11. Reorganizational processes in lexical and syntactic development

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What is the nature of change over time in learning to talk? Most obvious to the casual observer is the expansion of the child's linguistic repertoire: the addition of new content words, new functors (inflections, prepositions, articles, conjunctions, etc.), new patterns for combining words to make sentences, and so on. A second kind of change is more subtle, in that it involves nothing overtly "new." It must be described, rather, in terms of the reorganization of the knowledge underlying elements of the existing repertoire. The term *reorganization* will be used broadly in this chapter to designate both analyses compatible with, but deeper than, the child's initial formulation and more radical "redoings" of existing analyses.

Although certain reorganizational processes have long been recognized by scholars of child language, the phenomenon has until recently attracted only limited interest. The implicit assumption has been that reorganization plays a relatively minor role, one that is perhaps largely confined to certain domains such as inflectional morphology. This attitude is beginning to change, however. The last few years have seen a small but growing number of studies documenting reorganizational changes, and it is becoming clearer that reorganization, far from being an incidental process, flows continually beneath the more overt signs of progress like a subterranean stream.

Covert reorganizational processes seem to be particularly important during the preschool years, after the child has acquired a workable vocabulary and some basic ability at sentence construction. Before reorganization in any particular linguistic domain takes place, children may be able to produce elements from that domain quite fluently. However, the knowledge that enables them to do this may in many cases be relatively

superficial, consisting of piecemeal rules and unintegrated information for dealing with different kinds of words, sentence patterns, and situations. Only gradually do children begin to discern relationships and regularities among linguistic forms that they have not previously recognized as related, and to integrate these forms into more abstract, patterned systems.

Reorganization in language development has important implications for the way children work out the relationships between linguistic forms (words, inflections, patterns for word combination, etc.) and categories of meaning. In recent years it has been widely assumed that the development of meaning takes place largely prior to and outside the acquisition of linguistic forms. Language acquisition, according to this hypothesis, can be seen as a process of matching forms to preestablished meanings. Studies documenting reorganization indicate that this view is one-sided, however: Much of what goes on in the preschool years seems to involve children's gradual working out of the categories of meaning implicit in the structure of their language on the basis of experience with language itself. One important aspect of this process has been discussed in detail elsewhere: the child's analysis of meanings that are initially understood holistically into semantic components that have organizational significance across a wide range of forms (Bowerman, 1974, 1981b, 1982; Karmiloff-Smith, 1979a). The focus in this chapter will be on a second type of semantic change: the child's abstraction across multiple relatively specific form–meaning correspondences of broader categories of meaning that correlate with regularities in formal linguistic structure.

The chapter is organized as follows. First, the major widely recognized categories of reorganization are summarized to provide a backdrop against which newer phenomena may be evaluated. The next two sections present and discuss some data. The fourth section evaluates these data with an eye toward the developmental relationship between meaning and form, and the fifth continues this theme with a look at how relational syntactic categories are learned. A brief summary concludes the chapter.

The data to be presented come primarily from my two daughters, Christy and Eva, whose language development I followed closely by taping and daily note-taking from the time of first words. I have collected numerous comparable examples of each reorganizational genre from six other children in the same age ranges, however, so we can be reasonably confident that the phenomena to be discussed are of some generality.

11.1. Some existing accounts of reorganization

The major types of widely recognized reorganizational processes include the child's analysis of unanalyzed forms, the successive driving out or

replacement of one rule by another, and systematic changes over time in the way children comprehend words or sentence structures. Let us review these briefly.

Analysis of unanalyzed forms

The most familiar cases of "analysis" involve noun and verb inflectional morphology (Ervin, 1964; MacWhinney, 1978; Slobin, 1973). The child appears to start out in these domains by learning both uninflected forms (*shoe, foot; walk, break*) and inflected or irregular forms (*shoes, feet; walked, broke*) on a word-by-word basis. Although the child differentiates the forms semantically at this time (e.g., applies *shoe* to a single shoe and *shoes* to more than one shoe), she apparently does not yet recognize[1] the systematic relationship that holds between the singular and plural forms of nouns, or the present- and past-tense forms of verbs.

At a later point the child begins to "overregularize": apply the regular inflectional endings to forms that should not take them (*foots, breaked*). This is taken as strong evidence that the child has "analyzed" at least some portion of the regular inflected forms in her repertoire into two morphemes, each of which makes a semantic and phonological contribution to the whole. At this time the irregular forms that the child had used earlier fade out in favor of the overregularized forms. When the irregular forms later reassert themselves, they have a new status: They are no longer isolates operating independently from their uninflected counterparts and from regular inflected forms; rather, they are integrated into a system, as exceptions to it.

Many complex linguistic forms in addition to inflected words can initially be acquired as unanalyzed units, or *amalgams*, to use Mac-Whinney's (1978) useful term. These include compound words such as *mailman* and *blackboard* (Berko, 1958; L. Gleitman & H. Gleitman, 1970), contracted forms or phrases such as *don't, can't, it's, it's-a, that's-a, get-it*, and *good girl* (Bellugi & Klima, 1966; Brown, 1973; Nelson, 1973) and complete sentences like *Close the door* and *What's that*? (R. Clark, 1974, 1978; A. Peters, 1977). As in the case of the inflected forms, the child must break down these units and discover the elements of which they are composed, along with the rules according to which these elements are combined. When amalgams are long and relatively complex, as in the case of whole sentences, this breakdown may take place in several steps. In this case the amalgam is first treated as a fixed frame with one or two free slots through which novel words may be rotated (R. Clark, 1974; MacWhinney, in press).

A phenomenon related to the analysis of amalgams is seen in early phonological development. Several studies have noted that at the begin-

ning of vocabulary acquisition children may pronounce certain words more accurately than they do later on. Like the loss of irregular past and plural forms, the temporary "regression" in pronunciation actually marks a step forward: The child has begun to build a phonological *system* on the basis of the existing items in her repertoire, and to assimilate words to the rules of the system rather than dealing with them as isolates (Ferguson & Farwell, 1975; Kiparsky & Menn, 1977; Moskowitz, 1973).

Rule replacement

More spottily documented than the child's analysis of unanalyzed forms has been the process by which the child comes to sort out which of several possible morphological or syntactic rules apply to which members of a group of closely related language forms. This process may be characterized by the child's successive shifting from one rule to another over time. In the realm of inflectional morphology, such shifting has been termed "inflectional imperialism" (Slobin, 1966a). Inflectional imperialism can scarcely be observed in languages with relatively simple inflectional systems, like English. It is rampant, however, in more richly inflected languages like Russian, where there are up to six allomorphs (separate forms) for each case ending, with the choice among them determined by the gender and number of the noun. The child starts out by selecting the allomorph that is least complex on various grounds (see Slobin, 1973) or, all else being equal, most frequently encountered (MacWhinney, 1978), and applying it indiscriminately to all nouns. Later he may shift to a different allomorph of the inflection, dropping the first one completely. This process may be repeated several times. Eventually, however, the child sorts out which allomorphs apply to which nouns, and mistakes subside.

