Wife telling how husband thought of name for their baby).
- 128) They *break* her out. (Mother telling how disposable diapers give her child a rash).

too broadly. More direct support for this conclusion is that English provides a model upon which both the semantic and formal aspects of the errors could be based and that the errors «behave» exactly like more familiar overregularizations of inflectional morphology.

In adult English there are many verbs whose meanings can be roughly paraphrased as «cause (become) Y», where Y is a verb or an adjective. Morphologically there are several ways in which a noncausative predicate and its causative counterpart can be related to each other (for discussion see Lyons [1968: 360], Kastovsky [1973: 266-70]):

1. Derivational morphological devices, most of which are no longer productive (i.e., cannot be used freely to create novel words), e.g., *legal-legalize*, *rich-enrich*, *lie-lay*, *flat-flatten*¹¹.

2. Morphological identity: e.g., transitive and intransitive (or adjectival) *open*, *break*, *bend*, *turn*, *warm*, *dry*, *smooth*, and many others.

3. No morphological relationship at all: e.g., *die-kill*, *come-bring*, *see-show*, etc.¹².

Novel causative verbs like those in Table 1 are patterned like *break* and *warm*. The child simply takes a «received» non causative form and uses it directly, without morphological modification, in a causative sense. A child could presumably formulate a rule for performing such an operation on the basis of her observation of the morphological and semantic relationship between members of received causative-noncausative pairs like transitive and intransitive *open*. The exact form such a rule would take is not immediately obvious, however; this is the critical question that makes the causative verb errors relevant to linguistic theory.

In many cases adult English offers a legitimate causative verb with the same meaning as the child's «creation». For example, the errors grouped under A in Table 1 all involve adjectives that can in fact be used as causative verbs, but they require the derivational suffix *-en* or *-ize*. The verbs in the sentences grouped under B cannot themselves be used as causative verbs, even with modification, but adult English offers morphologically unrelated causative verbs with the same meanings. Sometimes children's overregularized causative verbs replace morphologically unrelated causative forms that were previously frequent in their speech. In Christy's case, for example, *bring*, *keep*, and *leave* had all occurred in transitive causative contexts before the onset of the novel causative forms; these vanished for some time in favor of causative *come* (e.g., see (8)-(10)) and *stay* (as in (20)-(25)). Certain other morphologically unpredictable causatives did not disappear entirely but were occasionally replaced in contexts that called for them by novel causatives derived from noncausative forms, e.g., *give* (replaced by *take*, *have*, (54)-(65)) *put* (*be*, (66)-(68)), *make* (*be*, (69)-(70)), *take* (*go*, (12)-(13)). The substitution of rule-governed but incorrect forms for previously well established forms that are correct but not predictable by rule is well known in the domain of inflectional morphology; it constitutes one of the strongest types of evidence for the status of errors as overregularizations.

Children's causative verb errors constitute overregularizations not only in form but also in content: the novel forms sometimes encode causative meanings that cannot be expressed with a single lexical item in adult English. The absence of some conceivable causative verbs in adult English is semanti-

¹¹ *-en* suffixation is not exclusively causative; it encodes «change of state» (Marchand [1969: 272]) and so occurs in intransitive contexts as well, e.g., «The apples reddened».

¹² Some pairings of noncausative forms with causative forms are relatively uncontroversial, e.g., *die*, *kill*. Other possible pairings are more difficult to justify. For example, is *send* the causative form of *go*, or is it *take*, *put*, or all of these? Is it reasonable to consider both *drop* and *knock down* as causatives of *fall*?

cally systematic: almost all existing causative verbs involve *changes of state*, including locative state (Binnick [1971a], Kastovsky [1973]). Children are not at first aware of this semantic restriction¹³ and create semantically ill-formed verbs with meanings paraphrasable as «cause to sing», «cause to giggle», «cause to guess» etc., as under C in Table 1¹⁴.

Even within the semantic domain of change-of-state there are certain holes in English — for example, no verbs meaning «cause to disappear» or «cause to ache». Some linguists regard these as «accidental gaps» in the English lexicon — accidental in the sense that such verbs would be semantically well formed, i.e., semantically *possible* lexical items, but for historical reasons they simply happen not to exist (McCawley [1970])¹⁵. Many of children's causative verbs fall into this category, cf. group D in Table 1.

The purpose of the foregoing discussion has been to establish that errors of the type shown in Table 1 reflect children's grasp of a semantic and morphological regularity in the structure of the English lexicon. We turn now to an investigation of the exact nature of the child's knowledge and of how well this knowledge appears to be captured by competing linguistic models of the structure of causative verbs.

CASE GRAMMAR: CAUSATIVE-NONCAUSATIVE PAIRS AS CONTEXTUAL VARIANTS

A traditional way of accounting for the relationship between the members of morphologically identical causative-noncausative pairs such as transitive and intransitive *break* and *open* has been to consider them as contextually-determined variants of a *single lexical item* (e.g., Jespersen [1927]). In this analysis, apparent differences in meaning between the members of a pair are ascribed to differences in the linguistic contexts in which they appear; the differences are not seen as inherent in the meanings of the words themselves.

A contemporary version of the contextual variants approach is found in Fillmore's [1968] case grammar treatment of causatives. In case grammar, the «context» of a verb, termed its «case frame», is defined in terms of the semantic roles («cases») of the noun arguments with which it can co-occur in sentences. According to Fillmore's analysis, a verb like *break* or *open* should

¹³ This restriction is clearly language-specific rather than a universal constraint on the semantics of causative verbs. Hebrew, for example, has many lexical causatives encoding meanings that fall outside the «change of state» category, such as «cause to sing», «cause to dance», and «cause to laugh» (Ruth Berman, personal communication). Even English has a few, e.g., *feed* («cause to eat»).

¹⁴ Children's novel causative verbs may differ semantically from the causative verbs of adult English not only with respect to the nature of the caused event, as in these examples, but also with respect to the kind of *causation* involved, e.g. whether or not direct physical manipulation on the part of the agent is involved. This is discussed on p. 46 below.

¹⁵ The notion of «semantically possible but nonoccurring» is analogous to the concepts of «phonologically possible but nonoccurring», e.g. *blick* (McCawley [1970]) and «morphologically possible but nonoccurring», e.g. *derival* and *arrivation* (Halle [1973]).

be given a single entry in the lexicon, along with a case frame specifying that it occurs obligatorily with an Object (patient) noun phrase and optionally with an Agent and/or Instrument noun phrase as well. The surface syntactic organization of a sentence is established through transformations that assign grammatical roles to the noun phrases. When there is only an Object in the underlying structure of a sentence with *break* (for example), the Object becomes the subject. If there is also an Agent, the Agent becomes the subject and the Object becomes the direct object. Fillmore proposed also extending this treatment to members of causative-noncausative pairs that are not morphologically related to each other, suggesting that *kill* and *die*, *show* and *see*, and *teach* and *learn* (for example) could be considered contextually determined variants of single lexical items just like transitive and intransitive *break*. If the sentence into which an item is to be inserted contains an Agent, the first member of the pair is selected; if not, the second member is chosen.

The explanation for children's causative verb errors that seems to follow from this account of the structural relationship between causative verbs and their noncausative counterparts is this: the child at some point realizes that some verbs and adjectives (e.g., *open*, *break*, *warm*) appear sometimes with an Agent and sometimes without, and that the presence of an Agent is associated with a causative sense and with a different syntactic treatment (Agent as subject, vs. Object as subject when there is no Agent). Having made this discovery, the child incorrectly assumes that many or all verbs and adjectives have the same flexibility.

Verbs that normally take Agents

This explanation is inadequate in at least two respects. First, it does not predict and cannot account for a certain subset of children's causative verb errors. In Fillmore's model, it is the addition of an Agent that makes predicates like *break*, *open*, and *warm* causative and allows them to take a direct object. As long as we restrict our attention to sentences involving words that do not normally take Agents — e.g., *die*, *fall*, and most adjectives — it is plausible to suppose that the errors result from the child's overly general application of her discovery that given predicates may appear both with and without an Agent, with the presence of an Agent associated with a causative sense. But many errors involve the causative use of verbs that in the child's own speech normally *already* occur with Agents, such as *come*, *go*, *sing*, *climb*, *drink*, *eat*, and *guess*. Thus, how can it be the Agent that confers a causative sense? In sentences involving verbs that normally take not only Agents but also Objects — e.g., (35) «But I can't *eat* her», as the child tries to feed a doll — there is nothing in the linguistic context itself to distinguish between a deviant causative reading and a normal noncausative reading: the syntax is unexceptional and the semantic functions (cases) that would be assigned to the nouns co-occurring with the verb would be identical under either interpretation. Clearly, then, the error does not inhere in a mismatch between linguistic context (case frame) and lexical item. Where then shall we locate it? What has

the child done wrong?

This inability of case grammar to account for errors involving the causative use of verbs that normally already take Agents reinforces an objection to the case grammar account of causative verbs that has already been raised on other grounds (Kastovsky [1973: 259], Anderson [1969: 101]): that relying solely on the presence of an Agent to provide the causative sense means there is no way to distinguish semantically between sentences involving true causative verbs and those involving «basically» or «inherently» transitive verbs that are not readily analyzable as causatives (*beat, read, listen*, etc.; cf. Lyons [1968: 384]). Sentences of both kinds would have Agentive subjects and Objective direct objects.

Directionality of errors

The second difficulty with the case grammar account of «what children learn» about the structure of causative verbs is that it cannot explain the *directionality* of the errors. If the errors stemmed from the child's realization that some words can express either a state (process) or an action that brings this state (process) about, depending on linguistic context, one would predict that a child would not only use obligatorily intransitive state (process) words in a transitive causative sense, as in the errors in Table 1, but also that he would sometimes use obligatorily transitive causative verbs intransitively in a stative or process sense. That is, at the same time that he begins to produce errors like «I'm just gonna fall this on her» (intransitive noncausative → transitive causative), he should also begin to produce errors like «John knocked down» (= [someone] knocked John down; John fell down) and «the fly killed» (= died) (transitive causative → intransitive noncausative).

Such errors do occur in child speech, for example, Christy, 3;0: «Bert knocked down» (= someone knocked Bert down). However, in Christy's and Eva's development, these errors did not appear until well after productivity in the use of noncausative predicates as causative verbs was well established, and they remained infrequent relative to the reverse error. These facts are incompatible with the case grammar analysis of the structural relationship between members of causative-noncausative pairs, since this analysis specifies no asymmetry between the members — no more «basic» status for one member of the pair than for the other. In significant contrast, the facts are not only compatible with but would be predicted by a linguistic model that represents the meanings of causative verbs compositionally, as will be discussed below.

CAUSATIVE VERBS AS SEMANTIC COMPOSITIONS

Unlike the «contextual variants» approach, a compositional approach to the relationship between causatives and their noncausative counterparts would treat the members of a pair as two distinct lexical items with different

meanings. The meaning of the causative would be said to be «composed of» the meaning of the noncausative (itself probably further broken down, e.g., into BECOME plus a specification of a state) plus an additional semantic element («feature», «component», «semantic primitive», etc.) representable as CAUSE (and perhaps additional elements further specifying the causing action, such as DO [SOMETHING]). Transitive *break*, for example, would be assigned a semantic representation such as (DO) CAUSE BREAK (or: BECOME BROKEN) and *kill* would receive a representation such as (DO) CAUSE DIE/BECOME DEAD/BECOME NOT ALIVE (etc.). Representations along these general lines are agreed on by both generative semanticists and lexicalists, as well as many linguists not clearly identified with either camp.

Derivational relationships

When there is not only a systematic semantic relationship between two sets of words but also a regular morphological relationship, as there is between transitive *open, break, warm* (etc.), and intransitive or adjectival *open, break, warm*, and between *legal, stable* (etc.) and *legalize, stabilize*, the question arises whether the words in the two sets should be regarded as *derivationally related* — that is, whether the words of one set should be characterized as constructed from the words of the other set. Operations for deriving new words from existing words or parts of words are called *word formation rules* (WFRs). WFRs often specify a morphological operation upon words taken as base (e.g., Adj. + -ize). However, there can be word formation rules with no associated morphological operation; this is often called «conversion» or «zero derivation»: for example, *to cash* as a verb from the noun *cash*, and *a look*, *a fall* as nouns from the verbs *to look, to fall* (Marchand [1969: 359-360], Aronoff [1976: 70], Lyons [1977: 522-523]). In addition to undergoing a morphological operation (if any), the base word to which a WFR is applied is affected semantically and syntactically (Aronoff [1976]).

When transitive and intransitive or adjectival *break, warm*, etc. are interpreted as derivationally related, the noncausative form is taken to be the base form (see Marchand [1969: 359] for arguments based on the relationship of these words to other patterns of deriving causatives in English, e.g., by affixation). There is no morphological change, of course, but there are semantic and syntactic modifications: the addition of the semantic element CAUSE (and perhaps others) to the meaning of the base and the shift from intransitive or adjectival status to transitive status.

A plausible explanation for the onset in a child's speech of errors like those in Table 1 is that she has acquired the rule of word formation sketched above (whose formal characteristics must still be determined), but has not yet learned exceptions to and constraints upon the operation of the rule¹⁶. The

¹⁶ A question that will not be explored here is whether there is one «zero derivation» rule that converts both intransitive verbs and adjectives into transitive causative verbs, or

directionality of the errors — that is, the early onset and greater frequency of errors in which a noncausative is used as a causative relative to errors of the reverse kind — supports this interpretation. This is because if the use of noncausatives as causatives reflects the operation of a rule of word formation, then the intransitive noncausative use of a verb always used as a transitive causative in the speech heard by the child would necessarily be regarded as a *backformation*.

