

## Starting to Talk Worse: Clues to Language Acquisition from Children's Late Speech Errors<sup>1</sup>

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On casual observation, language development may seem a relatively straightforward process of expansion and improvement. New words continually enter the child's vocabulary and their use is gradually brought into conformity with adult conventions; one-word utterances give way to short sentences consisting of content words and these lengthen bit by bit and are fleshed out with the articles, prepositions, inflections, and other "little words" that were omitted earlier; recursive operations for creating complex sentences out of simpler ones are sequentially acquired; and so on. This superficial look of monotonicity is misleading, however. Research of the last 20 years, and especially over the last decade, has revealed previously unsuspected complexities in growth curves, including marked decrements in the accuracy with which children produce and comprehend various aspects of language.

A thorough review of known U-shaped phenomena in language development is beyond the scope of this chapter; for overviews and interpretations of selected findings see Clark (1975), Nelson and Nelson (1978), Bowerman (in press b) and Strauss and Stavey (in press). The present goal is, rather, to present and discuss a subset of interrelated U-shaped phenomena in enough detail to suggest the pervasiveness and significance of certain underlying processes in language development that have received only limited attention in the past.

The phenomena to be considered are certain types of errors in children's spontaneous speech. The term *error* will be used in this chapter to refer to deviations from norms of adult usage and presumably from

<sup>1</sup> This research was supported in part by NICHD Grant HD 00870 and by a fellowship from the Netherlands Institute for Advanced Study in the Humanities and Social Sciences, Wassenaar, The Netherlands.

what the child has heard modeled; most of these will not be errors within the rules of the child's own system, although some of them may be, as will be discussed. Deviations from adult norms are, of course, characteristic of child speech from the beginning. What makes the errors considered here stand out from children's other departures from adult conventions is that they are preceded by a period in which (a) the linguistic forms later involved in the errors are used *correctly* and (b) the events to which these forms are subsequently misapplied are themselves referred to in a conventionally more appropriate way. This period may range from a few weeks up to 2 years, perhaps even more, depending on the error.

The onset of errors in domains of language that the child already appears to have mastered (hereafter called *late errors*) poses a challenge for the development of an adequate theory of the motivating force(s) behind language acquisition (see Karmiloff-Smith, 1978, 1979b). Traditional appeals to extrinsic factors such as explicit corrective feedback or selective failure by the child's interlocutor to understand are clearly inadequate, since they can "explain" only changes from less mature to more mature forms.<sup>2</sup> Contemporary proposals that avoid appeal to extrinsic motivation are also unsatisfactory, however. For example, Brown and Hanlon's (1970) Piaget-style suggestion that the child is propelled forward by "the occasional mismatch between his theory of the structure of the language and the data he receives [p. 50]" is clearly inapplicable to children's shifts from matching to mismatching forms. And the errors are equally difficult to account for by the currently popular hypothesis that change in language acquisition is internally motivated by children's efforts to solve communication problems, that is, to find linguistic devices to encode the meanings (both semantic and pragmatic) that they are capable of entertaining and want to express (e.g., Bates & MacWhinney, in press). This is because the earlier language forms that many types of late errors replace are already both grammatical and semantically and contextually appropriate, and so presumably are maximally effective in communication. The incorrect forms are generally quite comprehensible in context and thus do not actually disrupt communication, but they certainly do not constitute a communicative improvement.

The errors to be discussed in what follows appear to have little to do with communication per se. They point instead to a significance that language has for the child other than its usefulness as a tool for communication, a significance that is often downplayed or overlooked

<sup>2</sup> It is uncertain whether feedback plays an important role even in these cases; see Brown and Hanlon (1970) and Nelson (1973) for some counterevidence.

entirely in the current era of emphasis on the communicative functions of language. This is the role of language as a "formal problem space" (Karmiloff-Smith, 1979b): a complex "object" in the child's environment whose formal properties and structure the child explores just as he or she explores other aspects of the environment without immediate instrumental payoff.

Children's approach to the structure of language is similar in some respects to their approach toward other domains characterized by implicit patterns and regularities, for example, the behavior of balancing objects. In each domain, children show a disposition toward the construction of successively more comprehensive and abstract representations, each one more differentiated and better integrated than the one that preceded it. Developmental dips in performance are often the incidental by-product of this process (see Karmiloff-Smith & Inhelder, 1974/1975; Strauss & Stavey, *in press*, for relevant data and interpretations). Although the processes that we can infer to be at work in the domain of language are surely related to those involved in nonlinguistic cognitive domains, the subject matter upon which they work—words, sentences, etc., as they are "received" by the child from adult speakers and gradually systematized—has its own special character and must be explained in part in its own terms.

The lines of argument to be developed below draw upon analyses of selected sets of late errors that I have presented in detail elsewhere (Bowerman, 1974, 1977, 1978b, *in press a,b*). These errors and related language materials came primarily from my two daughters, Christy and Eva, whose language development I have followed with a tape recorder and notebook from the time of first words at about 12 months to the present (10 and 8 years, respectively).<sup>3</sup> Other late errors discussed by Ervin (1964) and Karmiloff-Smith (1977, 1978, 1979a,b) are also considered in an attempt to understand late errors of superficially rather different types within a common framework.

### **Overregularization of Inflectional Morphology: A Jumping-Off Point**

One case of U-shaped behavior in language development is already well studied and familiar to most cognitive psychologists. This involves

<sup>3</sup> The Christy and Eva data are supplemented at points by data from other children. Data from Kendall, Emily, and Andrea were collected by me. For additional material I am grateful to Ginny Gathercole (Jaime and Rachel), Robin Chapman (John), Cynthia Park (Hilary), and Mabel Rice (Mindy).

the child's learning of rules for inflecting nouns and verbs with morphemes such as plural *-s* and past tense *-ed* (Ervin, 1964). The sequence of events in this domain and inferred explanation for it is particularly clear and can serve as a convenient starting point for discussions aimed at identifying the determinants of late errors in other domains of language.

Children proceed as follows. First they produce correct instances of plural and past tense forms. Some of these forms conform to an inflectional pattern shared by a large number of forms (e.g., *shoes, dogs, walked, jumped*), others belong to minor patterns (e.g., *swam, rang*), and still others are irregular, that is, not predictable by rule (e.g., *feet, mice, went, broke*). At the next stage the correct but irregular and "minor pattern" forms are partially or totally eclipsed by incorrect forms that conform to the general patterns, for example, *feet* → *foots*; *mice* → *mouses*; *went* → *goed*; and *broke* → *breaked*.<sup>4</sup> Eventually the correct forms reassert themselves.

The commonly accepted interpretation of this sequence of events attributes the child's initial correct usage to her having learned the relevant forms as individual cases, in isolation from each other. After having acquired some exemplars of a regular pattern, the child comes to recognize their systematicity and to abstract rules that allow her to create new exemplars at will.<sup>5</sup> When the new rules come into operation, the child applies them in a blanket fashion, as yet unaware that there are instances where the rules do not apply. At this point overregularized forms like *breaked* replace irregular forms like *broke*. When the irregular forms reenter the child's speech or regain strength, we infer that they are no longer isolated, independent units, as before, but integrated into a system.

The difference in the child's understanding of plural and past tense forms before and after the period of overregularization is typically characterized in terms of the concept of *analysis*. Initially, the forms are said to be *unanalyzed* by the child—that is, she is not aware that *shoes* and *jumped* (for example) are composed of two units, *shoe* plus plural *-s* and *jump* plus past *-ed*. The onset of errors of overregularization indicates that analysis has taken place: that *-s* and *-ed*—and the semantic concepts

<sup>4</sup> Maratsos (1979) points out that, contrary to the common assumption, irregular forms typically do not vanish entirely during this period but alternate with their overregularized counterparts.

<sup>5</sup> Terms such as *recognize, become aware of, realize, and see* tend to imply conscious awareness. However, for lack of better terms I will use them throughout this chapter to refer to cognitive processes that are assumed to be unconscious (i.e., processes that the child has no metalinguistic ability to reflect on or talk about).

associated with them—have been abstracted out, conceptually freed from the forms in connection with which they were originally learned and thus newly available to enter into novel combinations.

Two aspects of the foregoing analysis are particularly important for understanding other late errors in spontaneous speech. At this point I will simply underline them; their significance will become clearer as we proceed. The first has to do with the relationships among linguistic forms in a child's developing grammar: It is the hypothesis that the child is capable of acquiring bits and pieces of language and using them completely correctly without being aware of how they are related to each other. Errors occur as a result of the child's efforts to integrate what has previously been separated. The second important aspect of the analysis has to do with the child's grasp of the INTERNAL STRUCTURE of a given form or set of forms: It is the hypothesis that forms that are analyzable within the adult system as *complex*—that is, consisting of subunits with independent combinatorial potential—can be used correctly by a child even though he is unaware of their internal structure.

### Learning about Lexical Structure

In the case of inflected forms like *shoes* and *walked*, the units whose combinatorial independence the child must come to appreciate have both semantic and phonetic substance; for example, *cups* is analyzable into two surface segments, *cup* and *-s*, each of which has a semantic significance. Not all semantic units that enter into patterned systems are phonetically explicit, however. Many words that are monomorphemic (i.e., cannot be broken down into more than one morpheme, or meaning-bearing segment) can nevertheless be seen, upon suitable analysis, as regular, patterned "bundlings" of sublexical semantic elements (or "components" or "features"), with characteristic patterns differing somewhat from one language to another (Fillmore, 1971; Jackendoff, 1976; McCawley, 1970, 1971; Talmy, Note 1, 1975, 1976).

In principle, children need never recognize these patterns in order to become fluent speakers of their language. They could simply memorize lexical items, one by one, and gradually work out their referential properties and boundary relationships to other semantically similar words, never looking beneath the surface of the lexicon to discover the organizational principles along which it is structured. However, certain sets of children's late errors indicate that the process of vocabulary development is much more complex than this.

In the beginning of language development, children frequently do

appear to accept prepackaged chunks of meaning—received words of the adult language—and they can perform surprisingly accurate mappings of these chunks onto nonlinguistic situations. (Difficulties around category boundaries, resulting in “overextensions” and the like, are common, however, cf. Clark, 1973.) Communication can proceed. However, as children’s linguistic repertoires expand, so does their implicit awareness of how the various parts of the linguistic system are related to each other. In particular, in the meanings of the words they know they begin to discover smaller semantic units across which combinatorial patterns operate. The evidence lies in their creation of novel lexical items structured according to the same patterns. These can be considered overregularizations, analogous to errors like *goed* and *foots* in the domain of inflectional morphology.

### “Resulting Event” Causative Verbs

One category of children’s novel lexical items corresponds semantically to a class of English verbs whose meanings conflate or combine the notion of an event or state (dying, coming, opening, falling, being flat, etc.) with a semantic element roughly representable as CAUSE to specify an action that brings about that event or state. Existing verbs of this semantic type include *kill* (roughly, ‘cause die’), *bring* (‘cause come’), *drop* (‘cause fall’), *flatten* (‘cause become flat’), transitive *break* (‘cause break’), and transitive *warm* (‘cause become warm’). Such verbs, although common in English, are rare in some languages, which instead encode the same meanings either periphrastically (through syntactic combinations such as English *make die*) or morphologically (e.g., *die* + causative suffix). (See Fillmore, 1971; Kastovsky, 1973; McCawley, 1970, 1971; Talmy, Note 1, 1976, for general discussion.)