A rule-replacement process similar to inflectional imperialism can also be observed in the pattern over time of children's interpretations of sentences whose syntactic structure must be construed in distinctly different ways as a function of the particular lexical items they contain, for example, *John is eager to see* versus *John is easy to see* (who is doing the seeing?) and *Mary asked Laura to go to the store* versus *Mary promised Laura to go to the store* (who will go to the store?) (C. Chomsky, 1969; Cromer, 1972). The child starts out in these cases by applying a single rule to both members of the pair, thus systematically interpreting half the sentences correctly and half incorrectly. Later he learns a second rule and may either substitute it for the first rule, now reversing his pattern of correct and incorrect interpretations, or use the two rules somewhat indiscriminately until he works out which rule should be triggered by which predicate.

Changing strategies for sentence comprehension

There has been a large number of studies documenting systematic changes over time in the way children respond to various words and sentences (e.g., Bever, 1970; E. Clark, 1975; E. Clark & Garnica, 1974; Maratsos, 1973, 1974a; Tavakolian, 1977). These differ from the "rule-replacement" studies already mentioned in that the shifts do not seem to be closely tied to the child's acquisition of legitimate rules of the adult language. Most of them, rather, appear to be interim strategies for dealing with sentences whose structures are not yet well understood (Cromer, 1976), and so they do not count as true examples of reorganization as the term is used in this chapter. At least one, however – Maratsos's (1973) documentation of a puzzling decline in children's understanding of the word *big* – seems to reflect real changes in the child's semantic system, although for reasons that are as yet unclear (but see Gathercole, 1982).

To summarize, several different kinds of reorganizational processes have been documented. Two points that are particularly fundamental to any further discussion of reorganization should be emphasized. One is that forms that to adults have a complex internal structure – that is, consist of subunits with independent combinatorial potential – can be used correctly by language learners before they are aware of this structure. This insight has been invoked primarily to explain delays in the child's learning of surface morphological structure, but recent studies show that it is also applicable to the child's acquisition of the meaning components of morphologically simple but semantically complex forms (Bowerman, 1974, 1981b, 1982; Karmiloff-Smith, 1979a). The second point – and the one with which this chapter is primarily concerned – is that forms that are initially learned independently of one another can later become integrated into a common rule system. Descriptions of this process have mostly focused on morphological learning, in which the analysis and integration of unanalyzed forms is conceptualized as a dichotomous phenomenon whereby a given form or segment of a form either is "analyzed" or is not. I will argue, however, that this view of analysis is too narrow: We need a broader conception whereby, with respect to any linguistic domain, the child may be described as uncovering successively deeper and more abstract levels of structure and regularity.

11.2. A covert semantic class: verbs prefixed with *un-*

The study of meaning in linguistics and in investigations of language acquisition has been dominated by attention to the semantic categories associated with explicit morphemes such as content words and plural *-s* or past-tense *-ed*, and to the semantic roles noun phrases play with respect

to their verbs (e.g., agent, patient). But semantics play a role elsewhere in language as well: in defining what class of items may *co-occur* with given affixes or other words. Whorf (1956) pointed out that these "covert" semantic categories, or "cryptotypes," are easy to overlook partly because they are identifiable only negatively – that is, in terms of restrictions on combinations with a more salient form – and also because their meanings are often elusive and hard to pin down with a verbal label.

One cryptotype in English discussed by Whorf is the category of verbs that can be prefixed with *un-* to designate the reversal of the action specified by the base verb. (This prefix should be carefully distinguished from *un-* attached to adjectives and past participles functioning as adjectives [e.g., *unkind, unbroken*], which means roughly *not* and imposes fewer restrictions on the base form.) Whorf describes verbs that can be *un*-ed as sharing "a covering, enclosing, and surface-attaching meaning . . . Hence we say 'uncover, uncoil, undress, unfasten, unlock, unroll, untangle, untie, unwind,' but not 'unbreak, undry, unhang, unheat, unlift, unmelt, unopen, unpress, unspill' . . . we have no single word in the language which can give us a proper clue to this meaning . . . ; hence the meaning is subtle, intangible, as is typical of cryptotypic meanings" (1956, p. 71).[2]

Whorf goes on to point out that, despite the difficulty of characterizing the class of verbs that can be *un*-ed, speakers have an intuitive feel for it. If a new verb is coined, say, *flimmick*, meaning "to tie a tin can to," speakers would readily say (e.g.), "He *unflimmicked* the dog." But if *flimmick* means "to take apart," "there will be no tendency for anyone to make a form *unflimmick* meaning 'put together'; e.g., 'he *unflimmicked* the set of radio parts'" (1956, p. 71). Notice that the constraint on *un*-verbs has nothing to do with real-word possibilities for reversal. For example, "Will you *unbreak* this?" could be a request to have a broken toy fixed, "How can we *unmelt* this candy bar?" could be said on a hot day, and "The boss felt silly when he slipped on a banana peel but I *unembarrassed* him by pretending not to notice" could be reported to a fellow worker during a coffee break.[3]

How children learn cryptotypes has received almost no attention. In virtually all discussions of the acquisition of inflectional and derivational morphology the emphasis has been on the child's understanding of the affix itself – its meaning and the fact that it has a combinatorial potential independent of the words in connection with which it has been encountered.[4] This exclusive interest in the affix and not what it attaches to is reflected in the format of typical "elicitation" studies (starting with Berko, 1958). In these experiments the child's only task is to supply the affix for a real word or a nonsense word whose meaning, specified by the experimenter, already fits the cryptotype. If she can do this consistently, she is credited with full competence in the use of the form. Investigations

of spontaneous speech can extend the picture we get from experimental studies by showing what words the child herself thinks are candidates for affixation. Analyses in some cases reveal an extended learning process that continues long after the child has "analyzed" affixed items into two independent morphemes.