Backformations

The creation of a backformation, by definition, involves the speaker's inference, from a «received» form that he understands as made up of more than one component, of the existence of a simpler form that is putatively the underlying base. As Aronoff puts it, «back-formation must be a sort of unraveling of WFRs [word formation rules] and other morphological rules...; that is, ...an individual back-formation can best be viewed as the answer to the question 'What word could this one have been formed from by a regular rule?'» [1976: 31].

Given this asymmetry, one would expect that «forward» errors (incorrect but rule-governed build-ups) should developmentally precede and tend to be more frequent than backformations (incorrect but rule-governed «tear-downs») in a particular paradigm, and this expectation is certainly borne out in the case of errors involving inflectional or derivational morphemes. For example, errors like the addition of plural *-s* to *sheep* to form *sheeps* occur early and are common, while those like the extraction of (a) *scissor* from *scissors* occur much later and are rare.

The hypothesized sequence of events leading up to the production of errors like «The fly killed» is as follows. At first the child is unaware of the internal structure of «received» causative verb like transitive *break* and *kill*, but uses them roughly correctly as unanalyzed units (see Bowerman [1974] for elaboration). This is analogous to the initial stage of correct use of both regular and irregular inflected forms.

Next the child comes to recognize, implicitly of course, that «zero derivation» causative verbs like *break* have an internal structure: that they are composed of their noncausative counterparts plus (at least) an additional component representable as CAUSE. This is analogous to the child's analysis of inflected forms, previously used as unanalyzed units, into their components, e.g., *shoe*+*-s*, *walk*+*-ed*. In the case of both causative verbs and inflected forms, the analysis presumably involves a comparison between the multicomponent forms and their bases, such that the phonological and/or syntactic differences between the two are noted and associated with a semantic dif-

two. Aronoff [1976] argues that the base of a WFR is always unique, i.e., the rule «will never operate on either this or that» (p. 48). However, novel causative verbs based on intransitives and adjectives appear at about the same time in children's speech, to judge from the Christy and Eva data, suggesting that at least initially there is only one rule.

ference. Thus, the alternation between *shoe* and *shoes* (and *cup*, *cups*, etc.) is observed, the singular form *shoe* is recognized «in» the plural form *shoes*, and the «extra» meaning encoded by *shoes*, plurality, is associated with the *-s*. Similarly, the alternation between transitive causative *break* and intransitive noncausative *break* (for example) is observed, intransitive noncausative *break* is recognized «in» transitive causative *break*, and the «extra» meaning encoded by transitive causative *break*, representable as (at least) CAUSE, is associated with the way transitive *break* differs syntactically from intransitive *break*¹⁷.

At some point after this analysis has taken place, the child begins to exploit her knowledge of the structure of causative verbs to create new ones cut to the same pattern. When she wishes to express a meaning that is jointly specifiable in terms of the meaning of a noncausative predicate she already knows plus the notion CAUSE, she simply «adds» CAUSE to the meaning of the noncausative predicate and accords this semantically new verb the syntactic privileges (transitivity) that are appropriate for causative verbs she already knows. This is analogous to the process assumed to underlie the onset of productivity with inflectional endings: the child begins to freely manipulate notions of plurality, past time, etc., joining them as needed to the meanings of known nouns and verbs, and marking the «additions» with the appropriate grammatical devices.

Finally, the child extends the relevant internal analysis to verbs like *kill* that she has never heard used intransitively but that she recognizes as *semantically* akin to transitive *open*, *break*, etc. — i.e., recognizes as causative verbs. In implicitly answering the question «what could *kill* (for example) have been formed from by a regular rule?», she interprets *kill* as a derived combination of CAUSE plus a noncausative predicate-of-the-same-form, analogous to transitive *break*. Now she is ready to «unravel» the word formation rule and create a backformation by stripping off the CAUSE component of *kill*, extracting a noncausative predicate-of-the-same-form, *kill* — which adult English happens to encode with *die* — and using this new word intransitively.

The analysis just presented of the directionality of children's causative verbs errors depends upon a compositional account of the structure of causative verbs (and is incompatible with the case grammar approach for reasons already discussed and with the meaning postulates approach, which will be considered later). But it does not discriminate between the generative semantics and lexicalist approaches to compositionality (despite the adoption of terms current in lexicalist literature). We will see whether there are grounds for doing so. First, however, we must look at a second kind of «contextual variants» approach that avoids some of problems posed by the case grammar analysis.

¹⁷ It is unclear how many different word pairs exhibiting a given alternation a child must observe before she associates a morpheme or syntactic property with an appropriately abstract meaning (plurality, past time, CAUSE), independent of the *particular* situations or words with which these concepts come packaged together. By the time Christy's first novel causative verbs appeared, she had used about 8 words in spontaneous speech in both transitive causative and intransitive or adjectival contexts: *open*, *close*, *break*, *wet*, *dry*, *spill*, *hurt*, and *pop*; some or all of these might have constituted the corpus from which she extracted the rule.

Lord [1979] has recently questioned the adequacy of an account of children's novel causative verbs that treats the causative form as composed of the noncausative form plus a semantic element representable as CAUSE¹⁸. She raises two basic difficulties. First, she observes that in her own two children's development the directionality of errors favoring novel transitives over novel intransitives was not marked, as it was in the case of Christy and Eva. In Benjy's speech, novel transitives preceded novel intransitives by about 2 months but the overall number of verbs involved in recorded errors of both kinds was the same (49). In Jennifer's case there was no clear-cut difference in time of onset. There *was* a difference in the total number of verbs participating in the two kinds of errors (49 novel transitives vs. 17 novel intransitives), which would seem to support a directional account, but Lord feels that this probably reflects the observer's failure to be as sensitive to novel intransitives as to novel transitives rather than a real difference in the relative frequency of the two kind of errors.

The lack of marked directionality in her data leads Lord to reject an analysis whereby words of one kind are taken as basic. She hypothesizes instead that errors of both types result from the child's grasp of a bidirectional paradigm in which «the same lexical item can have two different functions, depending on the number and nature of the noun phrases involved» (p. 83) (thus, a «contextual variants» approach).

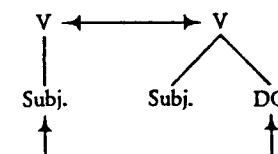
What is the nature of the optional argument, she asks? Here, like Bowerman [1974, and above], she considers the case grammar analysis inadequate because it does not account for the transitive use of intransitive verbs that already have Agentive subjects in their intransitive uses (*come*, *sing*, etc). Further — and this is the foundation of Lord's second objection to the compositional account of children's causative verb errors — an analysis of the optional argument in which the semantic element CAUSE plays the key role would be undesirable because it is too limiting: some of the novel intransitives produced by Lord's children could not readily be construed as involving the subtraction of CAUSE (e.g., «I can't hear it». (Puts clock to ear): «It can *hear* now») and, conversely, some novel transitives were not causative (e.g., «Did you *sound* that funny guy?» (=«hear», not «cause to sound»).

Given these facts, Lord argues for an analysis «not in terms of deep case roles or semantic primitives, but in terms of syntactic positions», along lines of the model developed by Tesnière, as shown in these diagrams (adapted from Lord's (9) and (10)):

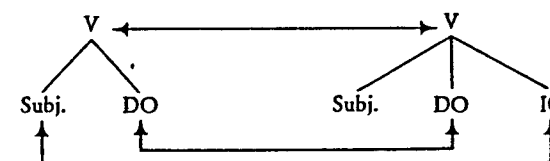
(a) Syntactic correspondences between one-argument and two-argument constructions (asterisks show ungrammatical child utterances):

¹⁸ Her counterarguments are directed at my formulation in Bowerman [1974], which is retained and elaborated in the preceding section of this paper.

- 1) it opened ↔ I opened it
- 2) I fell ↔ *you fell me
- 3) *It can hear ↔ I can hear it



(b) Syntactic correspondences between two-argument and three-argument constructions:



- 4) Aunt Ruth is trying to guess what I have ↔ *I'm trying to guess Aunt Ruth what I have
- 5) He's gonna guess it ↔ *I'm gonna guess it to him
- 6) I hold it ↔ *Hold it to me!
- 7) *She calls «Fluffy cat» ↔ We call her «Fluffy cat».

According to this formulation, the knowledge that underlies the child's commission of errors like the sentences starred above is of correspondences in the syntactic positions of noun arguments in sentences with different valences (number of noun arguments). Diagram (a) shows that the child sees a correspondence between the subject position in sentences with one noun argument and the direct object position in sentences with two. The addition of a new subject to a verb that normally (in adult speech) takes only one argument (e.g. *fall*) thus displaces the noun argument that otherwise occupies the subject slot to the object position. Conversely, the subtraction of the subject from a two-argument predicate (e.g., *hear*) causes the noun argument that otherwise would be the object to move into the subject slot. The processes represented in Diagram (b) are similar, except that here, because the verb with lower valence (fewer noun arguments) is already transitive, the addition of a new subject displaces the original subject to indirect object position rather than object position. Lord notes that «children's novel forms follow the predictions for causatives in universal grammar that have been proposed by Comrie [1975, 1976]», according to which a subject displaced by a new subject occupies the first syntactic slot available to it on Keenan and Comrie's [1977] Accessibility Hierarchy (Subject > DO > IO > Oblique) (see also Dowty [1976: 242] for a discussion of this).

Lord's careful analysis raises some perplexing questions. If her model can account for everything the word formation analysis proposed above accounts for and more besides — most notably novel transitives that are not causative

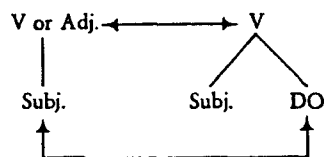
and novel intransitives that are not based on causative verbs — then it is indeed to be preferred. However, I think this is not the case. The model provides no explanation for certain phenomena that can be dealt with easily with a word formational account and, in addition, it raises serious new problems and questions of its own. These are discussed below.

Directionality reconsidered

Lord rejects a word formational account of novel causative verbs in large part because there was no salient asymmetry in her data favoring transitives made from intransitives over intransitives made from transitives. Satisfactorily assessing the prevalence of this asymmetry among English-speaking children in general (and among adults, for their tendencies in this respect are also relevant) clearly requires information beyond what is to be gleaned from Lord's and my limited corpora. Nevertheless, even if it should turn out, counter to what my own data suggest, that novel transitive verbs are not in general markedly earlier and/(or?) more frequent than novel intransitives, there remains the problem, not discussed by Lord, of directionality with respect to adjectives.

In Lord's corpora, as in mine, there were many novel causative verbs based on adjectives (e.g., Jennifer's «it *colds* my bottom», =makes my bottom cold, as child sits on a metal stool). Although Lord does not explicitly describe the formation of these within the syntactic paradigms she outlines, she would presumably account for them along with errors involving the transitive use of other one-argument predicates like *fall*. This requires only modifying Diagram (a) above to show that the leftmost predicate can be an adjective as well as a verb:

- 8) It opened ↔ I opened it
- 9) I fell ↔ *You fell me
- 10) The milk was warm ↔ Mommy warmed the milk
- 11) My bottom is cold ↔ *It colds my bottom



If a bidirectional paradigm is indeed what underlies these errors, the child should travel leftwards as well as rightwards. The child does indeed sometimes or even often create novel intransitive verbs from transitive verbs, as in «Bert knocked down», which is, of course, why Lord prefers the bidirectional paradigm account over a directional account. But we would also expect the child to create *adjectives* from transitive verbs, e.g.:

- 12) The fly is *kill* (=dead) ← you kill the fly
- 13) The milk was *beat* (=hot) ← Mommy heated the milk
- 14) The cup was *fill* (=full) ← I filled the cup

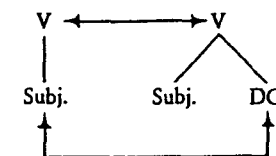
Such errors do not appear in my data, nor, apparently, in Lord's. This indicates that the use of adjectives as transitive verbs is indeed a directional process, and does not reflect the workings of a bidirectional paradigm. Does this mean that the creation of novel transitive verbs from adjectives involves an entirely different process than the creation of novel transitive verbs from intransitives, with the former best described as a directional rule of word formation and the latter in terms of a bidirectional paradigm of syntactic correspondences? This solution is unattractive because it provides no explanation for the fact that the two types of errors begin to occur at about the same time, are semantically virtually identical, and take the same syntactic form. It seems more plausible that a single process is involved.

Which extra arguments can be subjects?

A second difficulty with Lord's account is that it bypasses the question of how children know which «added» noun arguments are candidates for subjecthood and which are not. If Diagrams (a) and (b) adequately captured the knowledge that underlies children's novel transitives and intransitives, we could assume that the child would potentially slot any new noun argument into the subject position, displacing the argument that is normally subject to direct object position (or, if the verb is already transitive, to indirect object position). But the child does not.

Consider the intransitive verb *win*, which many children use as a transitive verb. According to Diagram (a), such errors should take the following form:

- 15) I won ↔ *You won me



where the meaning of «you won me» would be similar to «I beat you», or «I won out over you». But, in fact, children do not make such errors. They *preserve* the original subject and put the new noun argument into direct object position: «I won you». Why is the subject resistant to being displaced?