During the early period of word combination, children typically use both a number of transitive causative verbs such as *bring* and *drop* and a number of intransitive noncausative predicates such as *come* and *fall*. The adult syntactic and semantic restrictions on these words are observed, such that causative verbs are used correctly in transitive, causative contexts (*Mommy bring me potty*, *Christy drop bottle*) and noncausative predicates are used in intransitive, noncausative contexts (*I come*, *bottle fall*).

Between the ages of 2 and 3, a change occurs: Children sometimes use a lexical item that up until now has occurred in their speech exclusively in intransitive or adjectival contexts, in accordance with adult norms, as a transitive causative verb with a meaning roughly para-

phrasable as "cause the event or state of affairs normally referred to by this word to come about." Some examples are shown in Table 5.1.

What has happened? Because of the earlier period of correct usage, we cannot simply dismiss the errors as reflecting initial lack of knowledge about the words' part-of-speech membership. Rather, I have argued (Bowerman, 1974, in press a) that the errors are most plausibly interpreted as the result of two converging factors: (a) children's realization that a certain kind of complex meaning can be expressed with a single lexical item, a transitive verb, and (b) their formulation of a systematic method for deriving verbs with such meanings from existing materials. English in fact provides a simple model for the child: causative-noncausative pairs that have the same morphological form, such as *open*, *break*, and *warm* (*John opened the door; the door opened*, etc.). Apparently the child infers on the basis of such pairs a rule of word formation that specifies, in effect, that when a normally nontransitive predicate is used in a transitive way it takes on an extra element of meaning representable as CAUSE.

In order to derive a general rule for forming novel causatives on the basis of such pairs, children must make some implicit comparisons among the lexical items they have encountered in adult speech. They must recognize not only that there is a relationship between, for example, transitive and intransitive *open*, but also that this relationship is, in abstract terms, "the same" as that between, for example, transitive and intransitive *break*, *warm*, etc. Specifically, across all pairs, one member expresses essentially the same meaning as the other member with the addition of a semantic element representable as CAUSE, and this member systematically takes as its direct object the noun argument that is the subject of the other.

This hypothesized analysis by the child of received causative forms and their noncausative counterparts is completely analogous to the type of analysis we infer must take place before the child can use inflections like plural *-s* or past *-ed* productively: In both cases the child must recognize that a particular grammatical operation—a specific syntactic treatment in the case of the causative verbs and the addition of a morpheme in the case of the inflections—is associated with a particular semantic effect on the word to which the operation is applied.

Neither in the case of inflected forms nor in the case of causative verbs is it necessary for the child to have performed the analysis to be able to correctly use the forms provided by adult speech. Just as a speaker—even an adult—can know the appropriate class of referents for a word like *pancake* without seeing in it the words *pan* and *cake* or

Table 5.1<sup>a</sup>

## Use of a Noncausative Predicate as a Causative Verb

*Adult language offers a different verb<sup>b</sup>*

- |      |            |      |   |
|------|------------|------|---|
| (1)  | C          | 2:11 | <i>I'm gonna <b>sharp</b> this pencil.</i> (= sharpen. Sticking pencil into pencil sharpener)   |
| (2)  | C          | 2:11 | <i>How would you <b>flat</b> it?</i> (= flatten. Trying to smooth down paper on magic slate)  |
| (3)  | C          | 4:5  | <i>I'll <b>straight</b> these out 'cause you don't know how they went, did you?</i> (= straighten. Arranging disposable diapers that were jumbled in box)   |
| (4)  | E          | 2:4  | <i>Don't <b>tight</b> this 'cause I <b>tight</b> this.</i> (= tighten. Screwing nipple on her bottle)   |
| (5)  | Jaime      | 3:11 | <i>I'll put you in two cages and <b>fat</b> you up.</i> (= fatten. Telling what witch in <i>Hansel and Gretel</i> says)   |
| (6)  | John about | 2:3  | <i>You <b>sad</b> me.</i> (= sadden)  |
| (7)  | C          | 2:9  | <i>I <b>come</b> it closer so it won't fall.</i> (= bring. Pulling bowl closer to her as she sits on counter)   |
| (8)  | C          | 3:10 | <i>Go me to the bathroom before you go to bed.</i> (= take. To M who is tucking C into bed; she wants midnight trip to the potty. The next morning C says, "You didn't take me to the potty before you went to bed.") |
| (9)  | C          | 2:6  | <i>Mommy, can you <b>stay</b> this open?</i> (= keep. C having trouble with refrigerator door)  |
| (10) | C          | 2:9  | <i>I'm gonna just <b>fall</b> this on her.</i> (= drop. Holding piece of paper over E's head, then dropping it)   |
| (11) | Kendall    | 2:3  | <i>Kendall <b>fall</b> that toy.</i> (= dropped. After she drops a toy)   |
| (12) | Hilary     | 4+   | <i>He's gonna <b>die</b> you, David.</i> (Turns to Mother.) <i>The tiger will come and eat David and then he will be died and I won't have a little brother any more.</i> (= kill)                                    |
| (13) | E          | 4:10 | <i>Don't <b>dead</b> him.</i> (= kill. As M picks up a spider)  |
| (14) | John       | 2:6  | <i>Who <b>deaded</b> my kitty cat?</i> (= killed)   |
| (15) | C          | 5:0  | <i>My daddy lowered the seat and lowered the handlebars and <b>highered</b> the wheels.</i> (= raised. About new bike)  |
| (16) | C          | 3:3  | C: <i>See, she can't eat.</i> (Poking spoon at doll's closed mouth)<br>M: <i>Just pretend, honey.</i><br>C: <i>But I can't <b>eat</b> her!</i> (= feed)   |
| (17) | C          | 4:2  | <i>How do you write "Marc," 'cause I want to <b>have</b> it to Marc.</i> (= give. C drawing picture for a friend; later gives it to him)  |
| (18) | C          | 2:3  | <i><b>Full</b> it up!</i> (= fill. Looking with dissatisfaction into her bottle, which M has only partially filled)   |
| (19) | Jaime      | 6:8  | <i>This'll <b>hot</b> it up.</i> (= heat. Putting bread into toaster)   |

*No equivalent adult verb*

- |      |   |     |   |
|------|---|-----|---|
| (20) | C | 3:1 | M: <i>The cow would like to sing but he can't.</i> (As C handles broken music box cow)<br>C: <i>I'm <b>singing</b> him.</i> (As pulls on string that used to make music play) |
|------|---|-----|---|

(Continued)



Table 5.1 (continued)

(21)	Mindy	5:8	Mindy: <i>These are nice beds.</i> M: <i>Yes, they are.</i> Mindy: <i>Enough to wish me that I had one of those beds.</i>
(22)	E	3:0	<i>Don't giggle me.</i> (As M tickles E, making her laugh)
(23)	C	4:6	<i>Spell this "buy". Spell it "buy".</i> (Wants M to rotate blocks on toy spelling device until word <i>buy</i> is formed)
(24)	C	4:3	<i>Andrea. I want you to watch this book. Andrea. I want to watch you this book.</i> (Shortly) <i>I just want you to watch this book.</i> (C trying to get A's attention so she will look at the book)
(25)	E	3:7	<i>Yawny Baby—you can push her mouth open to drink her.</i> (Showing M how her doll can take a bottle)
(26)	E	3:2	<i>Will you climb me up there and hold me?</i> (Wants M to help her climb pole)
(27)	E	3:7	<i>I'm gonna put the washrag in and disappear something under the washrag.</i> (E playing in tub with a cup; has been pretending to do magic)
(28)	E	3:8	<i>I'm gonna round it.</i> (Rolling up piece of thread into ball)
(29)	Rachel	2:7	<i>Are you gonna nice yourself?</i> (Watching M put on eye shadow. Cf. <i>beautify, neaten, pretty</i> [yourself] up, etc.)
(30)	Rachel	3:8	<i>That one always sweaties me.</i> (Doesn't want to wear knit hat because it makes her sweaty)
(31)	C	7:8	<i>Did they vanish "knock-knock" cups?</i> (Noticing that paper cups in new pack no longer have "knock-knock" jokes on them)

<sup>a</sup> In this and following tables, C = Christy, E = Eva, M = Mother, D = Daddy. Age given in years; months. Dashes indicate broken-off phrase; ellipses indicate pause without sentence—final intonation contour.

<sup>b</sup> This verb is sometimes morphologically related to the child's form, sometimes not.

grasping how the meanings of these constituents contribute to the meaning of the whole, so the child can learn the domains of application of, for example, *cups*, *jumped*, and transitive *open* without having extracted semantic elements such as "plurality," "past time," and CAUSE. The meanings suggested by these labels are in some sense present in children's representations for the words or they could not use them correctly, but the meanings can be "present" as part of a complex semantic package, not yet conceptually independent and available for combination with other elements to form new packages. We will return to this topic in later sections (see pages 128–130).

Once children have understood the systematic semantic and syntactic relationships between existing causative verbs like *open* and their non-causative counterparts of the same form, they are in a position to create new causatives patterned in the same way. Some of the verbs they create according to this pattern express causative meanings that they have in fact already been expressing for some time with more adult

forms. For example, during the time that causative *fall* was frequent in Eva's speech, transitive *drop*, a previously well-established form, was rarely heard. An even more pronounced replacement took place in Christy's speech: *bring* and *keep*, which had been used very productively, dropped out entirely for some time in favor of causative *come* and *stay*. The forms that drop out partially or entirely can be seen as irregular with respect to the rule: Just as *went* cannot be predicted as the past tense of *go* and so is replaced by *goed* when the child formulates a rule for making past tense forms, so *bring* (for example) cannot be predicted as the causative form of *come* and yields to the pattern imposed by the new causative verb rule.

In other cases children's new verbs express meanings for which they previously had no verb. Sometimes adult English offers such a verb but the child has not yet learned it (e.g., Examples 1–6 in Table 5.1); often, however, there simply is no such verb, and adult speakers must use periphrastic constructions with *make*, *get*, etc. (Examples 20–31). Intriguingly, even in these cases the child's new causative forms do not constitute a communicative advance since the child already has the capacity to form periphrastic causatives. Discussion of this is reserved for a later section, however.

### Causative Verbs Incorporating "Manner"

Children's analysis of the causative verb forms discussed above constitutes an important early step in their discovery of systematicity in lexical structure. Another step in the same general semantic domain takes place about a year to a year-and-a-half later. At this time children appear to achieve a deeper understanding than they had previously of the pattern underlying sentences of the following kind: *Daddy chopped the tree down*, *Johnny pulled his socks up/over his knees*, *Mommy ate her cereal all gone*, and *George shot Harry dead*.