The acquisition by Christy and Eva of the process of deriving novel verbs prefixed with *un-* is instructive. A child learning to use *un-* appropriately is faced with five basic problems: (1) She must identify *un-* as a separate morpheme with a combinatorial potential independent of the particular verbs to which she has heard it attached; (2) she must figure out the basic meaning of *un-* – that it is "reversative" (that it can "undo the result of the verbal action," or "cause the object of the verb to be no longer *-ed*" [Marchand, 1969, p. 205]); (3) she must learn how to order *un-* with respect to the base form (learning to order affixes apparently takes place rapidly and with few mistakes; see Slobin, 1973, p. 197); (4) she must learn the syntactic category of the base forms to which *un-* may be affixed; and (5) she must learn that *un-* cannot be attached to simply any member of this syntactic category to convey a reversative meaning, but is, rather, restricted to the covert semantic class of verbs with a "covering, enclosing, and surface-attaching meaning."

The first *un-* verbs to appear in the records of Christy's and Eva's speech were often-modeled examples like *untangle, unfasten, unbuckle,* and *uncover*. At this stage, the words were generally used in semantically appropriate contexts, although occasionally the *un-* form occurred where the unmarked form was required and vice versa. There was no evidence that *un-* was recognized as an independent morpheme at this stage; words like *unbuckle* were unanalyzed monomorphemic units.

At the next stage (starting at age 3;9 [years; months] for Christy and 3;2 for Eva), *un-* began to generalize to novel verbs, which showed clearly that the original words had been analyzed into their morphemic components. Some examples of novel usages are shown in Table 11.1.

In Christy's case, the reversative meaning of *un-* was learned a good year before the covert semantic class to whose members *un-* can be attached. This is shown by her relatively frequent prefixation of *un-* to verbs that fall outside the covert category of covering/enclosing/surface-attaching meaning (see examples [1]–[3] in Table 11.1). Example (2) (*unstraight,* meaning "bend") is a particularly clear violation, because the meaning of *straighten* is exactly opposite to what is required for prefixation with *un-*.

Christy's eventual recognition of the semantic category associated with *un-* was signaled in two ways. First, most novel verbs prefixed with *un-* were now limited to verbs fitting the category (as in examples [4], [5], [6], and [9]). There were no longer any flagrant violations of the category like example (2), although very occasionally there were still instances of

Table 11.1. *Novel verbs prefixed with* un-

Christy

(1) 3;9:   *This is pooey that's coming out of here.* [in tub, showing cup with water spouting out of the holes]
             And that's how to make it ***uncome***. [blocking holes with hand]
(2) 4;5:   [C has asked M why pliers are on table]
             M: *I've been using them for straightening the wire.*
             C: *And* ***unstraighting*** *it?* [= bending]
(3) 4;7:   C: *I hate you! And I'll never* ***unhate*** *you or nothing*!
             M: *You'll never unhate me?*
             C: *I'll never like you.*
(4) 5;1:   [M working on strap of C's backpack]
             M: *Seems like one of these has been shortened, somehow.*
             C: *Then* ***unshorten*** *it.* [= lengthen]
(5) 5;1:   *He tippitoed to the graveyard and* ***unburied*** *her.* [telling ghost story]
(6) 5;1:   *I* ***unbended*** *this with* [= by] *stepping on it.* [= straightened; after stepping on tiny plastic three-dimensional triangular roadsign, squashing the angles out of it]
(7) 6;0:   *Wait until that* ***unfuzzes***. [watching freshly-poured, foamy Coke]
(8) 6;11:   *How do you make it sprinkle?* [C trying to figure out how kitchen faucet works. [after getting it to sprinkle]
             How do you make it ***unsprinkle***?
(9) 7;11:   *I'm gonna* ***unhang*** *it.* [taking stocking down from fireplace]
(10) 4;9:   *You can take it* ***unapart*** *and put it back together.* [C manipulating a take-apart toy. Here un- has migrated to the wrong part of speech.]
(11) 4;11:   *Will you* ***unopen*** *this?* [wants D to take lid off styrofoam cooler]
(12) 5;6:   *. . .* ***unpatting*** *it down.* [as C pats ball of ground meat into hamburger patty]

Eva

(13) 3;2:   [M has taken C's clothes off but done nothing else with her]
             E: *Why did you* ***unclothes*** *her?*
             M: *Why did I what?*
             E: [Repeats]
             M: *Why did I what?*
             E: *Um . . . why did you take her clothes off?*
(14) 3;2:   *I can't* ***untight*** *–.* [= loosen; E struggling with tight overall strap]
(15) 3;10:   M: *I have to capture you.* [grabbing E in game]
             E: ***Uncapture*** *me*! [trying to pull loose]
(16) 3;11:   [C coming to M with clip earring hanging from ear]
             E: *How do you* ***unsqueeze*** *it?*
             M: *What?*
             E: *How do you* ***unget*** *it . . . undone?*
(17) 4;7   [Holding up chain of glued paper strips]
             E: *I know how you take these apart.* ***Unsplit*** *them and put 'em on.*
             M: *How do you unsplit them?*
             E: *Like this* [pulling a link apart]
(18) 4;7:   *Will you* ***unpeel*** *the banana?* [giving banana to M]

Table 11.1 (*cont.*)

(19) 4;11:	[Showing M how to get playdough out of a mold] E: . . . *and then* **unpress** *it out.* M: *How do you unpress it out?* E: *You just take it out.*
(20) 4;7:	[Showing M how to work clasp on coin purse] *You slip it across . . . and you* **unslip** *it like this.* [As E says *slip* she moves the two metal parts past each other so purse closes; as she says *unslip* she opens it]

Note: Notational conventions: C = Christy, E = Eva, M = Mother, D = Daddy. Ages are given in years;months. Ellipsis dots at the beginning of an utterance indicate that the first part of the sentence is not included; within an utterance, they indicate a pause.

un- attached to "neutral" verbs (those lacking either the covering/enclosing/surface-attaching meaning or its opposite), as in (7) and (8).

Second and even more revealing was that *un-* now began to be used in a new way: It was occasionally prefixed redundantly to verbs that *already* encode actions that reverse acts of covering, enclosing, or surface attaching, as in (10)–(12). These uses are quite analogous to redundant past-tense and plural marking (e.g., *camed, jumpeded, feets, footses, feetses*) and double negatives (*I didn't have no peas*). They show clearly that the child associates the reversal encoded by *un-* with the particular subset of reversative acts that involve the uncovering or the separation or spreading out of parts. Interestingly, such forms also occur occasionally in careless adult speech, for example, *I got them unseparated*, meaning "untangled," said as the speaker worked on a pile of yarn pieces. A few such forms are in fact by now acceptable or almost acceptable variants of the unprefixed base: Compare, for example, *loosen* and *unloosen*.