The one-argument predicate *itch* provides a similar example. The normal subject of *itch* is a noun naming an affected body part. But Christy and Eva sometimes added an «experiencer», the owner of the body part. Lord's paradigm would seem to predict errors like this:

- 16) My nose itched ↔ *I itched my nose

Sentences like «I itched my nose» did occur, but not with the required meaning «I experienced my nose as itching». Rather, they meant either «I

scratched my nose» or «I caused my nose to itch» (e.g. by tickling it with a feather). When the «experiencer» reading of *I* was intended, the children retained the original subject and tacked on the new noun argument as oblique object: «my nose itches to me». (Other «perceptual experience» verbs which, unlike *itch*, are optionally transitive in adult speech, e.g. *hurt*, *sting*, *tickle*, were treated similarly).

The absence of errors like «you won me», meaning «I beat you», and «I itch my nose», meaning «I experience my nose as itching», in the face of scores of errors like «I fell you down» and «the feather itched my nose» (=caused my nose to itch) and a number of errors like «I won you» (=I beat you) and «my nose itches to me», indicates *selectivity* on the child's part: she does not accord every «added» noun argument the privilege of becoming subject and displacing the normal subject to object position. Which noun arguments will become subjects and which ones will not is clearly related to their semantic role with respect to the verb, which in turn is related to the meaning of the verb. This means that an adequate explanation of children's novel transitive verbs cannot be achieved, as on the syntactic correspondences paradigm account, by reference to syntactic factors alone.

We can conclude from the fact that Lord's model predicts certain errors that do not occur (as outlined both here and on pp. 29-30 above) that it is not constrained enough. The absence of the errors indicates that children know something more than, or different from, the proposed paradigms of syntactic correspondences. The model's overly-strong predictive capacity detracts from what at first glance seems to be its greatest advantage over the «word formation by semantic composition» account, that it accounts, as the latter does not, for novel transitives that are not causative and for novel intransitives made from noncausative transitives.

Novel noncausative transitives and novel non«decausative» intransitives

There is reason in any event to question the interpretation by Lord's model for these latter errors provided. Novel transitives that are not causative seem to be extremely rare. I have none in my data, and Lord presents only three:

- 17) Did you *sound* that funny guy? (=hear)
- 18) I *fit* these. (As child puts on socks)
- 19) I'm just gonna hold 'em and look at 'em and, uh, *interest* them. (=be interested in).

The second and third of these are susceptible to a significantly different account than Lord's. While *fit* can indeed occur with a single noun argument in adult speech («these fit»), it is often transitive («these fit me»). The child may well have heard transitive *fit* but be confused about which syntactic role is associated with which noun argument. Similarly, while *interesting* is a one-argument adjective, *interest* — the word the child in fact used — is a

transitive verb («these interest me»), and the child may have simply made a mistake about which of the two noun arguments should be subject and which object. Errors in assigning syntactic roles to legitimate (i.e., not «added») noun arguments also occurred occasionally in Christy's and Eva's speech, e.g. Christy, 7;8: «I don't appeal to that» (=that doesn't appeal to me), as a parent chuckled her under the chin.

Intransitives made from noncausative transitives (e.g., «It can *hear* now»; there are similar examples in the Christy and Eva data) are more difficult to explain away. However, these seem to be semantically restricted, albeit in a way that is difficult to pin down precisely, whereas Lord's model would predict that any transitive verb could be pared down to an intransitive. One type of error that is missing, for example, is the intransitive use of *take* plus an «action-specifying noun complement», as in the following hypothetical sentences:

- 20) Baths *take* too often around here. (=one/someone/ we take baths too often)
- 21) Rides could *take* all day at the fair. (=one/someone/we could take rides...)
- 22) Why do quiet times have to *take*? (=Why does one/someone/we have to take quiet times?).

These errors would be expected, on Lord's model, as the lowered-valence counterparts of sentences like «we could take rides all day...» And it is difficult to dismiss their absence as due to sampling factors, given a) that *raised*-valence errors with this type of construction are very frequent:

- 23) We're gonna take a bath. → Mama's gonna *take* us a bath. ((60), Table 1)
- 24) I took a ride. → A nice nurse lady *took* me a ride. ((62), Table 1)
- 25) I won't take a quiet time. → You'd better not *take* me a quiet time. ((61), Table 1)

and b) that *take* does occur relatively frequently as an intransitive verb in constructions of other kinds, especially with a locative particle, e.g., Christy, 3;11: «I think that blue doll's clothes can go in without *taking* off» (i.e., the whole doll, clothes and all, can go in the washing machine).

Also missing is a convincingly wide range of novel intransitives with animate subjects. There is clearly not an absolute constraint on such sentences in the child's grammar; Lord's data, for example, includes these, among others:

- 26) You're bothering me! You keep on talking to her! And that makes me *bother*!
- 27) They *attract* by the peanuts in the snow. (Said of squirrels).

However, see how much less «likely» the following hypothetical sentences sound:

- 28) You're beating me! You keep on cheating and that makes me *beat*! (i.e., get beaten).
29) She will *kiss* by (or: because of) her shiny new lipgloss. (i.e., get kissed).

Lord's model predicts that errors like (28) and (29) should occur as readily as (26) and (27) since they are syntactically parallel; their absence from her data and mine would thus have to be considered accidental. Alternatively, however, their absence may have a subtle semantic basis, and this could not be explained within a model that accounts for the errors without reference to the meanings of the verbs involved.

Subjects in oblique object position

It was argued above (pp. 30-31) that the syntactic correspondences model does not explain why certain «added» noun arguments systematically do not occur as sentence subjects while others do. A related question is why certain noun arguments that «ought» to be subjects of given verbs, according both to the conventions of English and Lord's syntactic paradigms, and which in fact usually are subjects in children's speech, turn up occasionally as oblique objects, most often as object of *by*. For example ¹⁹:

- 30) Eva, 5;0: It'll all clean up *by the rain*. (=the rain will clean it all up; where *it* refers to pretend jam on the car).
31) Rachel, 4+ : It's open by a rock. The door's staying open *by a rock*. (= a rock keeps the door open).
32) Eva, 4;10:
E: You made yourself be hard *by me*. (=I made you take yourself be hard; after E jumps on C while C is lying on bed, causing C to stiffen up).
M: What do you mean, she made herself be hard by you?
E: She made herself be hard because I jumped on her back and she raised her legs — (breaks off).

In (30), the transitive verb *clean up* is used incorrectly as a one-place predicate. On Lord's account, the intransitive use of a transitive verb results from the child's assumption that, as in the case of *open*, *break*, etc., the noun argument that plays the role of subject of a transitive verb is optional; if it is omitted, the noun argument that would otherwise be the direct object moves

¹⁹ These errors do not set in until considerably after novel transitive and intransitive verb uses appear. What is important, however, is that all three types of errors eventually co-exist in the child's speech; this should not be possible, however, if the cause of novel transitives and intransitives is knowledge of bidirectional paradigms of syntactic correspondences as sketched by Lord.

to subject position. But notice that in this sentence, the noun argument that would be the subject of transitive *clean up*, i.e., *the rain*, has not been omitted at all. Such a sentence should not occur of children's novel transitive and intransitive verb uses stem from their grasp of the paradigm of syntactic correspondences outlined by Lord. That is, if the child includes in her sentences the noun argument that is normally the subject for a given verb then it should be the subject, and the direct object should stay where it belongs; put the other way around, if the child wants to promote the D.O. to subject position she should feel obliged to leave out the original subject altogether.

The above arguments would not apply in the case of passives, where the direct object can be promoted to subject and the subject demoted to oblique object as long as the change is «registered» in the form of the verb. And perhaps the reader will be tempted to dismiss «it'll all clean up by the rain» as an ill-formed attempt at a passive. There are two good reasons not to do so. First, by the time Christy and Eva began to produce such sentences they had already been making well-formed passives for over two years; the technical ability to form a passive if a passive was desired was thus well within their command. And second, there are related errors with «demoted subject-» like noun arguments that resist interpretation as near-miss passives, e.g. (31) and especially (32) above. In (31) the verb form is wrong for a passive since *keep* or *hold* would be needed rather than *stay*: «the door is *kept/held* open by a rock». On Lord's model, this sentence should take the following form: «a rock is staying the door open». That is, the selection, along with the verb *stay*, of both *the door* — that which stays — and *a rock* — that which causes it to stay — should trigger a syntactic arrangement by which *a rock* is subject and *the door* is object. And, in fact, the transitive causative use of *stay* is common in child speech, cf. examples (20)-(25) in Table 1. Sentence (31) above indicates, however, that the «expected» syntactic arrangement is not obligatory.

The extraordinary sentence (32), «you made yourself be hard by me», should likewise never occur if Lord's model were correct. If the child wants to include mention of herself as the agent who caused «you made yourself be hard», she could do it in one of two ways, but either way the self-referent pronoun should function as sentence subject. One way — the adult way — would simply be to form a double-periphrastic causative, «I made you make yourself be hard». The other way would be to follow Diagram (b) above (p. 28), which specifies that when a new subject is added to an already transitive verb (here, the complement-taking verb *make*), the original subject becomes indirect object, thus: «I made yourself be hard to you» (or perhaps «I made you be hard to yourself»). Regardless of whether sentences of the latter type ever occur (I have never observed them), the important point is that in Lord's model, «you made yourself be hard by me» is an unaccountable anomaly.

The problem, I think, is that Lord's model is in one important respect too constraining, even though in other respects, as was argued above, it is not constraining enough: it posits too tight a connection in the child's developing

grammar between how many noun arguments are selected to accompany a given verb in a sentence and the way these noun arguments array themselves syntactically. There are undeniably *some* interconnections of this type in the child's grammar — otherwise the variety of errors in syntactic role assignment would be far greater than it in fact is. But there is nevertheless more flexibility than the model permits. Having chosen certain noun arguments, the child apparently still has some significant options about how to treat them syntactically, or, put conversely, having already filled certain syntactic positions does not prevent the child from adding other noun arguments that these syntactic assignments «ought» to preclude.

If the selection of noun arguments for a verb and the assignment of syntactic roles to these arguments are indeed somewhat independent processes for young children, then we cannot explain errors like «I fell that down», «Bert knocked down», and «it can hear now» as resulting from the child's grasp of a paradigm of correspondences whereby the syntactic role assigned to a noun argument is a function of what other noun arguments also appear in the sentence. A more plausible model, I would argue, is one that accounts for the errors without introducing assumptions about syntactic role assignment. And this is precisely what a word formation account such as was outlined earlier allows: no assumptions about the syntactic roles of the noun arguments surrounding a verb are necessary because the meaning of the verb is represented as an *inherent part of the verb itself*.

Accounting for developmental connections between roughly synonymous causative constructions

An account of errors like «you fell me down» that takes the meaning of the anomalously used verb into account is desirable on independent grounds in any event. A final difficulty with Lord's model is that, because it makes reference only to the syntactic properties of verbs and not to their meanings, it can offer no explanation for systematic relationships between children's novel verb forms and their constructions involving different verbs but roughly the same meanings. For example, why should transitive causative *come* and *stay* have essentially *replaced* the previously well established verbs *bring* and *keep/leave* in Christy's speech, as described earlier (p. 20)? Lord's account would predict occasional causative uses of *come* and *stay*, but these should essentially be independent of the child's handling of *bring*, *keep*, and *leave*.

Similarly, an interpretation of novel causatives based on syntactic correspondences cannot account for the close temporal linkage (to be discussed below) between the onset of the novel causatives and the emergence of semantically closely similar periphrastic causatives with *make* and *get*. But is this linkage only coincidental? A more satisfying explanation, I would argue, would account for these two phenomena within a unified framework, e.g. in terms of the activation in the child's semantic system of a meaning element representable as CAUSE.

Having returned again to the desirability of an interpretation of the errors

that invokes the element CAUSE, let us now go on to compare the generative semantics and lexicalist approaches to compositionality in lexical structure as accounts of what children are learning about the structure of causative verbs.

EVALUATING THE GENERATIVE SEMANTICS VS. LEXICALIST APPROACHES

Generative semantics vs. lexicalist treatment of derivational relationships between words

Processes of derivational morphology, or word formation, pose particular difficulties for the construction of comprehensive models of grammar. The problem is that they are neither fish nor fowl. They exhibit certain regularities that are associated with syntactic rules, but the regularities are only partial. There are also irregularities of a type that are usually handled in the lexical component of a grammar, traditionally the repository of whatever information is not predictable by general rule. For example, words that can be built systematically by analogy with other forms often do not exist (e.g., we have *break* (intransitive) and *break* (causative transitive); *disappear* (intransitive) but not **disappear* (causative transitive); similarly, we have *arrive*, and *arrival*; *derive* but not **derival*; on the other hand, *derive*, and *derivation*; *arrive* but not **arrivation*). And even if they do exist, they often do not have the meanings that would be predicted from their parts (see Zimmer [1964], Botha [1968], Halle [1973], Jackendoff [1975], and Aronoff [1976] for general discussion).

How should partial regularity be handled in a grammar? The generative semantics (GS) vs. lexicalist (L) models represent opposing answers to this question. The GS solution is most responsive to all the regularities that need to be accounted for, while the L solution is most responsive to all the irregularities that stand in the way of the successful operation of whatever rules could be formulated for capturing the regularities.

In the GS model, lexical items are built up in the derivation of sentences through the operation of exactly the same sorts of rules — phrase structural and transformational rules — as are used to specify syntactic structures (e.g., Lakoff [1970], McCawley [1968, 1970, 1971], Postal [1972]). The deepest level in the derivation of a sentence consists of an arrangement of semantic primitives, regarded as irreducible units of meaning, such as CAUSE and BECOME and NOT and ALIVE. These are operated upon by a series of transformations such that at successive stages in the derivation they become juxtaposed in configurations for which words can be substituted. For example, underlying the occurrence of causative transitive *break* in a sentence would be a derivational history in which (at least) CAUSE and whatever elements are specified as underlying intransitive *break* have been brought together by transformational operations and then transitive *break* has been substituted for the configuration. Precisely this same treatment is extended to causatives like *kill* that have no morphological relationship to a noncausative form: *kill*

would be substituted for a configuration in which CAUSE plus BECOME, NOT, and ALIVE (for example) have been transformationally brought into apposition.