Morphologically, the verbs in these sentences are identical to the verbs in sentences like *Daddy chopped on the tree*, *Johnny pulled on his socks*, *Mommy ate her cereal*, and *George shot Harry*. But according to analyses by several linguists (e.g., Fillmore, 1971; Kastovsky, 1973; McCawley, 1971; Talmy, 1976), they have a more complex internal structure, one that packs in additional semantic information in a systematic way as suggested by the following paraphrases: *Daddy chopped the tree down* = 'by chopping on the tree, Daddy caused it to go down' (or, alternatively, 'Daddy chopped on the tree, which caused it to go down'); *Johnny pulled his socks up* = 'by pulling on his socks, Johnny caused them to go (come, move) up,' and so on. In other words, a

verb that in some sentences serves as a simple statement of action upon an object can also be used as a "manner" causative verb, meaning, roughly, 'by performing this action on NP, cause NP to go . . . [in a certain direction/to a new location/to a new state].'

These verbs differ from the "resulting event" causative verbs discussed earlier in that they do not incorporate the notion of the direction, location, or end-state. This must be specified by a separate word or phrase (e.g., *down*, *up*, *dead*, *allgone*, *to pieces*). Conversely, the verbs do incorporate information about how the change comes about, which "resulting event" causative verbs do not. The difference can be appreciated by comparing *George killed Harry* with *George shot Harry dead*. In the first sentence, the end-state—that is, what happened to Harry—is incorporated into the verb since *kill* means something like 'cause die.' How George caused Harry to die is not specified, however. In the second sentence, what happened to Harry as a result of the action upon him is not given by the verb; he might or might not have died from being shot. Rather, the effect on Harry is specified separately by *dead*; the verb itself thus tells how George brought about this effect.

Children begin to produce sentences containing "manner" causative verbs as early as about age 2. However, the detailed data from Christy and Eva and more casual observations of other children indicate that the onset of the construction pattern is followed by a long period in which all the child's combinations of particular verbs with particular types of stative or locative effect complements are ones that are frequently modeled in speech to young children: for example, *pull up/down*, *push in/out/into* NP, and *eat all gone*. This suggests that during this early stage, the sentences are produced on the basis of rules of limited scope for combining particular action words with particular kinds of effect complements. (Notice that this is not the same as saying that these sentences are "unanalyzed" by the child in the sense that the separate morphemes are not recognized as such.)

What children apparently still lack at this time is an understanding that all these sentences are related—that they all conform to an abstract pattern that implies many other combinations that they have never heard. Before children can begin to create truly novel sentences along these lines, they must come to see how the sentences are structured. When they at last begin to create novel variants on the theme, most of the sentences are acceptable to adult ears and so pass unremarked (e.g., *don't hug me off my chair*, where it is unlikely that the child has ever heard *hug* with the meaning 'by hugging, cause to go'). Some, however, are overregularizations—the use of the construction pattern where it is blocked for various reasons in adult English.

Overregularizations are of two types. One type involves the use of a verb to mean 'by performing this action, cause to go' where the verb could not be used this way in adult English. Examples include 1–7 in Table 5.2. The second type is the use of a verb that can bear this meaning in some sentences but in this case juxtaposed with an effect (i.e., end-state or locative complement) that for various reasons renders its use in this way unacceptable. Examples include 8–17 in Table 5.2. Errors of this latter type suggest strongly that when children first use verbs like *pull*, *hit*, *pat*, etc. in sentences like *I pulled my socks up*, *I hit a ball over the fence*, and *I patted the Play-doh down*, the verbs are closely linked to particular types of effects. The "uncoupling" of verbs from specific effect complements evidenced in errors like Examples 8–17 indicates that the child has now recognized the more abstract potential of the verb for meaning 'by performing action X, cause to go' independent of the particular changes of location or state with which the child has heard the verb paired in the past.

**Table 5.2**  
"Manner" Causative Verb Errors

*Errors with verbs that can never be manner causatives.*

(1)	C	3:10	<i>Untie it off.</i> (Wants M to untie piece of yarn and take it off trike handle. Cf. acceptability of <i>tie it on</i> and <i>take it off by untying it</i> . No verb prefixed with <i>un-</i> can be used as a manner causative)
(2)	C	4:0	<i>I opened it off of it.</i> (After taking top off toy milk bottle)
(3)	Andrea	4:3	<i>When you get to her, you catch her off.</i> (She is on a park merry-go-round with doll next to her; wants a friend standing nearby to remove doll when doll comes around to her)
(4)	E	3:11	(As M and E go toward Christmas tree with candy canes on it) M: <i>I'm going to eat a candy cane. Do you want one?</i> E: <i>I'm going to choose it off.</i>
(5)	E	3:9	<i>A gorilla captured my fingers. I'll capture his whole head off. His hands too.</i> (As plays with rubber band around fingers)
(6)	E	3:11	<i>She jumped it off for Jennifer and Christy.</i> (After someone had jumped to pull an icicle down off eaves of house. Notice that <i>jump</i> can be used as a causative verb, but only in the sense of "cause NP to jump," not "by jumping, cause NP to move")
(7)	Rachel	4:9	<i>I'll jump that down.</i> (= I by jumping will cause that to go down. When about to jump on bathmat M has just put on top of water in tub)

(Continued)

**Table 5.2** (continued)

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*Errors with verbs that can be manner causatives (but not with every possible "effect" complement)*

Effect cannot be specified by a past participle (Green, 1972):

- (8) C 3:8 *I pulled it unstapled.* (After pulling stapled book apart)

Effect cannot involve negative causation (e.g., by performing action X, cause NOT to go . . .):

- (9) C 4:0 *Will this squeeze the blood from going through?* (Asking whether rubber band on her wrist would impede blood flow. = by squeezing, cause blood NOT to go through)  
 (10) E 2:11 *I'll hit he from doing that.* (Then slaps a friend who took a toy away. = by hitting, cause him NOT to do that)

Miscellaneous and hard-to-specify constraints on possible combinations of verbs and effect complements (cf. McCawley, 1971; Green, 1972):

- (11) Mindy 5:10 *Feels like you're combing me baldheaded.* (As M combs her hair)  
 (12) Mindy 5:6 *Are you washing me blind?* (As M wipes corners of her eyes)  
 (13) C 4:0 *I'm patting her wet.* (Patting sister's arm after dipping her own hand into glass of water)  
 (14) C 3:6 *And the monster would eat you in pieces.* (Telling a story)  
 (15) C 6:2 *It's hard not to knock them down 'cause whenever I breathe I breathe them down.* (Having trouble setting up a paper village)  
 (16) C 4:6 *Don't drive off my feet.* (= by driving [on them], make my feet come off. To friend who is nearby on a trike; C is barefoot. Friend [misunderstanding]: "I'm not even going to drive on your feet.")  
 (17) Emily 3:10 *Then we'd shoot them back up.* (After request for elaboration):  
 . . . *shoot them to be alive.* (Part of elaborate fantasy about killing people and then resurrecting them)
- 

### Some Problems with the Concept of Analysis

In the preceding discussions, the change in the child's knowledge from the period before the errors take place to the period of errors and beyond was characterized in terms of the concept of *analysis*, a term adopted from earlier investigations of the acquisition of inflectional morphology. However, I think this concept has proved somewhat misleading in recent attempts to compare language development to other departments of cognitive growth and should therefore be closely examined.

Several researchers have pointed out some striking parallels between the phenomenon of overregularization in child language and children's approach to cognitive tasks such as balancing weights and blocks and assessing the temperature or sweetness of water mixes (Karmiloff-Smith & Inhelder, 1974/1975; Strauss & Stavey, in press; Strauss & Stein, 1978). In both domains there is an initial stage at which the child performs correctly without the benefit of the knowledge that would underlie the same correct performance at a later stage. Then some principles are extracted and followed, but these do not do full justice to the complexity of the linguistic material or cognitive task at hand and so the child begins to make errors. Finally a broader theory is constructed that can cover all cases, and errors fade out.

The initial knowledge in the case of both language and cognitive task has been termed *global* and *undifferentiated* by Strauss (Strauss & Stavey, in press; Strauss & Stein, 1978), and these notions are equated with the concept *unanalyzed* found in discussions of language development. "Differentiated" ('analyzed') structures subsequently arise, resulting in certain errors, and finally these structures are coordinated, leading again to correct performance. There are at least two difficulties with this identification of the notion of "unanalyzed" with "global and undifferentiated" and "analyzed" with "differentiated," as follows:

#### DIFFERENTIATION VERSUS ANALYSIS

The term *differentiation* denotes a partitioning of an originally unified whole. It is usually contrasted in psychological literature with *abstraction*, the reverse process of creating a new higher level whole out of initially separate parts. An example of differentiation would be the child's subdividing of the domain of four-legged creatures initially referred to by *doggie* into *cats*, *dogs*, *cows*, etc. An example of abstraction would be the child's unification of *saws*, *hammers*, *screwdrivers*, etc., under the concept of *tools*.

The step taken by the child in "analyzing" previously "unanalyzed" linguistic forms such as plural nouns, past tense verbs, and causative verbs cannot be directly equated with differentiation. Previously unrecognized components do indeed emerge, as the term *differentiation* suggests. However, differentiation is only half the story. What occasions this differentiation is in fact its opposite: an act of *abstraction*, a pulling together of what were previously unrelated forms under a common higher order similarity. For example, children's identification of the abstract concept of "plurality" with the *-s* in *shoes* depends on their having noticed a semantic and phonological similarity between forms

that were originally learned and used quite independently of each other, such as *shoes*, *cups*, *spoons*, and *dogs*. Similarly, as argued earlier, children's analysis of causative verbs like *open* into a semantic element CAUSE plus an intransitive predicate specifying a resulting event depends upon their realization that despite the superficial meaning differences among transitive *open*, *break*, *dry*, etc., the words have a semantic similarity, and that they are all related in the same way by virtue of this shared meaning (CAUSE) to their intransitive counterparts.

It is not clear to me whether the process that Strauss has termed *differentiation* in children's progress in solving cognitive tasks might, like *analysis* in language development, be better viewed as implicating BOTH differentiation AND abstraction in the specific sense described above. If so, what would be the elements corresponding to *shoes*, *cups*, *spoons*, etc., among which an abstract similarity is found? If there is such an abstraction, the emphasis on differentiation is causing us to miss it. However, if there is not, then there is an important difference between developments in language and in solving cognitive problems that requires closer scrutiny.

#### IN WHAT SENSE IS THE ORIGINAL LINGUISTIC FORM "UNANALYZED"?

Not only do the ingredients that go into the process of "analysis" require a closer look, but also what is meant precisely by the claim that a word such as a causative verb is "unanalyzed" by the child in the period before she begins to make novel words patterned in the same way. To judge from changes over time in the kinds of errors made by Christy and Eva in the use of certain causative verbs, two different kinds of "analysis" must be distinguished, one of which may take place long before the other. These types of analyses correspond to the distinction often made between two aspects of meaning: *reference*, or the relationship of the word to the (class of) item(s) that it symbolizes, and *sense*, or the relationship of the word to other linguistic forms (see Lyons, 1968).

Errors of overregularization reflect the child's analysis of *sense* relationships. This is because the basis for an overregularization is the speaker's grasp of a regularity that by definition only exists as a pattern to which more than one form conforms. For example, before children can overgeneralize *-s* as a marker for plurality, they must recognize the alternation between forms like *cup* and *cups*, *dog* and *dogs*, etc., and see that across at least some minimal set of such alternations the *-s* is associated with a constant meaning.