Eva's development differed from Christy's in that she acquired a feel for the covert semantic category associated with *un-* almost simultaneously with learning its reversative sense. Most of her coinages respected the cryptotype (e.g., [13]–[15] and the first sentence of [16] in Table 11.1); she produced no flagrant violations like Christy's *unstraighting*; and, most important, she began redundant marking with *un-* quite early, as in the final sentence of (16) and in (17)–(20). Eva's recognition that *un-* designates not only reversal of action but, more specifically, reversal of a covering/enclosing/surface-attaching action was demonstrated particularly clearly in (20), where she had a completely free choice about whether *un-* would be attached to *slip* in connection with a closing action or with an opening action, and chose the latter.

To summarize, both children initially acquired a number of verbs prefixed with *un-* and used them correctly with no apparent awareness of

their internal structure. Subsequently they analyzed (at least some of) these words into their surface components and figured out the semantic force of *un-*, independent of the particular conceptual packages in which it had been previously encountered. This knowledge is enough to serve as the basis for the generation of new *un-* verbs with a reversative sense. Typical accounts of the "analysis of unanalyzed forms" stop here. However, in order to account for children's eventual avoidance of words like *unhate, uncome,* and *unsprinkle* and the flowering of redundant forms like *unopen, unpeel,* and *untake off,* we must postulate an additional step in their analysis, whereby they recognize that the verbs that are *un-*ed in the speech around them have a subtle semantic characteristic in common. This step apparently can be taken either at the time when *un-* itself is segmented and its meaning worked out, as in Eva's case, or at a later time, as in Christy's. In this latter case, the child's analysis of everyday verbs prefixed with *un-,* like *untie,* takes place in two steps, with an intervening period in which the internal structure of the verbs is only partly understood.

11.3. Partial productivity: early limitations on expressing cause-and-effect relations

In the foregoing section it was argued that even after the child has analyzed amalgams of a given type into separate components, further semantic analysis may be needed to limit the freedom with which the components are combined. In this section, we look at the converse of this process: a situation in which the child has segmented all the morphemes in strings of a certain type and knows something about combining and recombining them, but lacks awareness of the full freedom and flexibility of their combinatorial potential because she has not yet grasped that there is a broad semantic principle involved. In short, the form must be considered "productive" according to usual criteria for establishing productivity, but this productivity turns out to be restricted, relative to what it will later become.

The construction pattern in question is represented by common, everyday sentences like *Daddy chopped the tree down/in half, Mary wiped the table clean/dry, Suzy ate her cereal all gone, Harry pulled his socks up,* and *George pushed/kicked the door closed/open.* These sentences express complex causal events in which a certain action such as chopping on a tree, wiping a table, or pulling on socks is presented as causing or bringing about another event in which an entity (usually but not always the object acted upon) undergoes a change of location (falling down, coming up, etc.) or a change of state (becoming divided in half, clean, closed, etc.).

Certain combinations of causing action and resulting event are so com-

mon that many linguists have advocated entering them into the lexicon of a grammar as two-part verbs (*pull up, chop down*, etc.; see, e.g., N. Chomsky, 1962). However, this treatment fails to capture the potential this sentence pattern offers for novel juxtapositions of causing action and resulting event, such as *Don't scream/stamp the house down* (by screaming/stamping cause the house to fall down) or *The locusts ate the prairie brown and bare* (by eating, caused the prairie to become brown and bare [from a Laura Ingalls Wilder book]).

Other linguists, impressed by the flexibility of this pattern, have advocated building productivity into a grammatical description by deriving such sentences from two independent underlying propositions, joined causally: for example, [Harry pulled on his socks] CAUSE [his socks came (went, moved) up] (Fillmore, 1971; Talmy, 1972, 1976b). Such an account handles productivity admirably, but it must be supplemented by various constraints to block sentences that fluent speakers find bizarre (Fillmore, 1971; Green, 1972; McCawley, 1971). For example, past participles and certain adjectives can never serve to specify stative effects (compare, for example, *Mommy combed Mary's hair smooth/*untangled; I cooked the roast to a turn/*burnt; John hammered the metal flat/into a circle/*round/ *circular*). Furthermore, certain verbs, including all those prefixed with *un-*, cannot appear in the role of causing action (or, put differently, cannot be used with the derived meaning "by performing the action usually associated with this verb, cause NP to undergo change") (compare, for instance, *He tied it on* with **He untied it off* and *He pushed/pulled/blew the fence over* with **He leaned the fence over* [caused the fence to fall over by pushing/pulling/blowing/leaning on it]). Still other constraints would be needed to block combinations like *Susan wiped the table dirty* (with a stained rag, for example); neither the verb nor the effect word are in principle barred from participating in such a construction, but their juxtaposition sounds strange to adult ears for reasons that are not entirely clear.

The course of acquisition of these sentences may be described as follows (see Bowerman, 1977, for fuller discussion). Sentences containing common combinations of verb plus effect (e.g., *push* [or *pull*] plus *in* [or *out, up, down, over*]; *eat* plus *all gone*) begin to occur in good number when a child is as young as 2 years. It is conceivable that the child learns each combination on an example-by-example basis; it is more likely, however, that some generalization takes place such that the child can guess, even in the absence of confirming input, that if *push* can take *down/ off/in* and so on and *pull* can take *down* and *off*, *pull* can probably also take *in*.

For about a year and a half, probably considerably longer for some children, there is no visible change with respect to constructions of this type. Upon casual observation, the child's grasp of the forms seems fully

Table 11.2. *Errors involving the expression of cause and effect*

(1) C	(3;6):	*And the monster would eat you in pieces.* [telling a story]
(2) C	(3;8):	*I pulled it unstapled.* [after pulling stapled book apart]
(3) C	(3;10):	*Untie it off.* [wants M to untie piece of yarn and take it off tricycle handle]
(4) C	(4;0):	*I'm patting her wet.* [patting E's arm after dipping her own hand into glass of water]
(5) 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]
(6) E	(3;11):	[As M and E go toward Christmas tree with candy canes on it] M: *I'm going to eat a candy cane. Do you want one?* E: I'm going to *choose it off.*
(7) E	(3;9):	*A gorilla captured my fingers. I'll capture his whole head off. His hands too.* [playing with rubber band around fingers]
(8) Mindy	(5;10):	*Feels like you're combing me baldheaded.* [as M combs her hair]
(9) Mindy	(5;6):	*Are you washing me blind?* [as M wipes corners of her eyes]
(10) Andrea	(4;3):	*When you get to her, you catch her off.* [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.]
(11) Rachel	(4;9):	*I'll jump that down.* [about to jump on bathmat M has just put on top of water in tub]

adultlike. Then, however – rather suddenly in the case of Christy and Eva, the only children for whom detailed longitudinal data are available – there is a flowering of truly novel combinations of causing verb and resulting event. Some of these sound quaint but acceptable (*Don't hug me off my chair*), but others violate the various constraints that operate to limit productivity in adult speech. Some examples are shown in Table 11.2.