An important feature of the GS analysis of causatives is that it specifies an underlying unity between periphrastic causative sentences (e.g. with *make*, *get*, *cause*) and paraphrases of them that contain so-called «lexical» causatives such as *kill* or *break*. Sentences of the two kinds are held to be simply different surface structure realizations of the same underlying array of semantic elements. Thus, *John caused Harry to die* and *John killed Harry* would be said to share the same underlying structure. They differ only in that the derivation of the former sentence has stopped at the point at which elements such as BECOME, NOT, and ALIVE have been transformationally brought together and *die* has been substituted for them, whereas the derivation of the latter sentence has continued on to the point where the configuration containing BECOME, NOT, and ALIVE joins up with CAUSE such that *kill* can be substituted.

Lexicalists have criticised the GS approach on numerous grounds. Among the objections, two are particularly relevant for present purposes. The first is that GS generates structures too freely: it builds up configurations of semantic elements for which lexical items ought to be able to substitute, but the needed lexical items are missing. Lexical gaps are therefore «exceptions» that must somehow be accounted for, and this necessitates introducing devices like filters (e.g. Postal [1972]) to block the operation of the transformational rules when the consequences of their operation would be unacceptable. Such devices are *ad hoc*, argues the lexicalist; better never to have the potential to generate undesired configurations in the first place.

The second major criticism of GS has been that the semantic representations provided for words through the syntactic juxtaposition of semantic primitives are inadequate. In particular, «lexicalized» realizations of particular underlying configurations of semantic components (e.g., *John killed Harry*) do not mean exactly the same thing as periphrastic realizations of what are supposedly the same underlying structures (e.g., *John caused Harry to die*).

In the interests of building in the desired constraints from the ground up and in order to be able to specify lexical meaning as precisely as necessary, the lexicalist rejects the derivation of lexical items through syntactic operations. He/she opts instead to handle the semantic representation of words entirely within the lexicon of the grammar. In order to deal with those aspects of lexical structure that are regular, the lexicalist, following arguments for the «Lexical Hypothesis» made by Chomsky [1970], expands the power of the lexicon to allow it to take over certain work that had earlier (e.g., Lees [1960]) been assigned to transformations.

In most recent lexicalist approaches, each existing word (with exceptions to be noted) is listed in the lexicon as an independent, fully specified item (Halle [1973], Jackendoff [1975], Aronoff [1976], Roeper & Siegel [1978]). Relationships among lexical items are shown in various ways. Semantic similarities (overlap in meaning, subordinate-superordinate relations, etc.),

with or without morphological similarities, are captured through the use of shared semantic components in the semantic representations of the words. For example, Jackendoff [1975: 660] proposes the following lexical entries for *die* and *kill*:

<i>die</i>	<i>kill</i>
$\begin{bmatrix} /dɪ/ \\ +V \\ +[NP_] \\ NP_1 \text{ DIE} \end{bmatrix}$	$\begin{bmatrix} /kɪl/ \\ +V \\ +[NP_2_NP_1] \\ NP_2 \text{ CAUSE } (NP_1 \text{ DIE}) \end{bmatrix}$

(DIE would presumably require further decomposition in a complete specification). When there is a morphological relationship, as between transitive and intransitive *break* or between *legal* and *legalize*, this is made explicit through *lexical redundancy rules* whose role is to «extract generalizations from a dictionary» (Aronoff [1976: 31]). The advantage of redundancy rules over transformational rules for this task, according to Jackendoff [1975], is that «it is quite natural and typical for lexical redundancy rules to relate items only partially, whereas transformations cannot express partial relations» (p. 658).

The ability of speakers to create novel lexical items can be handled within the lexicalist framework by, for example, allowing redundancy rules to serve as rules of word formation. Thus, according to Jackendoff, «redundancy rules are learned from generalizations observed in already known lexical items... after a redundancy rule is learned, it can be used generatively, producing a class of partially specified possible lexical entries» [1975: 668]. Aronoff's position is related but puts stronger constraints on redundancy rules: «It is only a WFR which can serve as a redundancy rule, and WFRs are rules by which new words are formed. This means that the only sorts of facts which can count as redundancies or generalizations in the analysis of existing words are those which enter into the formation of new ones» [1976: 31]. Thompson [1976] proposes an alternative solution in which redundancy rules are used only to represent relations between words stored in memory, while separate rules that operate at a different level in the lexicon specify operations for forming new words. The purpose behind this distinction is to provide a formal account, as Thompson argues Jackendoff's system does not, for the fact that some lexical rules are extremely productive while others are not productive at all.

Psychological implications of the GS vs. L approaches

The relative merits of the GS vs. L approaches can be debated up to a point on the basis of their success in predicting well/ill-formedness and on other descriptive grounds. But ultimately a larger and more difficult issue is at stake: which approach best captures the underlying psychological reality? The characteristics of children's word formation errors may provide information

relevant to this question.

The most critical difference between the GS and L approaches, psychologically speaking, is this: the GS approach postulates that «the full mapping between underlying and surface structure is homogeneous, carried out by a sequence of *rules of one type*, transformations, with no point where some other type of operation plays a role» (Postal [1972: 135], emphasis added). The L approach, in contrast, postulates the existence of *distinctly different types* of rules, one set — lexical — having to do with the internal semantic and morphological structure of words and another set — syntactic — dealing with the organization of words into sentences.

That there should be psychological correlates of the strict separation between lexical, and syntactic rules is made clear by lexicalists. Bresnan [1978: 14], for example, argues that «the lexical-interpretative model should suggest the cooperating interaction of separate information-processing systems», which means greater processing efficiency. Roeper and Siegel [1978] propose that word formation rules in the lexicon have special formal properties, such that «a child, when faced with an unknown word, will try a limited range of projections in an effort to find its meanings», whereas «different kinds of hypotheses are needed to discover the structure of an unknown sentence» (p. 202). Finally, the most commonly cited psychological difference between the two types of rules is in their typical mode of operation. Syntactic rules operate whenever a sentence is produced or comprehended, and outputs are almost never memorized. Lexical rules, in contrast, are said to be passive. Most lexical items are simply stored and used as needed, such that the rules are only brought into use occasionally to add a new word to the lexicon or to analyze words already known or newly encountered (Halle [1973: 16], Jackendoff [1975: 668], Aronoff [1976: 46], Roeper & Siegel [1978: 211], Wasow [1977: 330-331]).

Causative verb errors: grounds for deciding between the GS and L analyses?

If the basic cleavage postulated by the lexicalist model between word formation rules and syntactic rules is psychologically sound, we might expect to see differences in the way children acquire or use the two types of rules. If, on the contrary, it should turn out that there are close developmental connections between putatively distinct kinds of rules, this would be grounds for favoring a grammatical model that, like GS, does not build in such deep *a priori* distinctions between rules — unless, of course, it could be shown that some kind of reorganization takes place in the child's grammar such that the two types of rules diverge only after a period in which they are indistinguishable.

Productivity. One obvious potential developmental difference between kinds of rules is in degree of productivity. This will not be explored in any detail here, since a thorough analysis would require comparing the relative productivity of a whole range of word formational rules and rules accepted to

be syntactic. However, even a preliminary inspection is enough to raise doubts about the usefulness of this property as a criterion which would neatly separate word formational rules from syntactic rules. The rule for converting noncausative predicates into novel causative verbs is, at least for some children, extremely productive. For example, between the ages of two and four, my daughter Christy produced over 100 recorded errors involving 36 different noncausative predicates (see Bowerman [1974] for a breakdown) and many more followed in subsequent years; many nonrecorded errors occurred as well. Scores of novel causative verbs were also produced by Eva and by Lord's two children. On grounds of productivity, then, the causative verb rule behaved more like an «active» syntactic rule than a «passive» lexical rule.

This will not dismay the lexicalist who is convinced that all WFRs belong in the lexicon, however. This is because despite the claim that lexical rules are typically «passive» compared to syntactic rules, it is well recognized that in fact some rules for deriving new words from existing words are as productive as any syntactic rule — for example, the addition of *-ness* and *-ly* to adjectives to form nouns and adverbs respectively. This is not seen as grounds for questioning their assignment to the lexicon, however. Rather, the rules are kept in the lexicon but their high productivity is accounted for by, for example, granting them an important characteristic formerly reserved for syntactic rules: not having their outputs listed in the mental grammar (Aronoff [1976: 45], Thompson [1975], Roeper & Siegel [1978]). That is, each occurrence of a word in *-ness* or *-ly*, for example, would be regarded as a fresh construction, not the reproduction of a stored lexical item.

This might well be the correct solution. That is, there may be grounds for separating WFRs from syntactic rules that are so strong as to make variation in productivity irrelevant. If so, however, this invalidates the argument that the distinction between lexical and syntactic rules is psychologically sound because it is systematically associated with a difference in productivity. One cannot have it both ways.

On the other hand, perhaps significant differences in productivity *should* be considered in an attempt to decide if a rule is lexical or syntactic. This would mean that some WFRs would need to be handled in the lexicon, others in the syntactic component. In his introduction to the Lexicalist Hypothesis, Chomsky [1970] was potentially willing to entertain such a compromise solution. In developing the hypothesis, however, other theoreticians, apparently striving for consistency in the grammatical model, have declared *all* WFRs to be in the province of the lexicon, even those that do not show the idiosyncracies in output and meaning that first led Chomsky to place at least *some* WFRs in the lexicon.

Word formation vs. inflection. Aronoff [1976: 9] distinguishes between two forms of the Lexicalist Hypothesis. According to the more widely accepted version, which Aronoff espouses, derivational morphology (word formational processes) is handled exclusively in the lexicon, but inflectional

morphology is dealt with in the syntactic component by transformational rules. A stronger Lexicalist Hypothesis, considered by Halle [1973] and Jackendoff [1975], is that *all* morphological processes, both derivational and inflectional, belong in the lexicon.

Developmental phenomena provide little support on psychological grounds for a grammatical model that places derivational and inflectional processes in different components of the grammar and terms them different kinds of rules²⁰. The similarities in the way these rules develop are striking, as has already been indirectly pointed out in the discussion of processes leading up to backformations (pp. 25-26 above). In both domains there is an initial stage of essentially correct usage of both derived or inflected forms and forms that are irregular with respect to the rule. This is followed by a stage of overgeneralization of the rule and concomitant dropping out or at least eclipsing of previously used irregular forms. Finally, this is followed by the return of the irregular forms (see pp. 52-55 below for parallels in this connection) and also by the occasional production of backformations. In this paper these stages have been sketched in connection with a «zero derivation» WFR, but the process is similar for WFRs including affixes (see Bowerman [in press] for the development of a rule for prefixing verbs with *un-*); in these cases there is the additional parallel with inflectional rules that the child may produce *redundantly marked* forms at certain stages²¹.

The clear parallels in acquisition between inflectional and derivational morphology are grounds for favoring a grammar that treats productive morphological processes of both kinds as more or less of-a-kind. What is not clear from these parallels alone is whether morphological rules are distinct from syntactic rules — i.e., whether there is an important psychological difference between rules having to do with the structure of *words* and those concerned with the structure of *sentences*, as the «strong Lexicalist Hypothesis» would postulate. Alternatively, it might be that a strict division between types of rules on the basis of the kinds of units they operate upon is psychologically not well motivated.

Developmental connections between lexical and periphrastic causatives. This latter possibility can be investigated by looking at the developmental relationship between word formation rules and syntactic rules whose outputs express similar meanings. Here we find evidence for a striking connection between lexical and syntactic development that is dealt with somewhat awkwardly at best within the L framework; the GS approach, in contrast, meets this challenge well.

²⁰ At least for English. See Berman [in preparation] for a different view with respect to Hebrew, based on acquisitional data. Reconciling these opposing conclusions is an important task, but beyond the scope of this paper.

²¹ For example, compare *feets*, *toastses*, *camed*, *walkeded*, (cf. Ervin [1964]) with «How do you *unbreak* this?» (as child tries to pull apart sheet of stamps), «Would you help me *unopen* it?» (as child tries to open container), and «How do I *untake* this off?» (trying to get out of swimsuit) (where *break*, *open*, and *take off* already incorporate the notion of reversal and separation that is also encoded with *un-*) (Bowerman [in press]).

In the GS analysis, as noted, sentence pairs like *John killed Harry* and *John caused Harry to die* are closely related, being simply alternative surface structural realizations of the same underlying structure. This structure is seen as complex, consisting (depending on the theorist) either of one proposition embedded into another (e.g., «John DO CAUSE [Harry BECOME NOT ALIVE]» or two independent propositions (e.g., «John did something», and «Harry died», both embedded into a higher predicate CAUSE (cf. McCawley [1968, 1970, 1971], Fillmore [1971], Kastovsky [1973]). In the L approach, in contrast, lexical and periphrastic causative sentences have distinct underlying structures: the structure underlying a sentence like *John killed Harry* would consist of only one proposition while that underlying *John caused Harry to die* would consist of two.