Before children arrive at an intralinguistic-system analysis of this sort in a given domain, and hence before errors of overregularization begin to occur, it is nevertheless possible for them to have "analyzed" the meaning of a word with respect to its potential referents. Evidence for analyses of this sort has been presented in Bowerman (1978a). The arguments are based on the way Christy and Eva extended certain words to referents in connection with which they had never heard those words used. *Open* and *close* will be used to illustrate since Christy and Eva used these words early and correctly as transitive causative verbs AFTER there was evidence that they had analyzed the words' meanings with respect to their referents but BEFORE there was evidence—in the form of errors of overregularization such as *I fell that down*—that they had understood the internal structure of the words as a function of their position in a network of causative–noncausative pairs.

*Open* and *close* were first used (starting around 15–18 months) as single-word utterances in connection with appropriate manipulations with doors, cupboards, drawers, boxes, and jars—all common referents for the words in adult speech to children. Within a few weeks of the initial uses of *open* and *close*, the children began to extend the words to referents such as pulling chairs out from the table (*open*) and pushing them in (*close*); spreading and bringing together the handles of scissors or can openers or the arms and legs of people; unfolding and folding bits of paper; taking pieces out of jigsaw puzzles and putting them in; pulling two frisbees apart; taking the stem off an apple; pulling up the seat of a couch (all three *open*); and turning on (*open*) or off (*close*) lights, radios, televisions, electric typewriters, and water faucets. Some of these are (marginally) acceptable exemplars of *open* and *close* in adult language; most, however, would have to be referred to by other words or phrases such as *push in/pull out*, *take off/apart* or *turn on/off*.<sup>6</sup>

How shall we account for these extensions? Some researchers have suggested that children store unanalyzed visual images of known referents for words and identify new referents on the basis of global visual or other perceptual similarities (Anglin, 1976; Vygotsky, 1962). But this does not account adequately for the present data. What, for example, is the global perceptual similarity between an act of opening a door or a jar, on the basis of which *open* is initially learned, and turning on an electric typewriter or a water faucet? A more plausible

<sup>6</sup> Notice that this paragraph outlines the downward curve of U-shaped growth in the use of *open* and *close* that is quite independent of the U-shaped curve in the use of causative verbs discussed previously.



explanation invokes the notion of *analysis*: After a period of sticking closely to known referents, children decompose these referents into two or more attributes, each of which they associate with the word and can recognize independently, that is, in situations in which they are not blended into a single package but rather appear separately, combined with entirely different contextual features.

To judge from the extensions of *open* and *close*, the features into which the children analyzed the original or "prototypical" *open* and *close* referents were (a) "separation/joining of parts" and (b) "revealing/concealing of something within" (with "something within" being potentially quite abstract). Both of these features conjointly characterize manipulations involving doors, jars, etc., and also those involving couch cushions and jigsaw puzzle pieces and perhaps chairs-with-respect-to-tables (although the revealing/concealing component is questionable here). But the features are present INDEPENDENTLY OF EACH OTHER in the context of actions on lights, televisions, water faucets, and typewriters ("revealing/concealing" in the absence of "separation/joining of parts") and manipulations with scissors and apple stems ("separation/joining of parts" without "revealing/concealing").

To summarize, many of children's overextensions of words are best accounted for by assuming that the children perform a featural analysis on the referents in connection with which they have learned the words. After this analysis, they apply the word in new contexts in which one or some minimal combination of these features is present. In the case of *open* and *close* it is the child's ability to recognize perceptually quite dissimilar acts as involving, for example, "revealing" or "concealing" that necessitates postulating a featural analysis on the child's part rather than a global perceptual matching to an unanalyzed image of a prototypical referent. For other words, there is additional support for the claim that the child performs a featural analysis in that the pattern of overextensions can best be explained by reference to inferred features that are assigned DIFFERENT WEIGHTS (Bowerman, 1978a).

This evidence for featural analysis of prototypical referents indicates that it is an oversimplification to consider children's words prior to the onset of overregularization in a given domain as "unanalyzed." In one sense they may well be analyzed, whereas in another sense—the critical sense with respect to overregularization—they are not. How the products of the two types of analysis become integrated into a single semantic representation for the word is a critical problem, but it is too complex to be tackled here. However, some lines of thought that may ultimately be relevant to the problem are discussed in later sections (pp. 128–131).

## Implicit and Explicit Ways to Say the Same Thing

In preceding sections certain late errors of child speech were interpreted as evidence that an important aspect of early lexical development is the child's discovery of systematicity in the way elements of meaning are combined or packaged together. It was argued that the discovery of such systematicity requires the implicit comparison of lexical items that were initially learned and used independently of each other.

There is evidence that children compare words not only to each other but also to syntactic constructions, and they may discover that a complex meaning can either be expressed by a single semantically rich word or distributed across two or more syntactically organized, semantically leaner words. A number of errors arise as children find relationships between alternative ways to say more or less the same thing and before they sort out the circumstances in which more concise versus syntactically more explicit encoding is required or preferred.

### Implicit and Explicit Causative Meanings

Creating novel causative constructions of the two types discussed earlier involves the rule-governed combining of what must at some level be recognized as independent meaning elements, including preeminently CAUSE, into superficially simple surface forms (i.e., single-word monomorphemic verbs). Causative meanings can also be expressed much more explicitly in English through periphrasis. Consider, for example, the following utterances, all of which could refer to the same event (of course, the speaker's choice among them is not random but is governed by subtle semantic and pragmatic distinctions like the degree of effort involved, whether intentionality was involved, and which NP receives primary focus):

- (1) *John opened the door.*
- (2) *John made the door open.*
- (3) *John made the door come open.*
- (4) *John pushed on the door and that made it (come) open.*
- (5) *John { opened the door  
made the door (come) open } by pushing on it.*
- (6) *The door { came open } { because John pushed on it.  
opened } { as a result of } John's pushing on it. }*
- (7) *John pushed the door open.*

There is clear-cut variation among these examples with respect to how explicitly semantic material is displayed. In (2) and (3), for example, the causal relationship between John as an actor and the door's opening is spelled out with the word *make*, whereas in (1) it is implicit, "hidden" in the verb *open*. Likewise, in (4)–(6) the causal relationship between John's action of pushing on the door and the door's opening is rendered explicit through the use of two separate clauses, whereas in the one-clause sentence (7) it is implicit.

There are intriguing connections in language development between the onset of the ability to express causal relationships relatively explicitly, as in sentences (2)–(6), and the RULE-GOVERNED ability to express them relatively implicitly, as in (1) and (7) ("rule-governed" must be stressed since "unanalyzed" exemplars of the implicit patterns [e.g., *Mommy open box* for (1) and *pull socks up* for (7)] are present very early). Specifically, explicit periphrastic causative forms apparently become established at just about the same time or slightly before the onset of the novel, overregularized, lexical forms that provide the evidence that the child has analyzed the lexical forms that already exist in her repertoire.

In Christy's and Eva's development, for example, sentences containing novel causative verbs like *I FELL that down* were first observed just after periphrastic constructions like *I made that fall down* began to flourish (see Bowerman, 1974 and in press a, for further details). Susan Carey (personal communication) has observed precisely the same sequence in her daughter Eliza's speech. This temporal sequence was repeated more than a year later in Christy's and Eva's speech. First there emerged surface-structurally complex two-clause sentences expressing a caused event and the action that caused it, such as *I made it come unstapled by pulling on it* [as in (5) above] and *I pulled on it and that made it come unstapled* [as in (4) above]. This was followed within a short time by novel surface-structurally simple (one-clause) sentences like *I pulled it unstapled* [patterned as in (7) above]. This latter type of error, it will be recalled, provides evidence that the child has come to understand the structure of a verb such as *pull* in familiar constructions like *pull it off* to mean 'by pulling, cause to go . . .'.

What is responsible for this temporal linkage between explicit (periphrastic) and implicit (lexical) ways of expressing causal relations? One possibility is that the child's ability to formulate the more explicit causatives facilitates her analysis of causative verbs like *open* by giving her a surface model of components that are normally implicit (Bowerman, 1974). Another equally or perhaps more plausible hypothesis, however, is that the onset of overregularized lexical causatives is independent of the periphrastic causatives but coincides temporally with their emer-

gence because both depend on, and are reflections of, deeper advances involving the child's isolation of elements like CAUSE as semantic units with independent combinatorial potential (Bowerman, in press a).

Once children have two or more causative forms in their speech that could potentially be used to refer to the same event, what determines which they will use in a given situation? The answer to this question has interesting implications for the theoretical issue discussed earlier of what motivates change in language acquisition. If the force that drives the child forward is to find linguistic means to encode semantic and pragmatic meanings he wants to express, then forms such as *John opened the door* and *John made the door open* should occur in somewhat different contexts, each form linked to its own (set of) semantic and/or pragmatic distinctions. In other words, the child who can already say *John opened the door* should not "bother" to learn to say *John made the door open* unless doing so allows him to make (a) distinction(s) that he had not previously been able to make.

There are at least two ways to approach this problem. One is to look at the total distribution of periphrastic and lexical causatives in children's speech, preferably at a given point in time, to see whether the forms systematically turn up in specifiably different contexts. The other is to look more microscopically at changes over time in the child's expression of given meanings, with an attempt to hold the meanings as constant as possible. I have not yet done the extensive analyses needed for firm conclusions. However, preliminary investigation provides no support for the hypothesis that the major motivating force behind change in language acquisition is to find solutions to communicative problems.

In adult speech, the choice between lexicalized and periphrastic causatives is linked primarily to a semantic distinction concerning how the causer brings about the caused event (McCawley, 1978; Shibatani, 1976). When the "causee" is involved nonvolitionally and the causer physically manipulates it/him (etc.) to bring the event about, a lexical causative is used if one is available. If there is none, then a periphrastic construction may be used. If direct physical manipulation is not involved, either because the causee performs on its own under direction from the causer or for some other reason, a lexical causative is avoided (with certain exceptions) and a periphrastic construction is used. The distinction can be appreciated by comparing *John stood the child up* (lexical form, direct physical manipulation) with *John made the child stand up* (periphrastic form, causee performing volitionally under causer's direction or instigation).

The distinction between direct causation involving physical manip-

ulation and indirect causation seems to play little or no role in the young child's choice between lexical and periphrastic causatives, as illustrated in Table 5.3 (see Bowerman, in press a, for more examples and a more complete discussion). Lexical causatives often occur where adults would use periphrastic causatives because no direct physical manipulation of the causee is involved (Examples 1–8)<sup>7</sup>; periphrastic causatives often occur where lexical causatives are available and would be used by adults because direct physical manipulation is involved (Examples 9–15) and, most tellingly, children often use both forms in the same speech context to express what appears to be the same meaning (Examples 16–25). In this latter case, the periphrastic form sometimes follows the lexical form and sometimes precedes it. It is unlikely that these are self-corrections on the child's part because the second version is often less appropriate than the first from the adult point of view.