These errors, analogous to overregularizations like *breaked* and *foots*, show clearly that the child has discovered an overarching pattern that unites a variety of superficially diverse sentences. To discover such a pattern the child must disregard the specific semantic contributions of the individual lexical items and see what they have in common – that at an abstract level *pull, chop, eat,* and *wipe* (for example) all specify actions that can *cause an entity to undergo a change,* and that *in, out, down, all gone, in half,* and *clean* all specify locative or attributive states into which an entity can enter. Once these abstractions have been made and linked to a certain syntactic pattern (N_1-V-N_2-locative or stative term), the child is in a position to create an infinite number of novel combinations. Before

this point, however, productivity is limited to certain previously heard combinations of cause and effect or at best to a collection of independent patterns such as, possibly, *"push/pull/pound . . . + in/out/up/down . . . ,"* *"cut/tear/rip/chop . . . + off/apart/in half . . . ,"* and so on. "Analysis" has taken place, but adultlike ability awaits the child's integration of these patterns into a shared, more abstract system.

11.4. Do meanings always precede forms?

Let us pause briefly here to take stock of the arguments made in the preceding two sections, and to begin to consider the implications of reorganizational errors for the issue of how form and meaning are interrelated in the course of language development.

Forms as a mapping for preestablished meanings

Over the last decade, the emphasis on the role of meaning in language development has grown steadily stronger. From an earlier era in which the child's categorization of reality was held to be largely molded through the semantic structure of the language he was acquiring, we have made a complete about-face to the position that cognitive development precedes, paces, guides, and enables language acquisition.

There is ample evidence for the importance of cognition in language development (see Bowerman, 1976, 1978a; and Johnston, in press, for reviews), and it is not my intention to dispute the "cognition-first" position on general grounds. However, in this and the next section I want to examine the viability of one tenet of this position, first explicitly set out by Slobin (1973) and since adopted by many other investigators: that language, far from instructing the child on how to categorize the objects and events of his world, serves merely to map the meanings that the child has already worked out on a nonlinguistic basis.

This hypothesis has served a valuable function in promoting examination of the relative difficulty for children of various formal linguistic devices for expressing meaning (Slobin, 1973, 1977; Chapter 5). However, it is becoming clearer that it is much too strong. In particular, it errs in its assumption that semantics – that is, meaning in language – is isomorphic with the nonlinguistic way of viewing the world. Among other things, critics have questioned whether children categorize the world on a nonlinguistic basis into just those kinds of concepts needed by language (evidence for language-relevant categorization of concrete objects is strong [Rosch, 1976], but what about actions, attributes, relationships, etc?), and they have pointed to cross-linguistic variation and selectivity among languages in the particular concepts that are obligatorily expressed and in the way even such universally important notions as causation and

motion get packaged (Bloom, 1973; Bowerman, 1976, 1980, 1981a,b,c; Dore, 1979; Gentner, in press; Schlesinger, 1977a; Slobin, "The role of language in language acquisition," 1979 manuscript).

Building meanings to fit forms

If meaning in language is not a direct map of thought, then a theory of language acquisition must be capable of explaining how the child formulates categories of meanings to fit the requirements of the particular language she is learning. Clearly, nonlinguistic cognitive abilities feed into this process, but we are still far from understanding how.

The two reorganizational phenomena that have thus far been discussed do not answer this question, but they do strongly implicate the importance of the child's *experience with language itself* in arriving at the meanings required. Consider the category of actions involving covering/enclosing/ surface attachment. At least some children develop considerable facility with *un-* prefixation before they evidence awareness that *un-* is restricted to verbs of this category. It is conceivable, of course, that they "have" the category on a nonlinguistic basis all along but simply do not discover that it is relevant to *un-* until relatively late. Why *would* they have this category, however – what would be its nonlinguistic utility? Schlesinger (1977b) has argued that "language learning depends [in part] on a categorization of objects and events which is needed solely for the purpose of speaking and understanding speech" (p. 155). The class of covering/ enclosing/surface-attaching actions would appear to be an excellent candidate for such a category.

Identifying the origin of the category "relationship between a causing action and a resulting change of state or location" is more problematic. Clearly humans (and at least the other higher primates) are disposed toward interpreting the world in terms of causal relationships; we would not want to attribute this disposition itself to language. But there may be an important difference between having the nonlinguistic ability to interpret causal events and having the kind of relational category that, as I have posited, underlies errors like *I pulled it unstapled*. In particular, the errors require a detailed mental representation in which a causal sequence is "decomposed" into an actor, an action, an entity that undergoes change, and the nature of the change. Such a finely articulated representation is not required simply for thinking about or interpreting causal events, however (see Bowerman, 1974, 1977, for discussion). Regardless of whether experience with language encourages this representation or it emerges quite autonomously, the relative lateness of the errors indicates that it does not underlie the early sentences with conventional cause-and-effect combinations like *pull up*. Rather, the abstract relational meaning is fitted to the construction pattern only later.

With the possibility in mind that meanings may be constructed to fit forms just as forms may be matched to preestablished meanings, let us now look at a specific issue over which there has been considerable debate: the role of meaning in children's acquisition of relational syntactic categories (or syntactic relations, for short) like "subject of the sentence," "predicate of the sentence," and "direct object of the verb."

11.5. Meaning and the mastery of syntactic relations

According to some researchers, children have a grasp of syntactic relations from the very beginning of word combination or even before (Bloom, 1970; Bloom, Lightbown & Hood, 1975; McNeill, 1966b). Other researchers have argued, however, that evidence for this understanding is lacking, and have proposed instead that children's earliest rules for word combination specify where to position words functioning in various semantic roles such as "agent," "action," and "object acted upon" (Bowerman, 1973b; Braine, 1976; Schlesinger, 1971), or in a combination of semantic and pragmatic roles such as "agent/topic" (Bates & MacWhinney, Chapter 6). A grasp of abstract, meaning-free syntactic relations may eventually be achieved when the child comes to recognize that noun phrases performing a variety of semantic roles may all be treated equivalently with respect to position and transformational possibilities (Bowerman, 1973b). Alternatively, relational semantic categories might serve as core or protypical meanings to which the properties of various syntactic relations are initially attached. Early exemplars of the syntactic relations in the child's speech would thus be limited to expressions of those core meanings; as the child progressed, however, he would gradually extend the boundaries of the meaning categories to encompass meanings increasingly distant from the core (Bates & MacWhinney, Chapter 6; deVilliers, 1980; Schlesinger, 1977a; Slobin, "The role of language in language acquisition," 1979 manuscript).