Superficially, the way in which lexical and periphrastic causatives develop in child speech would appear to support the L analysis. Sentences with lexical causatives, like *open box* or *Mommy open box*, appear well before periphrastic causatives like *Mommy make box open* — in fact, well before complex sentences of any kind. Close inspection, however, reveals an intriguing phenomenon. In the case of Christy and Eva, the two subjects for whom the most detailed longitudinal data are available, the first novel causative verbs (like those in Table 1) did not appear until several months after the first transitive uses of legitimate causative verbs like *open*, and, especially significantly, they appeared almost simultaneously with the onset of the first periphrastic causatives with *make* and *get*. For example, in Christy's development, the first novel lexical causative was observed at 24 months: «awant *full* Andrea bucket» (=I want to make Andrea's bucket full). Just one week earlier, the first periphrastic causative had been heard: «I made back wet» (after the child lay down in the tub). Between 24 and 26 1/2 months, only three causative verb errors were observed; after that there were many. During this two-and-a-half month period a variety of periphrastic causatives were noted, including «I made it full», «make cow fix», «make it clean», «it could make me sneeze», «I can't get door open», «no, you have get it cook» (=have to get it cooked) and «this get me sick». In Eva's case, the first novel lexical causative, «Kitty cat, don't *fall* Christy football» (=drop Christy's football) was noted at 23 months, just six days before the first periphrastic causative, «make feel better my thumb». For two months all novel lexical causatives but one involved *fall*. Meanwhile, many periphrastic causatives involving *make* and *get* plus a variety of predicates were occurring. By the time predicates other than *fall* began to occur as novel lexical causatives, the periphrastic pattern was well established.

This developmental sequence — the first novel lexical causatives occurring within a few days of the first periphrastic causatives — has also been observed by Susan Carey (personal communication) in her daughter Eliza's speech. The longitudinal data from Kendall suggest the same pattern, since the first recorded novel lexical causative occurred in the same sample, at 27 months, as the first recorded periphrastic causative. The records from Christy, Eva, and Kendall indicate further that the onset of periphrastic causatives is itself not a syntactically isolated development. It is, rather, part of a broader develop-

mental pattern in which the children were moving gradually towards the ability to produce a variety of complex (two proposition) sentences (see Bowerman [1974] for relevant analyses).

How shall we interpret the temporal correspondence between the onset of periphrastic causatives (and, more generally, complex two-clause sentences) and the creation of novel causative verbs? It could be pure coincidence, of course, given the small number of subjects. However, there is one strong reason for rejecting this interpretation. Approximately a year later, the sequence was precisely repeated in Christy's and Eva's development. This time, more complex kinds of causative constructions were involved. The lexicalized, superficially simple version of these sentences involves specification of an actor, a particular action, an object acted upon, and a change of location or state undergone by the object as the result of the action: *Daddy cut a tree down, John shot Harry dead*, etc. Some linguists have argued that such sentences are complex at an underlying level, being composed of a causing event proposition and a resulting event proposition linked through CAUSE (e.g., McCawley [1971], Fillmore [1971], Talmy [1976], Kastovsky [1973]). Their superficial simplicity, according to this account, is the result of a transformational history whereby a configuration roughly paraphrasable as «by performing action X, cause to move/become» is built up and the word for action X is substituted for it.

The course of development of these sentences would seem at first glance to belie this complex analysis: sentences of this pattern are produced in good number from about 2 years. However, for many months, such sentences appear to be limited to combinations of particular verbs with particular locative or stative effects that are frequently modeled in speech to children, such as *pull NP₁ up/down/into NP₂, cut NP off, eat NP allgone, spit NP₁ out/into NP₂, kick/push NP₁ closed/into NP₂*, etc. It was not until between 3 and 3 1/2 years that Christy and Eva began to produce truly novel combinations of causing verb and effect word or phrase, indicating that they now grasped at a deeper level than before the governing structural regularity. The byproduct of this new productivity was the onset of overregularizations violating certain constraints, e.g., «I pulled it unstapled» (after child pulls a stapled booklet apart), «untie it off» (request for yarn to be untied from trike's handlebars), «she choked me backward to the chair» (complaint about sister's action), and «I'm patting her wet» (as pats sister's arm with wet hand) (see Bowerman [1977 and in press] for data and analyses).

The onset of these overregularizations was closely preceded by the emergence of periphrastic causative sentences that in a GS model would be assigned an identical two-clause (causing event proposition and resulting event proposition) underlying structure — sentences with *by*-clauses («you made me cry with (=by) putting those up there»), and *S₁ — and that made — S₂* («The boy pushed the witch in the oven and that made her dead»). This is quite parallel to the earlier emergence of periphrastic like *Mommy made that box fall* at about the same time as novel lexical causatives like *Mommy fell that box*. Given these parallel occurrences, separated by a year in the children's

development, it seems unlikely that the onset of periphrastic causatives in a child's speech at the same time as the first evidence that the child has formulated a rule for turning noncausative predicates into causative verbs is purely fortuitous. Rather, the two events are linked. But how?

In the GS framework, the linkage is easy to explain. In order to create novel «zero derivation» lexical causatives, the child must understand the structure of received ones, like *break*, and see how they are related to their intransitive counterparts. According to the GS account, this structure is syntactic: a sentence like *John broke the stick* is derived transformationally from an underlying structure of roughly the form *John caused the stick to break*. And this is precisely the structure that underlies a periphrastic causative. Thus, the temporal correspondences between the emergence of periphrastic causatives and novel lexical causatives can be seen as the result of the child's having grasped the structure that underlies both. The apparent tendency for the more explicit periphrastic realizations of the structure to become established before the more conflated lexical version (disregarding here «received» causatives that have been used earlier, apparently without recognition of their internal structure) may reflect one of the very general operating principles with which children initially approach language, according to Slobin's [1973] analyses: «Underlying semantic relations should be marked overtly and clearly» (p. 202)²².

Within the lexicalist framework, accounting for close temporal relations between developments in the lexicon and developments in the syntactic component is more difficult. There is certainly no *a priori* reason to expect such linkages, since two completely separate components of the grammar, each with its own rules, are involved. To my knowledge, only Jackendoff [1976] has made suggestions which could be applied to the problem. According to Jackendoff, there are two different ways of combining semantic elements into semantically more complex expressions. The details need not concern us here. The important point is this:

either kind of composition may appear either as a result of combining the readings

²² Within either a GS or L analysis, we must explain how the child can use «received» lexical causatives like *open* months before there is evidence, in the form of novel lexical causatives, that she understands their structure as (roughly) CAUSE+noncausative predicate. Within the L framework, the transition from lacking a broken-down representation of, e.g., *open* to having one could be characterized as involving the extraction of a redundancy rule relating existing lexical entries such as transitive and intransitive *open*, *break*, etc. Within the GS framework the semantic representation corresponding to transitive *open* would be said to pass from being a semantic primitive, OPEN_i, to being a composition of smaller semantic primitives, e.g. CAUSE plus OPEN_i. The fact that children are able to use lexical causatives in a referentially appropriate way before there is reason to credit them with a grasp of CAUSE as a semantic primitive indicates that there is a critical distinction to be made between having a *cognitive* understanding of the structure of particular causal situations and having a *linguistic* understanding of the internal structure of causative verbs. We must credit a child who uses lexical causatives like *open* correctly with the former knowledge, but the latter knowledge, though dependent on the former, is of a somewhat different kind and apparently comes only later (See Bowerman [1974] for discussion).

of two constituents... or alternatively within the representation of a lexical item itself. For example, the verb *smash* means approximately the same as *break violently* or *break in a violent manner*; we can represent this similarity by assigning *smash* a semantic marker such as $\left[\begin{array}{l} \text{BREAK } (x, y) \\ \text{VIOLENTLY} \end{array} \right]$ (p. 92).

Following this line of thought we could hypothesize that the reason periphrastic causatives and novel lexical causatives emerge at close to the same time is that both depend on the child's understanding of a particular compositional structure that is shared by both, or, put, differently, whose realization is indifferent to domain (within-word vs. across-word). But this sounds suspiciously similar to simply saying, as GS would, but the lexicalized and periphrastic forms of a particular proposition share a common underlying structure. In other words, to the extent that this form of the lexicalist hypothesis can handle parallels in lexical and syntactic development as well as GS, it is because it is *erasing* distinctions between lexical and syntactic structure that lexicalists have argued on other grounds it is necessary to make.

Differences in meaning between lexical and periphrastic causatives? Some important similarities in the development of lexical and periphrastic causatives have been discussed, but one difference was noted as well — the child's ability to use «received» lexical causatives correctly before being able to construct periphrastic equivalents. There is another potential difference that is also critically relevant to this attempt to evaluate the GS and L analyses of causatives as accounts of what children are learning about the structure of these verbs: do lexical causatives and their periphrastic counterparts have different or identical meanings for children?

In the GS analysis, the two types of constructions should in principle have the same meanings, since they are derived from the same underlying structure and this structure provides all the semantic information necessary for the interpretation of the sentence. But in fact they do not. This is one crucial component of lexicalist arguments against the GS analysis (see Shibatani [1976: 28-38] for review). Shibatani summarizes the semantic difference between lexical and periphrastic causatives as having to do with how the causer effects the caused event. When the causer physically manipulates the «causee» in bringing the event about, such that the causee is involved as a nonvolitional entity, a lexical causative is used if one is available (if not, a periphrastic causative is used; see McCawley [1978]). In nonmanipulative situations, in contrast — e.g., those in which a causer gives directions to a volitional causee — periphrastic causatives are used. (There are certain exceptions to both generalizations, as Shibatani discusses). Compare, for example, the difference between the (a) and (b) forms of these sentences:

- 1a) John moved Bill.
- b) John made Bill move.

- 2a) John stood the child up.
- b) John had/made/got the child (to) stand up.

Of the various periphrastic causative forms in English (e.g., *make*, *get*, *have*), only those with *cause* can refer freely to either manipulative or nonmanipulative, directive situations.

The need to account for such meaning differences is an important motivation behind the lexicalist's decision to list lexical causatives in the lexicon, complete with their semantic idiosyncrasies, rather than deriving them syntactically from the same structures as periphrastic causatives. How the differences can be accounted for within the GS framework is not entirely clear. Even assuming it could be done, e.g., by positing various constraints on the conditions under which lexicalization can take place (cf. Fillmore [1971]) or by attributing the differences to conversational implicatures rather than accounting for them in the semantic representation of sentences (McCawley [1978]), the solution may seem somewhat *ad hoc*.

At this point, however, it is important to keep in mind the larger question: admitting that the GS account is imperfect, does it still capture a psychological reality that L misses in its efforts to account for semantic idiosyncrasies from the ground up? The close temporal linkage between the emergence of periphrastic causatives and novel lexical causatives, discussed in the previous section, suggests the answer may well be yes. Consideration of the semantic relationship between lexical and periphrastic causatives in children's development reinforces this suspicion.

If children differentiated semantically between lexical and periphrastic causatives from the very beginning, it would be reasonable to hypothesize that the two kinds of constructions have developmentally distinct origins. We could assume that children learn lexical causatives independently of syntax, listing them piecemeal in their mental dictionaries along with specifications of their meanings. But this does not seem to be the case. There is evidence that for some period of time lexical and periphrastic forms are either synonymous for children, both being used to refer indiscriminately either to manipulative causation or directive causation, or at least overlap very heavily in their range of application. Data that support this inference are presented in Table 2.

Under A in Table 2 are listed sentences in which the child uses a *lexical* causative — either an existing causative verb of English or a novel causative created from an intransitive — to express a meaning for which an adult would have chosen a *periphrastic* construction because no direct physical manipulation is involved²³. This error might be termed «overlexicalization». Under B

²³ In several examples (2, 3, 4, 7, 8, 9, 10) the «causer» is indeed touching or manipulating something, but an adult would not use a lexical causative corresponding to an intransitive predicate describing the change of state or location that the object undergoes because the connection between the physical contact and the effect is indirect (3, 4, 10) or because contact is not continually maintained (2, 7, 8, 9). In these cases a lexical causative of a different type, derived from the *causing action* (p. 43 above) rather than the resulting change of state or location, can sometimes be used, e.g. «bounce her that high» in (2) («by bouncing her cause her to go that high»), «flip it up to my nose» in (9) («by flipping it, cause it to go up to my nose»).

TABLE 2. Evidence for semantic synonymy of lexical causatives and periphrastic causatives.