The above analysis addresses the question of the total distribution of the child's forms. With regard to the second approach, the microscopic analysis of change in the expression of particular meanings, the following illustration from Eva's data is offered. The events referred to involve the intentional or unintentional release of something from the hand so that it falls; adults normally refer to this with the word *drop*. *Drop* appeared in Eva's speech first as a one-word utterance. By 1;9 it appeared in sentences and was used completely correctly for over 2 months, for example (age given in years: months; days),

- (8) 1;9;8 *Drop it.* (After purposely dropping a cherry into her ice cream)
- (9) 1;10;2 *I'm drop it.* (After purposely allowing vitamin pill to fall from hand to floor)
- (10) 1;10;13 *I drop my seed floor.* (After purposely letting seed from string bean fall from hand to floor)
- (11) 1;11;28 *Did Christy drop bottle?* (After hears crash in next room)

By about 1;11, events that earlier would have been encoded with *drop*

<sup>7</sup> In several of these examples the causer is indeed touching or manipulating something. However, an adult would not, as the child does, use a lexical causative corresponding to an intransitive predicate specifying the change of state or location the causee undergoes (e.g., *put*, *take*, or *causative go*) because the connection between the physical contact and the effect is indirect [as in (7), (8)] or because contact is not continually maintained [as in (6)]. In these cases a "manner" lexical causative (pp. 110–113), which specifies the *causing action*, not the *resulting state*, can sometimes be used [e.g., . . . *twists it down* for (8) and . . . *sliding/shoving her milk over to me* for (6)].

Table 5.3

## Distribution of Lexical and Periphrastic Causative Forms

*Lexical causative in context requiring periphrastic causative*

- (1) Jaime 5:0 *It **brings** your wishes true.* (= *makes* your wishes come true. After M has asked him what his magic pebble does)
- (2) C 3:8 *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.*)
- (3) C 4:0 *The machine might **put** him away.* (= *make* him disappear/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)
- (4) C 5:8 *It's not worse. But the airplane's **keeping** it.* (Regarding stomachache C had before boarding plane. Now as we fly, the plane (ride) is *making* stomachache continue)
- (5) C 5:10 *Water **bloomed** these flowers.* (= *made* these flowers bloom)
- (6) E 3:4 *Christy was **going** her milk over to me.* (= *making* it go. \*Putting, \*sending, \*taking. E upset after C pretends she will push milk glass so it slides across table to E)
- (7) E 4:2 *I got it [a ball] in another hole and I **took** it out.* (= *got* it out. E playing with party-favor game in which you try to get little balls into holes, under a plastic cover)
- (8) 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, sticking up)

*Periphrastic causative in context requiring lexical causative*

- (9) C 2:11 *I **maked** him dead on my tricycle.* (= *killed* him. Regarding imaginary monster she had run over)
- (10) C 3:3 *I **maked** mosquitoes dead in the park.* (= *killed*)
- (11) C 3:8 *If I touched Humpty Dumpty it would **make** Humpty Dumpty dead.* (= *kill*)
- (12) 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)
- (13) C 3:9 C: *Mom, would you **make** it come on?* (= *put*. Struggling with roller skate)  
M: *Huh?*  
C: *Would you **make** it come on my foot?*
- (14) E 2:3 *Then I'm going to sit on him and **made** [sic] him broken.* (= *break*. Looking at ant on seat of her toy tractor)
- (15) E 2:5 M: *Where are the others?* (Regarding missing keys)  
E: *I don't know. I didn't **get** 'em lost.* (= *lose*)

(Continued)

Table 5.3 (continued)

*Successive utterances, one with lexical causative and one with periphrastic causative, referring to same event*

- |      |       |      |   |
|------|-------|------|---|
| (16) | C     | 3:8  | Saying "giddi-up" doesn't <b>make</b> it go faster. Singing <b>goes</b> it faster. (C bouncing on spring-horse, has been singing loudly)  |
| (17) | C     | 4:2  | C: And I forgot to tell—I forgot to <b>remember</b> —I forgot to <b>make</b> you <b>remember</b> . (As M tucks C in at bedtime; M had earlier promised C she'd fix something and told C to remind her)<br>M: Yes, we'll do it tomorrow (etc.).<br>C: I'll try to remember to <b>remember</b> you. |
| (18) | C     | 4:5  | I'm <b>rounding</b> something. (A few intervening sentences) I'm gonna <b>make</b> it <b>round</b> in there. (As rolls piece of clay in plastic bag)  |
| (19) | C     | 5:0  | Okay. If you want it to die. Eva's gonna <b>die</b> it. She's gonna <b>make</b> it <b>die</b> . (Upset because E is about to touch a moth)  |
| (20) | E     | 2:8  | <b>Put</b> it on her. <b>Make</b> it <b>be</b> on her. (Wants M to put a dress on her doll)   |
| (21) | E     | 2:10 | A broken ring. Maybe that <b>brokened</b> it. Maybe that thing, whatever it is, <b>made</b> it <b>broken</b> . (Regarding melted plastic ring in dishwasher. Pointing to heating element)   |
| (22) | E     | 3:2  | E: Everybody <b>makes</b> me <b>cry</b> .<br>D: I didn't make you cry.<br>E: Yes you did, you just <b>cried</b> me.   |
| (23) | E     | 3:9  | E: Want me to <b>come</b> it out? (Broken end of magic marker)<br>M: Hm?<br>E: Want me to <b>make</b> it <b>come</b> out?   |
| (24) | E     | 3:9  | Can you <b>make</b> this <b>flattened</b> and <b>round</b> ? You <b>round</b> it and then I'll <b>flatten</b> it. (To M, as E plays with a piece of play-doh)   |
| (25) | Emily | 2:11 | You <b>make</b> me <b>swing</b> around. You <b>swing</b> me around. (To Melissa, who is rotating chair Emily is sitting in)   |

began to be expressed with periphrastic causatives or novel causative verbs, for example,

- |      |         |  |
|------|---------|--|
| (12) | 1:10;28 | Kitty cat, don't <b>fall</b> Christy football. (Looking at paper cutout of cat protruding from her pocket from which dangles C's ball. M has just thrown ball, commented that cat "caught" it) |
| (13) | 2:0;7   | <b>Make</b> <b>fall</b> down. (Holding spaghetti over floor, then drops it)  |
| (14) | 2:2;15  | I'm going <b>get</b> it <b>fall</b> . (Then drops a pancake on kitchen floor)  |

I have not been able to detect any contextual differences associated with the use of periphrastic versus lexical ways of expressing this mean-

ing during this period in Eva's development or between the use of causative *fall* and *drop* (causative *fall* was much more frequent at this time). The three forms seemed essentially synonymous.

It is conceivable that the child's choice between lexicalized and periphrastic forms is influenced by subtle factors that go easily undetected because they have nothing to do with the distribution of the forms in adult speech. Although this doubt can never be satisfactorily banished, it should not be clung to simply because of an a priori commitment to the view that new forms should not enter the child's speech unless they have a specific communicative job to do. It is just as plausible that new forms are often learned "because they are there"; the child cannot help learning them even if they do not immediately buy her greater communicative power. Once she has mastered the forms to a certain degree, she goes on to use them and the earlier learned, semantically equivalent forms in varied contexts, gradually learning through use and observation what semantic/pragmatic distinctions are associated with their distributions.<sup>8</sup> The child's use of different forms to encode the same meaning in the same speech context [as shown in (15)–(24) in Table 5.3], which is difficult to explain in terms of efforts to communicate semantic/pragmatic distinctions, is interpretable in this framework as part of the process by which children gradually work out which forms constitute the set of competing candidates in given speech contexts en route to discovering precisely how they differ. While this process is surely quite unconscious most of the time, it occasionally takes on the flavor of an abstract scholarly exercise, as in the following sequence:

(15) Christy, 4:2 (Contemplatively, in a room by herself, as she pours sugar from a box onto her cereal):

*I want to **pour** it in.*

*I want to **get** it in.*

*I want to **make** it go in.*

### Do Children Try to Mark Underlying Meanings Explicitly?

After analyzing a wide variety of acquisitional phenomena reported for children learning a number of different languages, Slobin (1973) concluded that children initially behave as if they were following an

<sup>8</sup> Bloom, Lightbown, and Hood (1975) argue for this course of development with respect to the acquisition of the distinction between nominal and pronominal reference. The children they studied appeared to "learn usage constraints on nominal and pronominal encoding *after* they acquire[d] the formal linguistic means for shifting reference [p. 36]."



operating principle specifying that "underlying semantic relations should be marked overtly and clearly [p. 202]." That is, they try to give each meaning a unique surface marking of its own. The various kinds of evidence from which this inference was drawn include the alleged tendency of children to spell out material that can be and usually is contracted or deleted in adult speech (e.g., *I will . . .* instead of *I'll . . .*), the tendency not to mark a semantic category by  $\emptyset$  (a "zero morpheme"), even when this is conventionally appropriate, and the selection of allomorphs that are phonologically unique as the first realizations of given inflections, rather than those that are phonologically identical with allomorphs of other inflections with different meanings.

Maratsos (1979) has recently questioned the accuracy of this characterization. Among other counterexamples, he notes that even "when children begin to control the full form of the copula BE (*he is happy*), they continue to use and extend the domain of the contracted form (*he's happy*). No apparent tendency arises to use only the full form and suspend the use of the contracted forms [pp. 342-343]." He concludes that children do not appear to be "determined to mark underlying relations in a clear and overt fashion [p. 343]" as soon as they can. Slobin (in press) apparently now agrees and suggests a reformulation of the operating principle to apply not to the child's tendencies at the moment of speech but to factors that influence *ease of learning*: "Surface marking which is 'overt' and 'clear' is more easily discovered and acquired by the child [ms. p. 8]."

I believe that still further work will be needed before the appropriate formulation of this operating principle is reached. Maratsos indeed shows convincingly that children by no means always mark underlying relations even when they are able to. Yet they seem to do it more often than one would expect if "overtness" and "clearness" were factors that influenced only the ease with which they learn various forms and had nothing to do with the children's dispositions at the time of speech.

The work of Karmiloff-Smith (1977, 1978, 1979a,b) gives us some new ways to think about this problem. In studies of French-speaking children's understanding and use of determiners (e.g., definite and indefinite articles and *le/la même*, 'the same'), Karmiloff-Smith noticed that beyond a certain age, children occasionally expressed certain meanings with ungrammatical forms (or, alternatively, forms that, although not unacceptable in themselves, are not used routinely by adults to express these meanings but are reserved instead for special emphasis). The children's utterances, which constitute late errors in the terms of this chapter, can be categorized roughly into two groups (Karmiloff-Smith, 1979b):

1. One category of errors is attributed to the child's recognition at a certain point in development that a single surface form in his repertoire, a word, for example, functions in different ways in different contexts. Initial correct usage of the form is possible "because for [young children] each function is isolated from the others. As children become aware that the same expression has more than one function, they tend temporarily to create new, and often slightly agrammatical forms, to differentiate between the various functions and conserve their separate meanings [Karmiloff-Smith, 1978, p. 12]."