There is some evidence that children's early rules for word combination may indeed be based on semantic categories (see, e.g., Braine, 1976), but it is not as strong as would be desirable. In particular, I became somewhat discouraged about the adequacy of an account whereby syntactic learning is mediated by semantic categories after analyzing data collected from Christy and Eva during the early period of word combination (Bowerman, 1976). Although there was a small amount of evidence for rules based on semantic categories like "agent" in Christy's corpus, there was virtually none in Eva's. Rather uncooperatively for the semantic hypothesis I was testing, Eva appeared to make a swift transition

> from an approach based on learning sequentially how to make constructions with particular lexical items to a much more mature system in which words of virtually all semantic subtypes were dealt

> with fluently . . . There is no evidence that she achieved this transition with the aid of relational concepts at a level of abstraction between the semantics of particular words and syntactic notions that are independent of any particular semantic content, such as "subject" and "direct object." [P. 58]

Maratsos (1979; Maratsos & Chalkley, 1980), reviewing this and other evidence, concludes that children are capable of arriving at adultlike knowledge of syntactic constructs (including both syntactic relations and part-of-speech categories like "verb" and "noun") without leaning on semantic categories like "agent" and "action." He proposes that this learning takes place through the amassing of detailed information about the syntactic handling of particular lexical items, followed by discovery of how distributional privileges transfer among them. Maratsos does not deny that some children may rely to some extent on semantic categories in the acquisition of syntactic relations and other grammatical forms. His point, however, is that this reliance is less common than many researchers have thought and that the child possesses efficient routes to adult knowledge that do not depend on semantics (see also Karmiloff-Smith, 1979a, for some relevant evidence).

If certain children do not start out basing rules for word combination on semantic categories and are capable of achieving adult fluency without them, does this mean that such categories play no role in their language development? Not necessarily. In keeping with arguments that I advanced in the last section, I will present evidence that the semantic correlates of at least certain configurations of syntactic roles may indeed come to be appreciated by children, but only *after* they have learned a great deal about those syntactic roles on a word-by-word basis. These semantic correlates, once perceived, serve to organize and transform what the child already "knows" on a piecemeal basis into an integrated system.

Coordinating semantic and syntactic roles

Every verb or other predicate of English has one or more noun arguments associated with it. Across verbs, these noun arguments fall into groups that play similar semantic roles ("cases") with respect to their verbs, such as "agent," "location," "patient" (or "object"), and so on (Fillmore, 1968a, 1977; Jackendoff, 1972; Talmy, 1972, 1976b). The cases associated with verbs can be used to classify verbs. At a relatively coarse level, verbs that take the same set of cases can be seen as semantically similar. Finer categorizations can be achieved by taking into account not only which cases are linked to each verb but also whether these cases are optional or obligatory in sentences with that verb and what *syntactic roles* (subject, direct object, etc.) are assigned to them (Fillmore, 1968a).

The assignment of syntactic roles to noun phrases instantiating the semantic roles associated with certain verbs is completely fixed. For example, with *eat*, the one who eats, or agent, must be subject, and that which is eaten, or patient, if specified, must be direct object (thus, *Mary eats pudding*, not *Pudding eats Mary*). For other verbs there is some flexibility. With *blame*, for instance, either the one who is blamed or that for which he is blamed can be direct object: *We blamed John for the accident* versus *We blamed the accident on John*. The resulting meanings are very slightly different (Fillmore, 1968a, p. 48).

The syntax of Figure and Ground in adult English. A particularly large and interesting set of "syntactically flexible" verbs in English includes *load, hit, spray, smear, drain, empty,* and many more. These verbs have three associated noun arguments: an Agent (A), a "moving object" termed Figure (F) by Talmy (Fillmore's [1977] "patient" and Jackendoff's [1972] "Theme"), and an object with respect to which the Figure moves, called Ground (G) by Talmy (Fillmore's and Jackendoff's "Source" or "Goal," depending on the direction of motion).[5]

In sentences with these verbs the Agent is optional. For ease of exposition, however, we will restrict our attention to cases in which A is present, where it obligatorily plays the syntactic role of sentence subject. What shall be direct object? This privilege can go to *either* Figure or Ground. Whichever is *not* chosen becomes oblique object (object of a preposition); in many cases it can be optionally omitted:

F as direct object	*G as direct object*
(1a) John hit/bumped the stick (F) against the fence (G)	(1b) John hit/bumped the fence (G) (with the stick [F])
(2a) The farmer loaded hay (F) (into the wagon [G])	(2b) The farmer loaded the wagon (G) (with hay [F])
(3a) The doctor drained blood (F) from the patient's veins (G)	(3b) The doctor drained the patient's veins (G) (of [their] blood [F])

As in the case of *blame*, the two treatments are not completely interchangeable; rather, they are associated with slightly different pragmatic and semantic properties. The pragmatic property is that the noun argument in the direct object slot is perceived as being more "in focus" or "in perspective" than the one in the oblique object slot (Fillmore, 1977). Put the other way around, speakers favor the direct object slot for whichever noun argument they want to focus on for reasons of preceding discourse, nonlinguistic salience, and so on. The semantic property is that when G is direct object, it receives a "holistic" reading (S. Anderson, 1971): For example, in (2b), the wagon is perceived as being completely

loaded, and in (3b) the veins are taken to be completely drained. If F is direct object, however, no such inference can be made. When G is an animate being or a body part, it is most typically made direct object, perhaps because it is usually perceived as more salient and important than F (Fillmore, 1977) or perhaps because G is then seen as holistically involved.