A. «Overlexicalization»: Using a lexical causative when an adult would use a periphrastic construction

- 1) Jamie, 5;0: It *brings* your wishes true. (=makes your wishes come true. After M has asked him what his magic pebble does).
- 2) C, 3;9: Yeah, but it'll only *take* her that much high. (=make her go that high. *send, *put, etc. C arguing for getting on spring horse with E, who is bouncing. She wants to bounce higher).
- 3) E, 4;2: I got it [=a ball] in another hole and I *took* it out. (E playing with party favor game in which you try to get little balls into holes, under a plastic cover).
- 4) E, 4;6: Keep doing it the way that *takes* it down. (=makes it go down. Wants M to keep twisting spiral in spiral notebook until it is back in place; it is half off, above).
- 5) C, 4;0: The machine might *put* him away. (=make him go away. C watching «Captain Kangaroo». Story about a magic machine that caused Captain Kangaroo to disappear for a while; she's now suggesting same thing may happen to Mr. Greenjeans).
- 6) C, 3;8: You *put* me forward a little bit. (=made me go forward. *sent, *took, etc. After M, driving, jerks car so C snaps forward. Compare with later, more adult form in similar situation, C, 6;3: You moved out too quickly and you *made* me fall backward).
- 7) C, 3;11: Watch how far I can *go* it. (=make it go. *send, *take, *put. C about to give toy car a shove so it will roll across floor).
- 8) E, 3;4: Christy was *going* her milk over to me. (E upset after C pretends she will push milk glass so it slides across table to E. *putting, *sending, *taking, etc.).
- 9) Marcy, 5;10: I'm going to flip it so I *go* it up to my nose. (Putting end of noodle in her mouth, then jerks head backwards. *put, *take, *send, *bring, etc.).
- 10) C, 5;4: But while they were doing it, they *dropped* it. They were too heavy. (Re: squirrels on bird feeder whose weight had *made* the feeder drop/fall).
- 11) C, 5;8: It's not worse. But the airplane's *keeping* it. (Re: stomach ache C had before boarding plane. Now, as we fly, the plane (ride) is *making* stomach ache continue).
- 12) C, 5;10: Water *bloomed* these flowers. (=made these flowers bloom).
- 13) C, 3;2: Is this to *climb* her up? (=let, enable (?) her to climb up. C pointing to a ramp leading up to a van in a picture; a hippo (=her) stands at the bottom looking up).
- 14) C, 3;4: I'm gonna *guess* it to him (=have him guess it; see No. 84, Table 1).
- 15) C, 3;0: How come it works better to *slip* me down if I have on long pants? (=let, enable (?) me to slip down. C at top of slide; has noticed her skin sticks to slides if she wears shorts).
- 16) E, 1;11: Christy won't *cry* me! (=let me cry. E. upset because C has commanded her to stop crying. Only a very few lexical causatives in English are paraphrasable with *let* rather than *make*, e.g. *leave* (let stay); possibly *drop* (let fall); cf. Jackendoff [1976; 105]).

B. «Overanalysis»: Using periphrastic construction where lexical causative is called for

- 17) C, 2;11: I *made* him *dead* on my tricycle. (=killed him. Re: imaginary monster).
- 18) C, 3;3: I *made* mosquitoes *dead* in the park. (=killed).

- 19) C, 3;8: If I touched Humpty Dumpty it would *make* Humpty Dumpty *dead*. (=kill).
- 20) E, 5;4: How could earthquakes *make* people *be dead*?
- 21) C, 3;1: I don't want you to *make* him *go off*. (=brush off, knock off. After M tries to brush a moth off C's carseat with her hand).
- 22) C, 3;9: C: Mom; would you *make* it *come on*?
M: Huh?
C: Would you *make* it *come on* my foot?
(=put. Re: roller skate. C has used *put* on innumerable other such occasions).
- 23) E, 1;11: I *get* that *wipe*. (=I *wiped* that. After E wipes hand).
- 24) E, 2;0: *Make* fall down. (=drop. E holding piece of spaghetti over floor, then drops it).
- 25) E, 2;5: M: Where are the others? (Re: missing keys)
E: I don't know. I didn't *get* 'em *lost*. (=lose).
- 26) E, 2;3: Then I'm going to sit on him and *made* him *broken*. (=break. Looking at ant on seat of her toy tractor).
- 27) Mindy, 6;4: I couldn't *get* the balanced *keept*. (=I couldn't *keep* my balance. Telling of difficulties in bike riding).

C. Successive utterances, one lexicalized, one periphrastic, expressing same semantic content

- 28) C, 3;7: M: «Can you *make* it *disappear*?»
C: Now *disappear* it again, it says.
(M reading from a book in which you use a mirror to change pictures).
- 29) C, 3;8: Saying giddi-up doesn't *make* it *go* faster. Singing *goes* it faster. (C bouncing on spring horse, has been singing loudly).
- 30) C, 4;2: C: And I forgot to tell — I forgot to *remember* — I forgot to *make* you *remember*. (As M tucks C in at bedtime; M had earlier promised C she'd fix something and told C to *remind* her).
M: Yes, we'll do it tomorrow (etc.)
C: I'll try to remember to *remember* you.
- 31) C, 4;2: I want to *pour* it in.
I want to *get* it in.
I want to *make* it *go* in. (C holding box of sugar, says this as starts to slowly pour sugar on her cereal).
- 32) C, 4;5: I'm *rounding* something. (A few intervening sentences). I'm gonna *make* it *round* in there. (As rolls piece of clay in plastic bag).
- 33) C, 5;1: I need to *round* this circle very much.
I need to *have* this *rounded* very much. (As rotates knife tip in lump of clay to make a cut-out circle).
- 34) C, 5;0: O.K. If you want it to die. Eva's gonna *die* it. She's gonna *make* it *die*. (Upset because E is about to touch a moth).
- 35) E, 2;8: *Put* it on her. *Make* it *be* on her. (Wants M to put a dress on her doll).
- 36) E, 2;10: A broken ring. Maybe that *brokened* it. Maybe that thing, whatever it is, *made* it *broken*.
- 37) E, 3;2: E: Everybody *makes* me *cry*.
D: I didn't make you cry.
E: Yes you did, you just *cried* me.
- 38) E, 3;9: E: Want me to *come* it out? (broken end of magic marker).
M: Hm?
E: Want me to *make* it *come* out?

-
- 39) E, 3;9: Can you *make* this *flattened* and *round*?
You *round* it and then I'll *flatten* it. (To M, as E plays with a piece of play-dough).
- 40) Emily, 2;11: You *make* me *swing* around. You *swing* me around. (To Melissa, who is rotating chair Emily is sitting in).
- 41) Rachel, 5;7: R: How come you're *waiting* me over here?
M: Hm?
R: How come you're... um... *makin'* me *wait* over here and you're over there? (R sitting in cart in store as M is getting something).
-

are shown examples of the opposite kind of error, «overanalysis», in which the child uses a periphrastic causative when direct physical manipulation is involved such that a lexical causative is called for. Finally, under C are listed examples in which the child uses *both* constructions in succession in the same speech context to express what appears to be the same meaning. Sometimes the periphrastic form follows the lexical form and sometimes the reverse. These sequences cannot easily be interpreted as indications that the child recognizes the distinction in meaning and is consciously or unconsciously «correcting» an initial slip. This is because even though the change is sometimes in the appropriate direction (e.g., from a periphrastic to a lexical form to encode physical manipulation, as in (40)), very often the result is *less* appropriate from the adult point of view (e.g., (31), (35), (29); the use of *go* as a transitive causative is obviously an error here but no other lexical change-of-location causative would be correct either (e.g., **put*, **take*, **bring*, **send*) since physical manipulation is not involved).

It is possible that fine-grained analyses of data from a number of children would show developmental trends that are missed in this rough grouping of errors. For example, it is my impression that errors of overanalysis are more common initially and errors of overlexicalization prevail later. Such trends would require investigation and explanation in their own right. Regardless of whether they exist, however, the mere occurrence of the errors suggests that the systematic semantic distinction between lexical and periphrastic causatives is not appreciated by children from the start but rather takes time to develop²⁴.

The apparent synonymy or near-synonymy of meaning between lexical and periphrastic causatives in the early stages of acquisition complements the finding that the onset of periphrastics and the child's analysis of the internal structure of lexical causatives are closely linked. Both phenomena are easily

²⁴ It is possible, of course, that children do distinguish between lexical and periphrastic causatives from the very beginning, but that the distinction is difficult for an investigator to recognize because the contextual or linguistic factors that play a role are not the same as those that govern selection between the forms for adults. In particular, pragmatic factors having to do with foregrounding and backgrounding of information may be involved. In this case the arguments made here still stand, since problems of focus are generally handled separately in a grammar from problems of semantic representation or «propositional» meaning.

explained if we assume, with GS, that the two forms share a common underlying structure. In contrast, within the L framework it is difficult to explain why children apparently *leave out* of their early semantic representations for lexical causatives precisely those elements of meaning that in the adult language distinguish the lexical forms from periphrastic causatives — elements having to do with physical manipulation.

There is at least one explanatory route available to the lexicalist, however. It has been argued that the acquisition of word meaning proceeds feature by feature, with the child learning the more general features associated with a word before the more specific features (Clark [1973]). This hypothesis has been very controversial, but it has seemed to hold up best in the domain of verbs and other relational words. For example, Gentner [1975] presents strong evidence that semantically simple verbs encoding changes of possession (*give*, *take*) are well understood before more complex verbs that are hypothesized to contain all the same components of meaning and additional ones besides (*pay*, *trade*), and these in turn are understood before cumulatively still more complex verbs (*buy*, *sell*, *spend*). This can be accounted for with a component-by-component model of acquisition which assumes that the more general components — those common to all the members of the set (CAUSE, DO, TRANSFER) — are acquired before the more specific components (OBLIGATION, CONTRACT) that distinguish the cumulatively more complex verbs from the simpler ones.

Applying this line of reasoning to the problem at hand, we could hypothesize that children's initial understanding of the meaning of lexical causatives is incomplete: meaning components having to do with causation and the event caused have been acquired but components having to do with physical manipulation have not. The absence of physical manipulation components makes the meanings of lexical causatives appear to fall together with those of periphrastics, but this is somewhat fortuitous, not the result of a commonality at the deepest level, i.e., identity of underlying structure. This explanation might be correct, but it will require work to be made compelling. For example, an answer must be found for the question of why the components of meaning having to do with physical manipulation should be considered less «general» than those having to do with causation, since presumably lexical causatives are generally characterized by components of both kinds.

To sum up, neither the GS nor L approach appears to have achieved a completely satisfactory solution to the difficult problem of handling the relationship between lexical and periphrastic ways of expressing approximately the same meaning. The GS analysis has the elegance of accounting with a single principle for the initial overlap or identity of meaning of lexical and periphrastic causatives and for the temporal linkage between the emergence of periphrastics and the onset of errors with lexical causatives. However, GS has trouble accounting for the eventual semantic divergence of the two forms. The L analysis, in contrast, is admirably equipped to handle semantic divergences. But the initial similarity in meaning between lexical and periphrastic causatives must apparently be considered coincidental, and the temporal meshing in

the development of the two forms can be explained only by making the putatively separate structures underlying them extremely similar. This must create doubts about whether the strict separation in principle between lexical and syntactic rules, which at points necessitates this duplication of specification, is advisable in the first place.

Abatement of causative verb errors. To the extent that we focus on the close developmental connections between periphrastic and lexical causatives, a grammatical model such as GS that characterizes both forms as alternative realizations of the same underlying structure is attractive. However, a further problem must be considered. The construction of periphrastic causatives remains an active, frequently exploited procedure throughout a speaker's life. But the construction of zero-derivation causatives does not. Adults create novel ones only occasionally and are implicitly aware of many limitations on the procedure; cf. our recognition of the bizarreness of the sentences in Table 1. Perhaps, then, there is a developmental shift in the status of the causative verb rule: it starts out syntactic and this accounts for its close links to periphrastic causatives, but somewhere along the line a reorganization takes place such that the rule becomes lexical²⁵. This possibility can be explored by looking at the way in which the productivity of the rule becomes restricted. This analysis may also provide further evidence on the question of whether the initial rule is lexical or syntactic.

When and how does the production of novel ungrammatical lexical causatives stop²⁶? In *a priori* speculation about this, several possible scenarios with different implications can be envisioned²⁷. Suppose the child suddenly or gradually stops making up new lexical causatives, but for some time continues to use the ones she has already made up in the past. This would indicate that

²⁵ Interestingly, Roeper ([1978], Roeper & Siegel [1978]) proposes just the opposite developmental sequence: that in the beginning children formulate only rules that must be considered lexical because they are semantically restricted, being defined over words or semantically definable classes of words. Some of these rules later become freed of lexical specificity and so qualify as syntactic rules, while the rest continue on as lexical rules. Developing such an explanation for the developmental connections between lexical and periphrastic causatives would be difficult, since the problem is that lexical causatives are used too liberally, not too restrictively.

²⁶ *Why* it stops is ultimately an even more intriguing question; unfortunately, however, the answer remains obscure. One thing is clear: item-by-item negative feedback — correction — cannot be necessary, since Christy and Eva almost never received such feedback but the errors faded out nonetheless. In the case of errors where there is an appropriate lexical causative but the child does not yet know what it is (e.g. *remind* for CAUSE *remember*) or does not use it consistently (*kill* for CAUSE *die*), the problem for the child is simply to learn which form to use. Apparently she can learn this by example. More difficult to explain is the decline of errors like causative *disappear*, where there is no lexical causative counterpart to substitute. How does the child learn in these cases to replace something with nothing — i.e., that a form with the meaning she wants does not exist? How does she learn to inhibit the creation of a lexical causative and stick to periphrasis?

²⁷ I am grateful to Barbara Hall Partee (personal communication) for her extensive thoughtful suggestions on this problem and also on the question, to be taken up subsequently, of the implications of the causative verb errors for a meaning postulates approach to semantics. (She does not necessarily agree with my conclusions, of course).

the products of the rule for generating causative verbs have been *listed* in the lexicon and so remain there even after the rule is no longer productive. The rule would therefore have to be considered lexical rather than syntactic. As Aronoff puts it, lexical rules (WFRs) «are rules for making up new words which may be added to the speaker's lexicon. We can think of them as once-only rules. They are thus very different from the rules of the syntax and the phonology which must apply in the derivation of every sentence» [1976: 22].

However, suppose instead that the child not only stops making up novel causative verbs but also stops using the forms created previously by the rule. The only lexical causatives remaining would be «received» forms of the adult language like *break*, which the child had presumably learned before the rule was formulated. This outcome would be hard to interpret. Clearly the child would not have been listing the novel forms as she created them. At one time this would have been considered evidence that the rule was syntactic, but, as was discussed earlier, recent L analysis have allowed for (and even urged: Aronoff [1976: 43-45]) the nonlisting of the products of particularly productive WFRs.