Consider Karmiloff-Smith's subjects' treatment of *un (une)*, which is equivalent both to the English indefinite article *a* and also to the numeral *one*. Children between 3 and 5 years understood this form as adults do and used it correctly in both its functions. Children between 5 and 7, however, sometimes made errors in comprehension: When they encountered *une X* in contexts where the meaning was 'indefinite reference', they interpreted it as if it meant 'one X' (only one X, the only X). And during this same period they sometimes used the ungrammatical form *une de X* to cover the numerical function of *une*, while *une X* was limited to the function of indefinite reference.

A second example involves *le/la même*, 'the same'. As in English, this form can mean either 'the same one' or 'the same kind'. The younger children in Karmiloff-Smith's study used the form correctly to cover both functions. But at around age 6 they began to restrict *le/la même* to the meaning 'same one' and to create ungrammatical forms when they meant 'same kind', as in these sentences: *J'ai une de même de vaches chez moi* ('I've got one of the same of cows at home'), or *la même de vache* ('the same of cow'). "They thus avoided the correct and economic expression 'j'ai la même' which they had understood as having the function 'same one' [i.e., 'same individual'] [Karmiloff-Smith, 1978, p. 12]."

Karmiloff-Smith explains such errors as reflections of children's efforts to "get a grip" on meaning distinctions to which they have become newly sensitive. By giving each meaning its own "external handle" thereby "rendering it tangible," children gain control of it. Only later can they go back to "allowing one external marker to convey several pieces of information [Karmiloff-Smith, 1979b, pp. 111-112]."

2. The second category of errors identified by Karmiloff-Smith involves children's treatment of surface forms that express two or more elements of meaning in the same contexts (as opposed to different meanings in different contexts, as in the preceding examples). For example, the French pronoun *mes* simultaneously conveys several pieces

of information: first person possession, definite reference, and totality. The younger children studied by Karmiloff-Smith used this and related pronouns correctly in the same kinds of contexts as adults. Beyond a certain age, however, they sometimes used constructions in which each piece of information packed into the pronoun received a separate marking. For example, an earlier correct sentence such as *mes voitures sont allées au garage* ('my cars have gone to the garage') would now be replaced by a sentence like *toutes les miennes de voitures sont allées au garage* (roughly, 'all the [plural] mine [plural] of cars have gone to the garage'), a construction reserved only for very strong emphasis in adult speech.

This latter sort of error appears closely related to a number of errors in my own data. First are the errors, described in the preceding section, in which the child uses a periphrastic causative when the adult, and often the child herself at an earlier age, would use a lexical causative. Repeated here is Example 13 from Table 5.3, a particularly nice illustration:

- (16) C 3:9 C: Mom would you *make* it *come* on? (Struggling with roller skate)  
 M: Huh?  
 C: Would you *make* it *come* on my foot?

On innumerable previous occasions of donning footwear or other clothes, Christy had used the word *put*, as in *Would you put it on?* Why the sudden change to *make come*, certainly a less desirable formulation from the adult point of view? *Put* is regarded by many linguists as a causative form for a noncausative predicate expressing location or change of location; thus it can be broken into the meaning component CAUSE plus an intransitive predicate somewhat indeterminate between, for example, *be*, *come*, and *go*. The meaning elements that are implicit in *put*, Christy's usual word in this sort of context, are thus spelled out clearly on this particular occasion.

Rather than switching to a new verb, let us pursue *put* in more detail; it can serve as an example for a genre of similar errors involving other verbs.<sup>9</sup> There were many other utterances by both Christy and Eva

<sup>9</sup> See Bowerman (in press b) for a discussion of relevant examples with verbs or other words that specify actions involving separation, removal, or spreading out of parts (*open*, *apart*, *take off*, *pat down*, etc.). At 3:5 and 4:9 respectively, Eva and Christy began occasionally to mark this "away from" semantic notion redundantly with *un-*, as in *Will you unopen this?* (= *open*; wants lid taken off container), *You can take it unapart and put it back together* (said of a toy), *How do I untake this off?* (struggling to get out of swimsuit), and . . . *unpatting it down* (part of a sentence said as child patted ball of ground meat into hamburger patty).

indicating that the children were working on the internal structure of *put* and the relationship of its meaning elements to surface phrases with *make*, *come*, and *be*:

- (17) E 2:8 *Put it on her. Make it be on her.* (Wants M to put a dress on her doll)
- (18) C 3:1 *I wanta be it off. I wanta put it off.* (C struggling with sweater. After utterances, leans over so M can help her take it off)
- (19) C 5:0 C: *Why do you have to be it smooth before you put it in a pony tail?* (As M brushes C's hair)  
 M: *What?*  
 C: *Why do you have to put it smooth before you put it in a pony tail?*
- (20) E 5:0 E to M: *Be a hand up to your nose.*  
 M: *What?*  
 E: *Put a hand up to your nose.*
- (21) C 3:4 C: *What does "mending" mean?* (After C herself has used this word to ask M to fix her broken parasol)  
 M: *It means fixing, repairing.* (As she tries to tape ripped paper)  
 C: *You mean, put a tape be over?*

It is important to stress that such utterances were occasional, not routine. Most of the time *put* was used in the ordinary way (with certain exceptions to be discussed later). Clearly, then, the children were indeed not striving as a matter of course to mark every underlying semantic element they recognized, just as Maratsos has urged. But why do such utterances occur at all? Why did the children not simply continue to say *put* as they had done before?

Karmiloff-Smith's suggestion is appealing: that when children begin to see elements or distinctions of meaning within a form that has previously been opaque to them, they will tend to pull these meanings out for independent marking. This approach needs refinement to be made compelling, however. A major problem is to account for why certain meaning distinctions in certain words get pulled out for more explicit marking, but others do not.<sup>10</sup> For example, it was argued on page 117 that before the age of 2 Christy and Eva recognized "separation of parts" and "revealing of something within" as separate components

<sup>10</sup> Recognition of the importance of this problem I owe to discussions with Robin Campbell.

of the meaning of *open*. Why did they not devise some method of marking these independently, at least as soon as they were capable of constructing short sentences? (In fact, a method WAS found for the "separation" component, although not until more than two years later [cf. Footnote 8], but not the "revealing" component.)

One important factor that may underlie selectivity in explicit marking is the degree to which a given semantic distinction or meaning component has *recurrent organizational significance* in the language being learned. Meaning distinctions that are relevant only to one or a small handful of language forms may typically be left implicit, even if the child might in some sense recognize them, as Christy and Eva apparently recognized "revealing of something within" as a component of the meaning of *open*. In contrast, meaning distinctions that run systematically through a variety of forms (cf. Carey's, 1978, highly relevant discussion of the child's discovery of "lexical organizers") may be pulled out for special attention under certain circumstances. Why? For at least two reasons.

First, in order to receive explicit marking, a meaning distinction must have attained a certain degree of conceptual independence from the meanings with which it cooccurs in particular language forms. Recurrence in a number of different forms fosters this independence by allowing the child to distinguish what is constant—that is, what semantic material behaves as a unit from one form to the next (CAUSE being one such unit, for example)—from what is variable.

Second, and perhaps at least equally important, meaning distinctions that have recurrent organizational significance are likely to turn up not only embedded as elements in more complex lexical packages but also more independently, encoded by separate syntactic forms or inflectional or derivational morphemes. Thus, CAUSE is represented in (relatively, although still not quite) "pure" form by *make*, *get*, etc. in periphrastic causative constructions, and the "separation" notion found implicit in *open* and other words is more explicitly marked by *un-* in *unwrap*, *uncover*, etc. The existence of these semantically "purer" expressions for significant meaning distinctions may help children conceptualize the distinctions and discover them even where they are implicit as elements of more complex meanings (cf. page 119). Even if the forms do not help in the discovery of the distinctions, however, they still provide a means by which children can mark the distinctions once they have discovered them. If this argument is correct, we should find that children's creation of deviant overly explicit forms is closely tied to the availability of conventional, more explicit forms. That is, children should

build deviant linguistic constructions out of linguistic forms already provided by the language but should not INVENT forms to mark meaning distinctions where the language offers no suitable candidates.

### Connections to Other Developmental Phenomena

Some of the processes involved in overly explicit marking do not appear to be specific to the acquisition of spoken language or even to language at all. With respect to language in a nonverbal medium, Newport (1980) reports that children learning American Sign Language as their first language create deviant forms closely analogous to those discussed in this paper. For example, a hand movement showing that an entity curved leftward while moving—a leftward-curved gesture in the adult system—was broken down by a child into two discrete components, a straight forward motion followed abruptly by a straight leftward motion. Other errors involved the recombination of semantic and configurational elements abstracted from existing signs, analogous to the causative verb errors discussed earlier. Interestingly, Newport found that these outward symptoms of the speaker's analysis of the implicit structure underlying the forms of American Sign Language were largely limited to native signers. Although people who learned ASL later in life might become very fluent, they appeared to accept and work with conventional signs as unanalyzed units to a much greater extent than did native signers.

An ingenious study by Karmiloff-Smith (1979b) indicates that the child's disposition to discover and give discrete marking to significant underlying meaning distinctions extends to representational systems other than language. Seven- to 11-year-old children were shown a road with many bifurcations drawn on a long sheet of shelf paper. They were told that they would be driving a sick person in a toy ambulance along this road to the hospital. To enable them to go as quickly as possible when the time came, they could go through the route once first and should make notes for themselves in whatever way they wanted. Subsequent analyses of the children's self-devised notational systems showed that in midtask they often spontaneously modified systems that were already perfectly adequate to the demands of the situation. Of particular relevance to the present discussion was "the tendency to move from a form which carries potentially all the necessary information, to marking externally each piece of information by a separate symbol [p. 111]." For example, an initial symbol that simultaneously showed both which way to turn and which way not to turn on a bifurcation was abandoned in favor of *two* markers, one for each

of these distinctions. Later the children often went back to using the single, plurifunctional form again. Karmiloff-Smith points out similarities between these shifts during the course of a short experiment and her earlier observations of overly explicit marking in children's acquisition of the French determiner system (cf. pages 125-127) and concludes that there are "deep-rooted analogies between macrodevelopment and microdevelopment of representational systems [1979b, p. 114]."

Some possibly relevant parallels between linguistic and perceptual development should also be noted. It was suggested above that the child's overly explicit marking of meaning elements may arise from an underlying process in which the child is gradually identifying semantic distinctions that have recurrent organizational significance in the language being learned. Recent work by Kemler and Smith (1979) indicates that an analogous process may characterize perceptual development. With a series of sorting tasks and other techniques, Kemler and Smith investigated differences in the way children and adults perceive stimuli that vary along multiple dimensions (e.g., size, shade). They found that dichotomies that had been suggested by previous investigators between "holistic" and "differentiated" perception or, in more specialized variants of these constructs, "integral" and "separable" perception, did not precisely capture the critical variable. This variable, they propose, is the degree to which certain dimensions along which variation in multidimensional space can be described assume "special experiential status" relative to all the potential axes or directions of stimulus change. Some dimensions, such as size and shade, are highly differentiated and privileged for adults, in the sense that shared and unshared values on these dimensions are immediately and necessarily perceived. Young children, it was found, can access these dimensions under certain conditions but do so only with difficulty and not as a matter of course. Kemler and Smith hypothesize that overall, perceptual development is characterized by movement in the direction of increasing differentiation of certain dimensional axes from other directions of stimulus change.