There are a number of English verbs that are semantically similar to *hit, load*, and the like in that they also have the semantic roles A, F, and G associated with them. However, they lack the syntactic flexibility of the earlier group. For some, which we will term Pattern F verbs, F must be direct object, whereas for others, which we will term Pattern G, G must be direct object:

F as direct object	*G as direct object*
Pattern F	
(4a) John poured/spilled/put water (F) (into a cup/onto the floor[G])	*(4b) John poured/spilled/put the cup/the floor (G) (with water [F])
(5a) Jim stole a watch (F) (from Sam [G])	*(5b) Jim stole Sam (G) (of a watch [F])
Pattern G	
*(6a) Sally touched/felt her hand (F) to the baby (G)	(6b) Sally touched/felt the baby (G) (with her hand [F])
*(7a) Bob filled water (F) into a cup (G)	(7b) Bob filled a cup (G) (with water [F])
*(8a) Jim robbed a watch (F) from Sam (G)	(8b) Jim robbed Sam (G) (of a watch [F])
*(9a) George covered a blanket (F) over the bed (G)	(9b) George covered the bed (G) (with a blanket [F])

Acquiring verbs with Agent, Figure, and Ground

Verbs with the associated semantic roles Agent, Figure, and Ground are among the most common in English, and children start to acquire them as early as the one-word stage. What kinds of order rules do they follow when they begin to combine words with them? The Agent is treated as subject and precedes the verb; this is apparently not problematical. But what about F and G? If children were following a semantically based rule such as "Put the word specifying *the object affected by the action* after the action word," they would run into confusion, because there are really *two* "objects affected" for these verbs – both F, the moving object, *and* G, the object that the moving object leaves or, especially, contacts. And if they used order rules based on narrower semantic categories like "Put the word specifying the moving object, or Figure, after the action word,"

or "Put the word specifying the reference point object, or Ground, after the action word," they would consistently perform correctly with either Pattern F or Pattern G verbs, and incorrectly with verbs of the opposing pattern.

In fact, however, children show neither confusion nor consistent patterns of correctness and error. Rather, they are strikingly accurate with verbs of all types, correctly choosing as direct object whatever the adult would choose. For example:

> Pattern F: *I put it (F) somewhere (G), I put this (F) mine bed (G) with me* (= I put this into my bed . . .), *pour more milk (F)* (Christy, age 2 or earlier); *I spill water (F), Christy pour water (F) on me (G)* (Eva, age 2 or earlier)

> Pattern G: *Don't touch my B.M. (G)* (*hand* is the implicit F) (Christy, 2;0); *Touch my pussy cat (G), I want touch ceiling (G), cover me (G) up so me go night-night with my piglet* (*blanket* is the implicit F) (Eva, age 2 or earlier)

Syntactically flexible verbs ("Flexible Pattern") are initially represented primarily by *hit* and *bump* with an animate or body-part G; in these cases children make G direct object, as is conventional: *I hit self* (Christy, 2;0); *Don't hit my fanny* (Eva, 2;0).

This initial correctness is strong evidence that the child's choice of direct object for these verbs is *not* at first guided by semantic categories such as those previously proposed. Instead, it indicates that children learn piecemeal for each verb which noun argument associated with it should appear as its direct object. The story might end here – adultlike competence with the syntax of these verbs has apparently already been reached by, let us say, about age 2½. But later developments show us that acquisition is in fact not yet complete. One to 1½ years after Christy and Eva seemed to have mastered these verbs, they began to make striking errors with them. Some representative examples are shown in Table 11.3; comparable errors in my data from other children were produced in the age range 4;3 to 7;2.

By far the most frequent kind of error involves verbs of Pattern G. These require G as direct object, but the child now accords F that privilege, either making G the oblique object (examples [1]–[6] in Table 11.3) or omitting it entirely (examples [7]–[9]). Somewhat less frequently the child "compromises": She omits F but declines to make G the direct object as is required; instead, she "demotes" G to oblique object position (examples [10]–[11]).

Errors of the reverse type with Pattern F verbs are less frequent and do not flourish until somewhat later. These involve making G the direct object and F, if mentioned, the oblique object (examples [12]–[14]).

Table 11.3. *Errors in assigning syntactic role to noun phrases functioning as Figure and Ground*

Pattern G
A. Syntactic roles of F and G reversed:
- (1) E (3;0): *My other hand's not yukky. See? 'Cause I'm going to **touch** it* (F) *on your pants* (G). [= touch your pants with it]
- (2) C (4;3): [Shows error in comprehension]
  M: *Simon says, "Touch your toes"* (G).
  C: *To what?* [interprets *toes* as F, is looking now for G]
  [A moment later]
  M: *Simon says, "Touch your knees."*
  C: *To what?*
- (3) C (6;10): ***Feel** your hand* (F) *to that* (G). [= feel that with your hand; wants M to put her hand over one end of hose, then blows through the other end]
- (4) E (5;0): *Can I **fill** some salt* (F) *into the bear* (G)? [= fill the bear (a bear-shaped salt shaker) with some salt]
- (5) E (4;5): *I'm going to **cover** a screen* (F) *over me* (G). [= cover myself with a screen]
- (6) C (4;9): *She's gonna **pinch** it* (F) *on my foot* (G). [= pinch my foot (G) with it (F); protesting as E approaches with a toy. Cf. (11).]

B. G omitted:
- (7) E (4;1): *I didn't **fill** water* (F) *up to drink it; I **filled** it* (F) *up for the flowers to drink it.* [= filled the watering can (G) up (with water[F])]
- (8) E (4;11): *And I'll give you these eggs* (F) *you can **fill** up.* [giving M beads to put into cloth chicken-shaped container (G)]
- (9) E (5;3): *Terri said if this* [= rhinestone on a shirt] *were a diamond then people would be trying to **rob** the shirt* (F). [= trying to rob me (G) (of the shirt)]

C. G "demoted" to oblique object:
- (10) C (3;11): *Eva is just **touching** gently on the plant* (G). [= touching the plant]
- (11) C (4;2): ***Pinch** on the balloon* (G). [= pinch the balloon; giving instructions to M]

Pattern F
- (12) E (2;11): E: *Pour, pour, pour. Mommy, I **poured** you* (G). [waving empty container near M]
  M: *You poured me* (G)?
  E: *Yeah, with water* (F). [= poured water on you]
- (13) E (4;11): [M asks at breakfast if E is going to finish her toast]
  *I don't want it because I **spilled** it* (G) *of orange juice* (F). [= spilled orange juice on it]
- (14) C (6;5): [Telling of TV episode]
  C: *Once the Partridge Family* (G) *got **stolen**.*
  M [puzzled]: *The whole family?* [has interpreted Partridge Family as (F), the stolen item, as verb requires]
  C: *No, all their stuff* (F). [Cf. reverse error in (9).]

Table 11.3. (*cont.*)

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Flexible pattern with animate or body part G

(15) C (3;4): *I **bumped** this* [= a toy] (F) *to me* (G). [= I bumped myself with this.]

(16) C (3;8): *I **hitted** this* [= a toy] (F) *into my neck* (G). [= I hit my neck with this.]

―――

Unlike errors with Pattern F and G verbs, those with Flexible Pattern verbs like *hit* and *bump* are not ungrammatical, strictly speaking (although the preposition chosen may be incorrect), because these verbs "allow" either treatment. However, after months of assigning the role of direct object to animate beings or body-part Gs, as is conventional, children now occasionally reallocate that role to F (examples [15]–[16]).