In a third scenario, the child not only stops making up novel causative verbs and using the ones she has already created, but she also stops using «received» zero-derivation lexical causatives like *break*. (Irregular forms like *kill*, if any, would presumably remain.) Given this outcome, we can assume that the child has analyzed all her pre-existing «received» causatives as products of the rule, and so has erased them from her lexicon. Once she stops using the rule productively, all lexical causatives formerly generated by the rule would drop out of her speech and have to be relearned.

This scenario is most compatible with the hypothesis that the rule starts out syntactic but undergoes a change to become lexical. While the nonlisting of the products of a rule is itself, as noted, compatible with either a syntactic or lexical analysis, what would be difficult to reconcile with a lexical interpretation of the initial rule is the *obliteration* of existing lexical items. Why should a word, once listed, be lost? (Even minor deaths such as the temporary loss from Christy's vocabulary of *bring*, *keep*, and *leave* in favor of causative *come* and *stay* (p. 20 above) fit rather uncomfortably into the lexicalist framework). At some point after (some of) the original acceptable lexical causatives like *break* reenter the child's speech, the child would presumably start to make occasional causative verb errors again; otherwise there would be no adult errors of the type shown in Table 1 to report. But this time the rule would be different — extremely restricted in productivity. It would seem reasonable now to consider it a passive lexical redundancy rule, a rule with tenuous connections at best to the earlier syntactic one.

As it turns out, the abatement of the causative verb errors (extrapolating from the Christy and Eva data) corresponds to none of these scenarios; there is yet a fourth. The child gradually stops making errors with noncausative forms whose causative counterparts are morphologically unrelated but are extremely common. These «irregular» causatives either return to use or

regain strength, depending on whether or not they had completely dropped out. Thus, causative *go, come, stay, die, fall*, etc. are heard less and less frequently while *take (send, put), bring, keep* and *leave, kill* and *drop* or *knock down*, etc., take over their functions²⁸. At the same time, however, the child continues to use the rule productively to create causatives for noncausative forms that either lack lexical causative counterparts (e.g., *disappear*) or whose «irregular» counterparts are relatively infrequent and so presumably have less chance to be learned (e.g., *remind [remember], raise [rise]*). Semantic constraints on possible causatives generated by the rule seem to be acquired during this period: novel causatives are less and less frequently created from predicates that do not specify a (change of) state or location, and the kind of causation encoded by the verb is increasingly restricted to active intervention involving physical manipulation on the part of an agent. A second rule for deriving causatives from noncausatives is also acquired — adding *-en* — but this rule coexists peacefully with the first, not supplanting it²⁹.

During the period when «irregular» causatives take hold again but new causatives are still being created, albeit less frequently, the child begins to display a metalinguistic sense of what is and is not possible. Table 3 presents some examples. It is particularly intriguing that the child develops a rather firm sense of the unacceptability of certain forms (e.g., to *fall* something down) while at the same time continuing to use the rule to produce causatives that are equally unacceptable to adult ears but that involve less common predicates (see example 4, 5, 7, 8, 10, in Table 3, and also errors in Table

²⁸ Long-since abandoned causative forms resurface once in a while. Sometimes the child knows the required form well and may recognize the error herself (see (8) in Table 3). More often, however, the child seems to fall back on the derivational operation because none of the familiar lexical causative counterparts for the form are semantically quite suitable in the specific context; in this case the child rarely, if ever, shows signs of awareness that an error has occurred. For example:

C, 5;0: They *went* off the cannons at the last. (Describing performance of 1812 Over-ture. *took/sent/put, etc. Fired off)
C, 7;1: I can — I can *go* it around. (Protesting as M starts to rub shampoo (= «it») into in C's wet hair to make later; wants to do it herself. *take/put, etc. Rub?).
C, 7;11: Are you *going* a tape recorder? (Has heard noises in next room where M is. *taking/putting, etc. Operating, working, playing, running).

Presumably these errors gradually disappear because children become more adept at finding an appropriate verb or at avoiding altogether a sentence for which there is no completely satisfactory lexical solution (periphrastic solutions may not be possible for particular sentences because direct physical manipulation is involved, as in the last two examples).

²⁹ *-en* is added both to adjectives and verbs, sometimes redundantly, and sometime is used in noncausative contexts involving change of state, as in adult English (see footnote 11). A thorough analysis is beyond the scope of this paper, but a few examples may be of interest: E, 3;6: It *smoothen*s the water out. (Stroking wet stomach with washrag in tub); E, 4;2: After I *prettyen* up my rock, can I go outside? (painting a rock); E, 4; 6: You can *warmen* my dress out. (After E's dress gets cold and wet); C, 4;1: If I do it fast that'll *fasten* it up. (As dresses quickly to go out) M: Fasten what up? C: The faster I get dressed the faster I get ic cream; Matthew, 3;4: Will you *straightenen* this out, please? (Handing M a squashed paper cup, NB redundancy) E, 3;8: You have to *patten* them out. (Making hamburger patties); E, 5; 1: I *shrinkened* the couch. (After changes legs on block couch so they are horizontal rather than vertical); C, 6;0: First they look like they're wet and then they *fluffen* out. (of newly-hatched chicks); E, 4;3: It's gonna *colden* up. (of the weather).

TABLE 3. Signs of metalinguistic awareness about «possible words» created with the zero derivation rule for causatives.

1) C, 3;8:	I have to <i>be</i> — <i>have</i> it up! (Tugging on sock).
2) C, 3;8:	And <i>go</i> — <i>put</i> it like that. (As M puts C's socks on; telling M to turn tops over in a certain way).
3) C, 4;7:	She won't <i>sit me</i> — <i>let me sit</i> next to her during reading time. (Complaining about friend's behaviour at school).
4) C, 4;10:	C: <i>Bigger</i> my band. (To M, as request for M to loosen sports band on her glasses. Intonation suggests she recognizes something odd about the word). M: Is that a real word? ³⁰ C: No. «Smaller my band... small my band...» (contemplative, trying these out). M: If I said «I'm going to bigger your band» — does that sound like something I would say? C: No, because it's not a real word. M: How would I say it? C: «I'm going to <i>bigger</i> — I'm going to <i>make</i> your band <i>bigger</i> today».
5) C, 5;3:	C: You almost <i>made</i> me <i>fall down</i> . (To M). M: I almost fell you down. C: (Grins broadly). M: Can you say that? C: No! You almost <i>made</i> me <i>fall down</i> !
6) C, 5;4:	I'm not going to pick up the cheerios that I <i>fall</i> — that I <i>drop</i> on the floor.
7) C, 6;8: E, 4;2:	E: Christy, you <i>fell</i> me into the car! (After C makes her stumble against car). C: (laughs and repeats E's error for M's benefit, with pointed emphasis on word <i>fell</i>).
8) C, 5;11:	(Has been begging for friend to be allowed to stay for dinner; M has said she thought friend's family needed her later on): They're not gonna need her! <i>Wé éat hér!</i> (Emphatic stress on each word. Then claps hand over mouth and smiles sheepishly, recognizing error).
9) C, 6;2:	Say «rabbits ears cooking on the stove» (a family formula for making unwilling child laugh) and see if you can <i>laugh</i> — (breaks off, pauses)... <i>make me laugh</i> .
10) C, 6;3: E, 3;8:	E: Will you <i>learn</i> me how to read that book? (To M) C: (Also to M, with pointed scorn): «Learn» you? What does she mean, «learn» you?

1 by Christy at relatively advanced ages).

The way in which causative verb errors fade out is very similar to the decline of overregularizations involving inflections. Common irregular forms that have been supplanted by overregularized forms came back in relatively early (e.g., *feet, came*) while at the same time rule-governed errors continue to occur with less frequent words (*oxes, springed*) and with words that are unmarked in the plural or past (*sheeps, putted*). This continues, at a reduced level, even into adulthood, where overregularizations of infrequent forms occur often enough to undermine the strength of the original forms and even

³⁰ The metalinguistic questioning and modeling of novel causative verbs by M in examples 4 and 5 are exceptional. I almost never drew attention in any way to the errors for the obvious reason that I did not want to «contaminate» the data.

cause their loss (e.g., *dived*, *leaped*) (compare such adult inflectional errors with the adult zero-derivation causative verb errors in Table 1). Minor inflectional patterns may also be learned and exploited productively, resulting in forms that alternate with but do not completely replace correct but irregular forms or overregularizations generated by the dominant pattern (e.g., *brang*, *brong*, *bringed* and *brought* all as past tense forms for *bring* in my daughter Eva's development). This is analogous to the acquisition of *-en* as a second way of turning noncausatives into causatives.

To return to the original question of this subsection, can the way in which causative verb errors fade out be taken as evidence for a developmental shift in the status of the rule, from active syntactic to passive lexical? The gradualness of the process makes this solution suspect. Where to place the cut in a seamless garment? Clearly, no major event takes place to indicate that the rule has changed from being one kind of a rule to another; it seems to be basically the same rule all along, simply used less often and under semantically somewhat more restricted conditions. And if the change in the rule's status is taken to be gradual, what can we say about the characteristics of a rule «in transition» from the syntactic component of the internalized grammar to the lexicon? Could not an adult grammar also contain such a rule, permanently frozen in transitional position? These same objections could also be applied to an alternative account of the status shift: that rules for inflecting, deriving, and combining words are at first *undifferentiated* in children's grammars and only later diverge, taking on their distinctive lexical vs. syntactic characteristics.

To avoid the messy business of transition in status we could assign the rule to the lexicon from the start, where its gradual decline in productivity could be handled unproblematically. This solution would, however, leave unaccounted for — or awkwardly accounted for at best — its connections to periphrastic causatives. It would also, if we are consistent, necessitate the same treatment for rules governing inflections, since the way in which these rules develop and exceptions to them are learned is, as we have seen, virtually identical to the learning of derivational rules. Of course, in the case of inflections like past *-ed* or plural *-s* there are relatively few exceptions compared to the vast number of forms to which the rule applies, which is presumably why most linguists have found it reasonable to treat these as syntactic rules. In the case of the zero-derivation causative verbs, in contrast, there are many exceptions. But what the developmental phenomena make very salient is the *arbitrariness* of decisions about how much irregularity a rule must show before it is declared unsuitable for the syntactic component and removed to the lexicon.

MEANING POSTULATES

In the immediately preceding sections I have assumed the desirability of a compositional approach to the structure of causative verbs, the problem being

to assess the relative merits of the GS and L methods of accomplishing the composition. Two alternatives to a compositional approach were considered earlier and rejected (case grammar and a paradigm of syntactic correspondence); both of these were analyses whereby members of a causative-noncausative pair are considered as contextually determined variants of a single lexical item. In this section we consider a third alternative to a compositional analysis, an approach through meaning postulates.

Meaning postulates (MPs), formulated originally by Carnap [1956], are inference rules that express analytic entailments holding between lexical items (cf. Kempson [1977], Fodor [1977] for general introduction). In a meaning postulates approach to causative verbs, the relationship between *kill* and *die* and between transitive and intransitive *break* (for example) would be handled by rules specifying that to *kill* someone entails causing him to die and that to *break* something entails causing it to break. However, the *meaning* of *kill* and transitive *break* would not be seen as «composed of» elements such as CAUSE and elements making up the meanings of *die* and *break*. Rather, both *kill* and *die* and both transitive and intransitive *break* would be entered into the lexicon as undecomposed semantic primitives or «atomic predicates». The main advantages of the MP approach, its advocates point out, is that it permits meaning relationships to be expressed without committing the linguist to formulating, for each lexical item, an exhaustive list of its semantic components, an endeavor notoriously fraught with difficulties (e.g., see Bolinger [1965], Fodor [1977]). Fodor, Fodor & Garrett [1975] have argued in favor of replacing semantic composition altogether with MPs; Lakoff [1970] proposed a more conservative «mixed» view that accepts the need for some MPs while at the same time retaining semantic components to do other work.

Several arguments against using MPs to capture some or all of the meaning relationships in a lexicon have been presented (Lakoff [1970], Katz & Nagel [1974], Kempson [1977], Katz [1977]); there is no need to review these here. Only two specific difficulties that the causative verb error data raise for an MP analysis will be discussed. The first is the problem of accounting for *productive* or *creative* use of MPs. MPs are not built into a grammatical model as part of the apparatus for generating words or sentences. Rather, MPs are after-the-fact constructs — «inference rules holding over structures output by the grammar» and therefore «not... subject to syntactic constraints» (Fodor [1977: 155]). In view of this, how can we explain children's rule-governed creation of *novel* causative verbs along the pattern offered by existing causatives like *break*?

Leaving aside this basic difficulty, which is built into the definition of MPs, how would one have to organize MPs within a grammatical model so as to approach an account of the productive generation of zero modification causative verbs? One would clearly first have to rule out an analysis whereby each causative-noncausative pair would have its own MP connecting its members, e.g., $X_1 \text{ kill } X_2 \rightarrow X_1 \text{ CAUSE } (X_2 \text{ die})$; $X_1 \text{ break (transitive) } X_2 \rightarrow X_1 \text{ CAUSE } (X_2 \text{ break [intransitive]})$. Otherwise there would be no recurrent structure in

the lexicon from which a child could extract a generalization. Suppose, then, that one specified a general causative MP that applied to a number of lexical items, e.g., $X_1\alpha X_2 \rightarrow X_1 \text{ CAUSE } (X_2\beta)$, where (α, β) pairs are items like 'kill' and 'die', transitive 'break' and intransitive 'break', etc. (The lexical entries of the words to which the MP applies would be so marked, along with an indication of the other member of the (α, β) pair). This is still not enough. The MP would also have to be linked to recurrent morphological patterns wherever they occur, such as morphological identity in the case of transitive and intransitive *break*. Now we could perhaps say that the child comes to recognize the covariation between a certain MP and a certain morphological pattern; he learns, in effect, that forms related by a particular MP are also often related by a particular morphological pattern.