Intriguingly, the young children in Kemler and Smith's studies appeared to "experience moments of insight some time after first being exposed to the task. In these moments, they often spontaneously comment[ed] on the dimensional structure of the stimuli as if such structure was not recognized previously [1979, p. 147]." This seems strikingly analogous to the spontaneous shifts toward more explicit marking made by the children in Karmiloff-Smith's (1979b) study of self-devised notational systems.

To summarize, there is converging evidence from several sources for the importance and pervasiveness of children's disposition to analyze stimuli in such a way that they discover the deep underlying dimensions that serve to structure domains taken as wholes. The precise nature of these dimensions vary as a function of the content, of course, but the process itself appears to be similar across domains.

### **Recognizing Abstract Similarities between Spatial and Nonspatial Meanings**

In discussions in the previous two sections, the child has been pictured as a sort of junior zoologist, focusing a microscope on words to discover an organized world within. Although it was noted that understanding the child's analysis of words requires reference to abstraction as well as to differentiation, the emphasis has been on the differentiation aspect of the process.

In this section the abstraction process comes to the forefront as we look at some errors of a different kind. These errors will be interpreted as evidence for a process in which the child spontaneously comes to see similarities among words or phrases whose meanings were not previously recognized as related. I will concentrate first on a circumscribed set of errors in order to build up the necessary interpretive framework, and then give a few further examples to indicate that these errors are only a subset of a wider network of deviations that are all conceptually interrelated.

#### **Substitutions of *Put* and *Take* for *Make***

The verbs *put*, *take*, and *make* were all learned by Christy and Eva when they were about 2 years old. At first they were used completely correctly (i.e., in semantic/syntactic contexts in which adults would also use them), except that, as noted earlier, periphrastics with *make* sometimes occurred where adults would use lexical causatives (e.g., *make fall* instead of *drop*).

After a while *put* and *take* began to interchange occasionally with each other and with *bring*—that is, to occur in sentences that from the adult point of view clearly called for one of the other verbs (e.g., Example 18 on page 128). *Make* and *let* were also sometimes substituted for each other. These late errors are interesting in their own right, but they will be bypassed here (see Bowerman, 1978b, for examples and discussion).



After these errors began to fade out, some new ones appeared. *Take* and *put* both began to occur in sentences where *make* (or sometimes the closely related periphrastic causative *get*) was semantically and syntactically called for. The reverse error of *make* for *put* was also observed, though less frequently; no examples of *make* for *take* were recorded, however. Representative errors are shown in Table 5.4.

What has happened? Various accounts of why children use one word

**Table 5.4**

Word Substitutions Involving *Put*, *Take*, and *Make* (*Get*)

---

*Put* for *make* (or *get*)

- |     |   |      |   |
|-----|---|------|---|
| (1) | C | 4:3  | I <b>putted</b> part of the sleeve blue so I crossed it out with red. (Telling M about mistake in drawing)  |
| (2) | C | 5:4  | I <b>put</b> it brown. (After colors skunk's stripe brown)  |
| (3) | C | 5:0  | C: Why do you have to be it smooth before you <b>put</b> it in a pony tail? (As M brushes C's hair)<br>M: What?<br>C: Why do you have to <b>put</b> it smooth before you put it in a pony tail? |
| (4) | E | 2:10 | I want to <b>put</b> it tight. (Wants M to let her tighten nipple on her bottle)  |
| (5) | E | 3:10 | They <b>put</b> Dorothy different than in the book. (After watching <i>The Wizard of Oz</i> on television)  |
| (6) | E | 4:7  | I'm not going to <b>put</b> it too long. (E cutting pieces of yarn for a doll's hair)   |

*Take* for *make* (or *get*)

- |      |   |     |  |
|------|---|-----|--|
| (7)  | E | 3:9 | I'm <b>taking</b> those cracks bigger. (E pulling on cracked peanut shell)   |
| (8)  | E | 4:7 | Christy just <b>took</b> hers brown. (E and C have been coloring identical pictures. E has just proudly pointed out that books in a bookcase in hers are colored in many colors; this remark is disparagingly comparing C's plain brown books with her own). |
| (9)  | C | 3:9 | That's as full as I'm going to <b>take</b> it. (After C carefully fills a cup almost to the brim)  |
| (10) | E | 3:4 | It's inside out. Will you <b>take</b> it not inside out? (Giving shirt to M)   |
| (11) | E | 6:1 | I'm also gonna have to have soapy water 'cause Christy <b>took</b> it all soapy. (At the end of long list of complaints about having to bathe after C in the same bathwater)   |

*Make* for *put*

- |      |   |     |  |
|------|---|-----|--|
| (12) | E | 2:2 | I <b>make</b> some butter my sandwich. (As E puts butter on bread)   |
| (13) | E | 3:0 | <b>Make</b> them back up. (Wants M to put tiny dolls back onto coffee table; they'd just fallen off)   |
| (14) | E | 3:0 | Don't take these apart 'cause I'm gonna <b>make</b> these . . . on this. (Warning M not to remove parts of mechanical airplane; she then puts more pieces onto it) |
-

for a referent when an adult would use another have been proposed (e.g., Bloom, 1973; Clark, 1973; Huttenlocher, 1974). However, these are designed to explain only errors that occur relatively early in development, before correct usage has been established (e.g., *doggie* for a cow before the child knows or can say *cow*). They are clearly inapplicable to errors that start to occur only months after correct and productive usage of both the word required and the word substituted for it has been established.

An alternative explanation that takes into account the "late" nature of the errors plus the fact that the words involved were used correctly most of the time even during the period of errors is proposed in Bowerman (1978b). The errors are considered similar to adult "slips of the tongue" such as these examples taken from Fay and Cutler (1977), Fromkin (1971), and Nooteboom (1969):

- (22) *I really like to—hate to get up in the morning.*
- (23) *It's at the bottom—I mean—top of the stack of books.*
- (24) *The two contemporary, er—sorry, adjacent buildings.*
- (25) *Not Thackeray but someone that wrote below Thackeray—before Thackeray.*

Such errors in adult speech are assumed to result from a minor breakdown in sentence construction (Fromkin, 1971, 1973 [introduction]; Laver, 1973; Nooteboom, 1969). The speaker is thought to start with a certain complex meaning he wants to communicate. As he proceeds, several candidate lexical items for the expression of parts of this meaning may be "activated" and compete with each other for selection. The speaker must then implicitly evaluate the candidates for appropriateness and make a choice. Most of the time this is done fluently and completely unconsciously. Sometimes, however, a word that is inappropriate, although in the general semantic neighborhood of the required word, is accidentally selected. The speaker may occasionally detect and correct the slip, as in the examples above, but often he does not.

Following this model, the children's occasional substitutions of *put* and *take* for *make* can be taken as evidence that these words shared something semantically for the children. When the children had the intention of expressing a meaning normally encoded with *make*, the words *put* and *take* were also at least sometimes activated, and vice versa for *put* and *make*. The fact that the substitutions did not occur from the time the words were first productive in the child's vocabulary suggests that they had not been semantic neighbors earlier (i.e., that

each word initially operated independently of the others in its own domain of reference). Why did they draw together?

In the kinds of sentences under consideration, *put*, *take*, and *make* are all causative verbs expressing actions that cause an entity to undergo a change of some kind. The change in the case of *put* and *take* is primarily—virtually exclusively, in the speech of young children—a change of SPATIAL LOCATION. In the case of *make*, it is one of so-called STATE.

A number of scholars have argued that meanings having to do with spatial location/change of location and those having to do with state/change of state are closely related in human cognitive structure. The evidence for this is primarily linguistic. Talmy (Note 1, 1975, 1976), for example, shows that certain patterns according to which semantic elements are packaged into single words, including the two causative verb patterns discussed earlier, apply identically to both locative and stative meanings. He concludes that the two meaning domains are "organized by the human mind in such a way that they can be specified by [homologous] structures [1976, p. 234]." Jackendoff (1976, 1978), arguing similarly from linguistic evidence, proposes that expressions of spatial location and motion are basic, and generalize to several nonspatial "locational modes" including "identification" (which subsumes characterizations of both category membership [e.g., *John made the pumpkin into a jack-o'-lantern*] and attributes [e.g., *Mommy made the milk warm*]), "possession," and "circumstance" (where the "location" is an event or state of affairs in which an entity is involved). To the arguments of Talmy and Jackendoff can be added those of many researchers who have been struck by the frequency with which terms for talking about states, time, and other nonspatial topics are borrowed from the domain of physical objects and their movements in space (e.g., Lakoff and Johnson, 1980; Traugott, 1978; Whorf, 1956, p. 146).

Arguments based on the evidence of linguistic patterning for a cognitive organization whereby nonspatial notions involving "location" and change are structured similarly to those involving spatial location and movement, perhaps with the latter serving as a kind of metaphor for the former, are appealing. However, the step from finding structure in language to making inferences about the structures operative in the heads of individual speakers must be taken cautiously. This is because, as has been pointed out repeatedly in this paper, it is possible for speakers to use conventional bits of language fluently without recognizing the deeper patterns according to which they are organized (see also Gleitman & Gleitman, 1970).

The analysis of linguistic errors offers a path around this difficulty. When the speaker uses language forms in ways she has never heard them modeled, she cannot simply be repeating "frozen" structures whose underlying organization and relationships she does not appreciate. Rather, the errors must be assumed to result from structures and processes that are PSYCHOLOGICALLY ACTIVE. They can therefore be used to make inferences about the speaker's underlying conceptual organization that cannot be made when speech is conventional.

To return now to the *put*, *take*, and *make* errors: I propose that when speakers import verbs learned and previously used exclusively in connection with spatial meanings into sentences that have nothing to do with spatial position or motion, where they are neither acceptable by adult conventions nor likely to have been modeled, this constitutes strong evidence that the nonspatial notions referred to and the spatial notions for which the words would be appropriate are seen as semantically similar by the speaker. The absence of the errors in the early phases of the child's linguistic development, when they could in principle occur because the relevant words are known, suggests that this cognitive organization equating spatial and nonspatial notions is not present from the start but rather is constructed over time. We will return to this topic shortly.

### Related Errors

The *put*, *take*, and *make* substitutions described above are only the tip of the iceberg. Many other errors, some "late" in the terms of this chapter and others not, also attest to the child's eventual recognition of abstract similarities between spatial and nonspatial position and change. Spatial words are substituted for nonspatial words far more frequently than the reverse, which suggests that, at least ontogenetically, spatial position and change are indeed primary, the basis for a metaphor. A few examples are briefly reviewed.