The problem still remains, however, of explaining how the child takes the step from passive recognition of a connection between an MP and a morphological pattern in existing lexical items to creating novel words patterned in the same way. This seems to require reference to a mental entity that is neither the MP nor the morphological pattern but precisely a coherent articulation of the two — in other words, a *rule* that says, in effect, if you perform *this* morphological operation on words of such-and-such a type, you get *this* semantic effect.

At this point it is not clear that the grammatical model we have arrived at is any different in principle from a lexicalist account such as Jackendoff's [1975] or Aronoff's [1976] that invokes redundancy rules linking morphological patterns to meanings. This is an echo of objections that have been made on other grounds to the effect that developing the MP approach to the point where it could adequately handle problems of accounting for lexical and sentential meaning amounts to making it almost indistinguishable from an approach invoking semantic components (Katz & Nagel [1974], Kempson [1977]).

It is worth noting that *inflections* present precisely the same problems for an MP approach to meaning as does a speaker's ability to generate novel causative verbs, given the developmental parallels, pointed out repeatedly above, between inflection and derivation. If transitive and intransitive *break* are to be entered into the lexicon as independent entities, and each one assigned its own undecomposed atomic predicate related only through meaning postulates, then consistency demands the same treatment for the inflected forms of words. A grammatical model that treats *cat* and *cats*, *walk*, *walked*, and *walking*, etc. in this way is uneconomical, to say the least, and again, how can the productivity of the inflections be accounted for? In contrast, this is straightforward in a model that is willing to «break off» pieces of the meanings of words and link them systematically with derivational or inflectional morphemes or, in the case of zero modification, with a particular syntactic treatment.

The second difficulty the causative verb error data present for the MP approach is to account for recurrent noncausative-causative relationships between *particular words*. It is commonly assumed that MPs may not state

regularities involving the *phonological forms* of words but only those involving language-independent atomic predicates (Lakoff [1970], Fodor [1977: 155]; although see Katz & Nagel [1974] for what seems to be a different assumption on this point). For example, a causative MP could state that the atomic predicate for *kill* entails CAUSE 'die' (where 'die' is not the word *die* but the meaning or atomic predicate corresponding to it), but it could not state this regularity in terms of the words themselves.

This distinction may seem unproblematic as long as we attend only to causative-noncausative word pairs in which the noncausative word would be assigned the same atomic predicate in every context in which it occurs, since in this case there would be only one causative atomic predicate corresponding to it and this would be uniquely associated with a particular word. But difficulties arise when a particular noncausative word corresponds to one atomic predicate in one context and to another atomic predicate in another, yet the causative verb corresponding to it remains the same in most or all contexts. Lakoff [1970] has argued against the MP analysis of causatives on the basis of a relationship like this between *come* and *bring*. He points out that the causative of *come* is systematically *bring* even though *come* may be embedded in idiomatic phrases with very different meanings, e.g., *come up* (for discussion), *come to* (awaken), *come out* (be published), etc. (see also Binnick [1971b]). This relationship cannot be captured in a system that does not allow reference to the words themselves, but it is easy to account for within a compositional framework in which *bring* is said to be substitutable for the complex predicate CAUSE-*come* regardless of the meaning of the phrase it appears in.

If the MP analysis of causative verb structure accurately captured what children know about the meanings of morphologically identical pairs like transitive and intransitive *break*, then any causative form a child predicted from its noncausative counterpart would have to be predicted on the basis of the *meaning* of the noncausative alone, not from its form, since a causative MP would make reference only to meanings and not to words. In other words, children should not systematically keep creating the *same* causative verb out of a given noncausative word unless the noncausative word means the same thing in every context in which it occurs. But in fact this happens.

Consider, for example, phrases like *take a bath*, *take a ride*, *take a walk*, *take a nap/quiet time*, *take little bites*, etc. In these phrases, *take* is, in effect, a dummy verb that allows information about the specific action involved (bathing, riding, walking, napping or resting, biting or eating) to be expressed in nominal form. The atomic predicates corresponding to these phrases would therefore all be different. On the MP analysis, there would be no reason to expect the causative version of these phrases to contain the same verb. How then can we account for sentences like (57)-(65) in Table 1, ... *take NP a bath / ride / walk / quiet time / little bites*? The recurrent presence of causative *take* here can be traced only to the presence of the word *take* in the noncausative phrases, not to the meanings of the phrases. It seems most plausible, then, that what children who create such errors have learned about

morphologically identical causative-noncausative pairs is not only a link between their *meanings*, as the MP approach would specify, but also a link between the *words themselves*; the rule that is used in generating novel causatives thus applies to particular words rather than to the atomic predicates to which the words correspond.

For this reason, as well as for the more general reason discussed previously of inability to account for creativity with causative verbs, the MP analysis of the structure of causative verbs, at least in its present state of development, appears to be inferior to an analysis that decomposes causatives into their noncausative counterparts plus an element like CAUSE.

SUMMARY AND CONCLUSIONS

In the preceding pages, language acquisition data — specifically, information about children's production of novel lexical causative («I *fell* that down») — have been used to evaluate the relative merits of five different theoretical approaches to the structure of causative verbs and to the relationship between causatives and their noncausative counterparts. This effort was motivated by the joint convictions that linguistic theorizing should rest on a psychologically sound basis and that information about language development, if exploited thoroughly and with awareness of often-ignored pitfalls, can provide invaluable clues to the structures and processes of language as they are organized and called upon by the fluent speaker.

The models that have been explored are case grammar, a paradigm of correspondences in syntactic positions (see footnote No. 5 above), generative semantics, the lexicalist position, and meaning postulates. The tenets of these approaches have been laid out in rather general terms, with the intention having been to identify and evaluate the most basic ways in which they differ with respect to what they posit about the nature of the speaker's knowledge, rather than to compare the myriad alternative formulations possible within each model.

Two major areas of theoretical conflict with particular psychological relevance were highlighted: 1. whether an adequate characterization of the structure of causative verbs requires an appeal to semantic compositionality, such that the meanings of causatives are described as consisting of the meanings of their noncausative counterparts plus (at least) an additional semantic element roughly representable as CAUSE; 2. whether the knowledge that speakers draw up on in generating novel lexical causatives is best characterized as a lexical or a syntactic rule. What can we conclude about these issues?

Compositionality

The generative semantics and lexicalist approaches to causative verbs are both compositional. One major alternative to a compositional account is to ascribe the basic difference between a causative verb and its noncausative

counterpart not to differences in the inherent meanings of the verbs but to differences in the linguistic contexts into which the verbs are set. Whether the knowledge that leads to errors like «I *fell* that down» can be adequately characterized in terms of speakers' generalizations about the linguistic contexts that surround verbs might depend upon how «linguistic context» is conceptualized. However, it was concluded that neither a semantic characterization of context, as in the case grammar approach, nor a syntactic characterization, as in the paradigm of syntactic correspondences approach, provides a satisfactory account of what children are learning about the structure of causative verbs. Counterarguments were based on the facts that the pattern of error production is asymmetrical or directional in a way that the models do not predict, that children do not produce certain errors that would be predicted, and that they do produce other sentences that are deviant in ways that either cannot be identified or located by the model (case grammar) or that violate constraints built into the model (syntactic correspondences paradigm).

A second major alternative to a compositional account is provided by meaning postulates. Like the generative semantics and lexicalist positions, a meaning postulates approach locates the difference in meaning between a causative and its noncausative counterpart in the difference between the semantic representations of the words themselves rather than in differences in the relationship between the words and the surrounding linguistic context. However, these meanings are represented as irreducible semantic primitives or «atomic predicates» rather than as compositions of smaller elements of meaning; the relationships between them are given by inference rules specifying analytic entailments between the atomic predicates.

The difficulty with this approach, it was argued, is that by definition inference rules cannot be part of the *generative* apparatus of a grammar, and if the rules are modified in such a way that they might be invoked as the basis for the novel causative verbs created by children and adults, the end result is not clearly distinguishable from a lexicalist account. A further difficulty is that children clearly operate on *words* in forming novel causatives, whereas meaning postulates specify relationships only between the atomic predicates corresponding to the words and not between the words themselves.

Overall, it was argued, a compositional account offers a better fit for the pattern of children's errors (including not only causative verbs but also other relevant constructions) than do any of the noncompositional approaches reviewed. According to such an account, novel causatives such as transitive *fall* are the products of a «zero derivation» rule of word formation which takes a noncausative predicate as its base, adds (at least) CAUSE to its meaning, and accords this semantically new word the syntactic privileges of a transitive verb. Directionality in error production favoring novel transitive causatives over novel intransitives is readily understood within this framework as resulting from differences in the frequency with which a rule is applied in a forward direction (word build-up) versus in a backward direction (word «tear-down», or backformation). Moreover, this framework permits a plausible account of why legitimate causatives like *bring* and *keep* may be partially or

even totally replaced in the child's speech by novel forms like transitive *come* and *stay*: the legitimate causatives are interpretable as «irregular» with respect to their noncausative counterparts, and so yield to the pressure of the child's efforts (Slobin [1973]) to impose patterns wherever possible. The «contextual variants» and the meaning postulates approaches, in contrast, cannot explain this phenomenon. This is because they do not treat the noncausative member of a causative-noncausative pair as «more basic» than its causative counterpart; consequently, a causative form that is morphologically unrelated to its corresponding noncausative cannot be characterized as «irregular» with respect to it.

Is the rule syntactic or lexical?

When the structural knowledge that underlies children's production of novel causative verbs is characterized as a rule for forming novel words out of existing ones by the addition of (a) semantic element(s), with accompanying syntactic alterations, the question still remains of whether this rule should be seen as syntactic, as on a generative semantics account, or lexical, as in the lexicalist model. This issue poses what in my opinion are the most subtle and challenging problems of all those discussed in this paper for those who would attempt to come to grips with the psychological implications of alternative linguistic analyses. A great deal of space has therefore been devoted to it in the preceding pages, even though a completely satisfactory conclusion could not be reached.

Although a number of complex and interrelated subproblems are involved, many of these can be subsumed under what seems to be the most critical psychological issue at stake: should the rules mapping underlying structures into surface structures be divided into two distinct types, one set — lexical — having to do with the internal semantic and morphological structure of words and the other set — syntactic — dealing with the organization of words into sentences? Or is there only *one* type of rule, transformations, underlying both lexical structure and sentence construction? The former position is adopted by lexicalists, the latter by generative semanticists.

The many difficulties associated with trying to handle everything by transformations have been amply demonstrated, and few linguists today would argue for this solution. However, developmental data strongly suggest that currently influential lexicalist alternatives have gone too far in the opposite direction. The strict division in the lexicalist's grammar that separates rules of word formation from syntactic rules and treats them as qualitatively different appears to be highly arbitrary, psychologically speaking. While rules certainly differ from each other with respect to degree of productivity, degree to which they admit of exceptions, degree to which their results are semantically regular as opposed to idiosyncratic, etc., rules of word formation do not behave as a set with respect to these variables, distinctly different from rules uncontroversially accepted as syntactic.

The developmental course followed by the «zero derivation» rule for

forming novel lexical causatives illustrates with particular clarity the arbitrariness of decisions about which component of grammar a rule should be assigned to. It starts out extremely productive, virtually exceptionless, and semantically highly predictable — all characteristics most typically associated with syntactic rules — and moves gradually over the course of many years to end up as a rule employed rather rarely, subject to so many exceptions that some theorists (e.g., Thompson [1975]) do not consider it a rule of word formation at all. If we decide to consider it first a syntactic rule and later a lexical rule, how do we pinpoint the time at which its status shifts? And if we consider it a lexical rule all along, how do we justify its initial separation from the body of syntactic rules attributed to the child?

There is this further problem: one of the cornerstones of the lexicalist attack on generative semantics is that the GS transformational rules generate configurations of semantic elements for which lexical items «ought» to exist but do not; the lexicalist prefers not to build into the grammar the potential for generating them in the first place rather than to postulate mechanisms for generating them and then have to account for their nonexistence through filters or other supposedly *ad hoc* devices (see p. 37). However, this appears to be precisely how the child's grammar develops: He must learn piecemeal which forms are exceptions to the «zero derivation» rule for forming lexical causatives, and presumably these bits of information act throughout his life to block the production of sentences like «I fell that down», except under conditions of fatigue, humor, etc., when they are likely to slip through.

Finally, the lexicalist model also has difficulty accounting in a principled (as opposed to *ad hoc*) way for two important developmental connections between lexical and syntactic ways of expressing roughly the same meanings: the temporal linkage between the onset of novel lexical causatives and periphrastic causatives, and their initial coincidence in meaning. In contrast, these can easily be handled within a model which, like generative semantics, assigns the same underlying structure to both forms.

In summary, the developmental data point up some serious weaknesses in the lexicalist position. While the generative semantics approach taken as a whole undeniably has many problems, I believe that lexicalists, in their desire to correct its flaws, have essentially thrown out the baby with the bathwater — that is, have lost some important insights that turn out to be on psychologically firm ground about the relationships between lexical structure and sentence structure. I do not know how these insights can be recaptured in an optimal grammar and integrated with important advances made since the generative semantics position was at its strongest, but I would argue that such a step is essential to any future efforts to achieve a psychologically valid framework for grammatical description.

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