### MORE ON PUT AND TAKE

In addition to substituting for *make* in constructions expressing changes of state, *put* and *take* also sometimes occur in phrasal substitutions for a meaning that an adult would express with a *single word*, a "resulting event" causative verb:

- (26) C 3:9 *But never ever put the door locked.* (= *lock* the door.  
Scolding M, who had accidentally locked the front door  
so that C could not get in)

- (27) C 4:7 *Put it all filled.* (= fill it [up]. Instructions to M, who is filling C's cup)
- (28) C 3:9 M: *Stop unbuttoning me.* (As C tries to unbutton one of M's shirt buttons)  
C: *I'm not taking you unbuttoned.* (= unbuttoning you)
- (29) E 4:6 *I took it undone so I could . . .* (trails off). (= undid it. Showing M how she has separated a link on a paper chain in order to insert a new segment)

These errors not only provide more support for the claim that the child has come to organize notions of change-of-state and change-of-location similarly but also further exemplify the kind of *overexplicitness* of marking underlying meanings discussed on pp. 124–130. In these sentences, the child has decoupled the linkage that is found in the transitive verbs *lock*, *fill*, *unbutton* and *undo* between the end-state (being *locked/filled/unbuttoned/undone*) and the cause-change meaning components (*take*, *put* = [very schematically] CAUSE go [come, move, etc.]) and expressed these two parts of the meaning separately.

In addition to its locative and stative uses, *put* was sometimes used to express actions causing changes of other kinds: change of category membership (see 30 below), change of "circumstance" (Jackendoff's [1976, 1978] term) (31 below), and change of possession (32–37 below):

- (30) E 6:2 *I wish Wokewietje was here. I would like him to put me into a little, little person.* (= turn, change, make; said of a tiny cloud fairy in a book)
- (31) E 4:0 *I'm gonna put them having peas so they'll have some dinner that we are.* (Arranging a dinner for peg doll family just before going to eat her own dinner that includes peas. No other everyday verb readily suggests itself as the "right" one; this complex meaning would typically be cast in a different way)
- (32) C 3:3 *You put me just bread and butter.* (Request for M to give it to her)
- (33) C 3:4 *You put the pink one to me.* (Request for M to give her the pink one of two cups)
- (34) C 3:4 *Put Eva the yukky one first. Give Eva the yukky one first.* (Wants M to give E the bad-tasting medicine before the good-tasting medicine)
- (35) E 2:4 *Can I go put it to her?* (Then takes juice and gives it to C)
- (36) E 2:4 *How come you're putting me that kind of juice?* (As M prepares to give unfamiliar juice to E)

- (37) E 2:4 We're **putting** our thing to you. (To D after M has told children that it is time to *give* him their Father's Day presents)

*Give* was also occasionally substituted for *put*, although less frequently:

- (38) C 4:1 Whenever Eva doesn't need her towel she **gives** it on my table and when I'm done with it I *give* it back to her.
- (39) E 2:7 **Give** some ice in here, Mommy. Put some ice in here. (Pointing to ice crusher)
- (40) E 2:10 E: I'm gonna **give** your glasses right here. (Putting M's glasses on couch next to napping M)  
 M: Huh?  
 E: I'm gonna **put** your glasses right here.

Notice the self-paraphrases in (34), (39), and (40). These were relatively infrequent, most often occurring, as in (40), in response to an adult *What?* or *Huh?* (which I sometimes said to elicit more speech on the same topic). In such sequences the child invariably changed from the incorrect to the correct word. That is, she never simply repeated the incorrect word nor did she ever start out with the correct word and then paraphrase it with an incorrect word. This indicates that she had some sense of which word was the more appropriate one (as is, of course, also suggested by the fact that she used it most of the time), even though, unlike adults who make "slips of the tongue," she may well not have realized that the word substituted for it was really wrong. (See Bowerman, 1978b, for a discussion of possible differences between adults and children in the self-monitoring process.)

#### IMPORTATION OF SPATIAL WORDS INTO THE TIME DOMAIN AND VICE VERSA

A final bit of evidence offered here for the child's equation of spatial and nonspatial notions of position and change includes the use of spatial words for time notions and, less frequently, the reverse:

- (41) E 3:9 Can I have any reading **behind** the dinner? (= *after*. To M, who is fixing dinner; request to be read aloud to)
- (42) C 7:6 I don't remember **behind** those two. (= *before*. C has just been recalling her last two birthday parties; cannot remember any previous ones)
- (43) E 4:10 Today we'll be packing 'cause tomorrow there won't be enough **space** to pack. (= *time*. The day before the family is to leave on a trip early in the morning)

- (44) C 7:2 *Do we have **room** before we go to bed for another reading?* (= *time*. M has been reading aloud in the evening; just finished book)
- (45) E 7:0 *She can jump **until** the table.* (= *as high as*; *up to*. E making toy monkey jump from floor to surface of low table)

At the time these errors were made, the time word or spatial phrase that would have been appropriate (*after, before, time, as high as or up to*) was well known to the speaker and was almost always used where called for; similarly, the spatial words *behind, space*, and *room* had been used entirely correctly exclusively for spatial referents for up to several years before these errors.<sup>11</sup>

### Why Does the Child Come to See Similarities between Spatial and Nonspatial Notions of Position and Change?

As noted earlier, the errors just discussed (and various other related categories of errors) did not set in until months or years after correct and properly delimited usage had been well established, both for the "target word" and the word substituted for it. This suggests that similarities among spatial and nonspatial notions of position and change (where "nonspatial" includes [at least] stative attributes, possession, identity, time, and Jackendoff's "circumstance") are not at first appreciated by the child. Rather, they take time to develop. Why do they develop? There are at least two plausible possibilities, and, at present, no clear grounds for choosing between them.

One is that the equation between spatial and nonspatial position and change comes to be made simply because that is the way the human mind is preprogrammed to develop. The formal similarities noted by, for example, Talmy and Jackendoff in the way spatial and nonspatial concepts are encoded in language would then be considered a reflection of this inherent cognitive disposition. Children would come to make

<sup>11</sup> *Until*, in contrast, had occurred very occasionally with spatial as well as temporal reference from its first appearance in Eva's speech. However, it was learned relatively late, only after Eva had already begun to substitute earlier-learned space and time words for each other. This illustrates that a given cognitive event or process, in this case the child's organization of space and time within a common framework, can lead either to U-shaped phenomena or to initial errors followed by later improvement, depending on whether we look at the behavior of linguistic forms that were learned before this event or after it.

these equations simply by virtue of possessing a human brain, although language might presumably reinforce the disposition. This view appears to be the one favored by Talmy and Jackendoff.

The second alternative gives a causal role to the requirements of language learning: Children come to equate (changes of) state, identity, etc. with spatial location and motion because language constantly invites them to do so. For example, English-speaking children at first hear and learn verbs like *go* and *come* in the context of physical motion. But as they grow older, they are faced with learning to understand and produce sentences like *the engine went dead*, *the concert went on for two hours*, *he went white with rage*, *she came to her senses*. At first he may learn to handle such stative or durative uses of *come* and *go* as completely separate functions of the words, just as Karmiloff-Smith suggests takes place with plurifunctional forms like *même* and *une* in French (see p. 126). Eventually, though, the fact that the same forms are being used in several different functions may be grasped, and the child will seek a unifying semantic principle. Once similarities between spatial and nonspatial notions begin to be appreciated in connection with linguistic forms that in fact do have both spatial and nonspatial uses in conventional speech, it would not be surprising if the equations "leaked" a bit and began to affect the use of words that conventionally are more restricted.

If the latter interpretation is correct, and the child's equation of spatial and nonspatial notions comes about as a result of efforts to learn the range of application of adult language forms that span both concepts, we should expect to find cross-linguistic differences in what types of errors are made and even whether any are made at all. Conversely, if the "universal cognitive structure" interpretation is correct there should be striking uniformities across children learning different languages. The type of data that could help decide this issue is not available at present.

## Summary and Conclusions

A number of interrelated U-shaped phenomena involving "late errors" in the course of language development have been presented. The errors were divided into two large categories: (a) those that have to do with the child's discovery of the internal structure of semantically complex words, and with the relationships between these words and constructions that express approximately the same meanings in a syntactically or morphologically more explicit way and (b) those that stem



from the child's growing grasp of abstract semantic relationships among words from superficially quite different semantic domains.

Within each category, the errors the child makes can be seen from the standpoint either of the forms themselves or of the meanings the child is expressing with these forms. For example, in the case of a child who begins to use *fall* as a causative verb, we can locate a decline in correctness both with respect to the child's handling of *fall* itself (previously restricted to intransitive contexts, as is appropriate; now erroneously also used transitively) AND with respect to the acceptability of the child's encoding of the nonlinguistic situation (previously referred to correctly by *drop*, now erroneously referred to by causative *fall*).

It has been argued that errors that set in only after the child has established conventional patterns of speaking are neither predicted nor readily explained by traditional and contemporary accounts of the motivational force behind change in language acquisition that stress corrective feedback, selective listener misunderstanding, mismatch to the adult model, or the child's efforts to communicate new semantic and pragmatic distinctions. Rather, the errors point to the importance of children's disposition to discover structure and regularity in their environment independently of any obvious or immediate instrumental gains. Possession of a structure-inducing disposition will indisputably result overall in long-term pragmatic payoffs in any cognitive domain and is essential if language acquisition is to take place at all. However, the point is simply that the desire to achieve these payoffs cannot be invoked as the direct motivation behind the child's execution of linguistic analyses that may lead to improved communication (being able to make finer semantic or pragmatic distinctions and so on) only much later, and sometimes never.<sup>12</sup> In short, the structure-inducing disposition does not appear to operate solely in response to pragmatic need.

<sup>12</sup> Structural regularities that are not "useful" even though they may be noticed would include, for example, any derivational affix that is no longer used productively in the adult language. Child speech abounds with overregularizations involving these forms, such as Christy's *two-th grade* for 'second grade' and Eva's *befront the couch* for 'in front of the couch.' They are eloquent testimonials to the child's readiness to discover structure where there is no pragmatic need.

That a structural regularity, even though recognized, may never be "useful" is consistent with the claim, made repeatedly in this chapter, that the fluent use of a linguistic form can be achieved in the absence of a deep understanding of its structure. The fact that many forms exhibit structural regularities that are somewhat independent of what a speaker needs to know to use them correctly means that there is considerable room for individual differences among speakers, both with respect to the strength of the tendency to discover "nonuseful" structure and with regard to which particular linguistic domains receive in-depth analysis (see Gleitman & Gleitman, 1970; Bowerman, in press b).

Several connections were pointed out between the analytical processes found in language acquisition and those that characterize development in other departments of cognitive growth. Common to both language development and the child's approach to the cognitive domains tapped by weight-balancing tasks and the like, as has been noted by Karmiloff-Smith and Inhelder (1974/1975) and Strauss and Stein (1978), is the construction of successive "theories" that are applicable to increasing numbers of individual cases and that integrate them within a common framework.

There also seem to be points of contact between the process referred to as "differentiation" in some of the cognitive literature and "analysis of previously unanalyzed forms" in the language acquisition literature. It was argued, however, that the two constructs should not be too quickly identified with each other, since in language, at least, "analysis" implicates both differentiation and abstraction equally, and forms that are "unanalyzed" in one respect may well be "analyzed" in another. I believe that achieving a deeper understanding of these issues of differentiation and analysis will require further investigation of the hypothesis discussed on pages 129-132: That a critical aspect of early cognitive, linguistic, and perceptual development is the child's gradual isolation and conceptualization, from among all the distinctions that it is possible for him to make in a given domain, of those distinctions that have organizational significance for the domain taken as a whole.

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