Understanding the errors

What causes the errors just outlined? Several possibilities should be considered.

Local confusion between semantically related verbs? A conservative hypothesis would attribute the errors to confusion at the moment of speech between two semantically similar verbs; for example, the child intends to say *rob* and sets up her syntax accordingly, but then accidentally selects *steal*, a verb with an almost identical meaning but opposite syntactic requirements. This explanation must be rejected, however, because it predicts a much narrower range of errors than is actually found: It accounts well for errors with *rob* and *steal* and possibly *fill* and *pour*, but has nothing to say about errors of an identical type involving verbs that lack a semantic partner with opposite syntax, such as *touch, feel,* or *pinch.* A further problem with this hypothesis is that it is not clear how it can account for errors in *comprehension* as opposed to production, for example, (2) in Table 11.3.

A syntactic generalization? A broader hypothesis is needed, then. Most plausible is that the child comes to generalize the syntactic treatment appropriate for verbs of one type to verbs of another type. But along what lines does this generalization take place? Specifically, will it be necessary to invoke semantics in our explanation, or can we manage with an interpretation that does not take meaning into account?

Let us hypothesize that the errors do not involve meaning but stem instead from a relatively superficial syntactic analysis whereby the child

notices that strings of the following syntactic descriptions are roughly interchangeable in meaning:

(10a) NP_1-VP-NP_2-$\left\{\begin{array}{l} against \\ on \\ into, \text{etc.} \end{array}\right\}$-$NP_3$ ↔ (10b) NP_1-V-NP_3-*with*-NP_2

John hit a stick against   John hit the fence with
the fence.   a stick.

(11a) NP_1-V-NP_2-$\left\{\begin{array}{l} from \\ out of \end{array}\right\}$-$NP_3$ ↔ (11b) NP_1-V-NP_3-*of*-NP_2

Jim drained water from   Jim drained the barrel
the barrel.   of water.

She might then assume that other strings fitting the (10a) description could be converted into (10b) and vice versa, and that those fitting the (11a) description could be converted into (11b) and vice versa. This analysis would indeed lead the child to produce errors like *Feel your hand to that* ([10b] is transformed into [10a]) and *I poured you with water* ([10a] is transformed into [10b]). But it would also lead to many types of errors that do not occur in my data, and that I have never seen reported, such as:

($10a_1$)   I read a book to Mary   → *($10b_1$) *I read Mary with a book*

*($10a_2$) *I ate a spoon* $\left\{\begin{array}{l} against \\ on \\ into \end{array}\right\}$ *my* ←($10b_2$)   I ate my pudding with a

pudding   spoon

*($10a_3$) *I opened my key against*   ←($10b_3$) I opened the door with
            (etc.) the door   my key

($11a_1$)   He read a poem $\left\{\begin{array}{l} from \\ out of \end{array}\right\}$ → *($11b_1$) *He read the book of a*

            the book   *poem*

($11a_2$)   Mother $\left\{\begin{array}{l} saw \\ called \end{array}\right\}$ Johnny → *($11b_2$) *Mother* $\left\{\begin{array}{l} saw \\ called \end{array}\right\}$ *the*
            from the window   *window of Johnny*

The absence of these errors means that the child recognizes that the potential for converting (10a) into (10b) and (11a) into (11b), and vice versa, is not general across all sentences meeting these syntactic descriptions. It is, rather, restricted to just those sentences containing verbs whose noun arguments function semantically as Agent, Figure, and Ground. The child's sensitivity to this restriction, then, indicates that she

has grasped these relational meanings along with the syntactic flexibility with which they are linked. The reason that errors like *I ate my spoon against the pudding* and *I read Mary with a book* do not occur, according to this interpretation, is that the child does not construe the postverb noun arguments of *eat* and *read* in terms of the semantic functions Figure and Ground, and so does not perceive them as candidates for rearrangement.

Notice that the child cannot arrive at this semantic categorization of verbs on a nonlinguistic basis, purely by observing whether there are "moving objects" and "reference-point objects" in the real-world events specified by the verbs. In "filling" the liquid does move relative to the container, and in "covering" the draping object does move relative to a surface; however, in "eating" the spoon (or other implement) also moves relative to the food source, and in "opening a door" the key moves relative to the door. The meaning distinction that unites *fill* and *cover* (for example) and distinguishes them from *eat* and *open* is therefore more abstract. Like the category "verbs of covering/enclosing/surface attachment," the category of verbs whose noun arguments play the roles of "Figure" and "Ground" appears to be defined not by the nature of the world but by the semantic structure of English. It is consistent with this interpretation that children do not begin to generalize the treatment appropriate to Flexible Pattern verbs to Pattern F and Pattern G verbs until long after verbs of all three kinds are in their vocabularies. That is, to the extent that particular semantic groupings are part of the structure of language and not given directly by the organization of the world or by the child's inherent cognitive biases, we would expect the acquisition of these groupings to require experience with the structural details of the language being learned.

Semantic interpretation: overregularization or manipulation of focus? I have argued that accounting for errors such as those shown in Table 11.3 requires reference to the semantic roles played by the verbs' noun arguments. Still to be discussed, however, is *why* the errors occur, given that the child has already learned the conventional syntactic handling of each verb. There are at least two possibilities: overregularization and attempts to manipulate pragmatic focus.

1. *Overregularization.* Overregularization involves "redoing" the syntax or the morphology of forms that fall outside a particular pattern to make them conform to the pattern. The pattern to which children could be responding in the present case is this: Even though English has many Pattern G verbs (G as direct object), Pattern F verbs (F as direct object) predominate, probably both in sheer numbers and in token frequency. Talmy (1972) therefore proposes that the "F as direct object" pattern should be considered basic or unmarked, and that the "G as direct object" pattern should be considered "inverted" or marked.[6]

According to an overregularization interpretation, children would come to have a general sense that verbs with the configuration of semantic roles A, F, and G have a characteristic syntactic treatment associated with them. Errors like (1)–(11) in Table 11.3, in which Pattern G verbs are given Pattern F treatment, would thus be analogous to morphological overregularizations based on the dominant pattern, such as *foots* and *bringed*. In contrast, errors like (12)–(14) in Table 11.3, in which Pattern F verbs are given Pattern G treatment, would reflect the use of a systematic but statistically subordinate pattern, analogous to *brang*.

The tendency for errors of the first type to predominate early, with a later influx of errors of the second type, is reminiscent of the process of *rule replacement* discussed earlier. One important difference, however, is that at no time did one or the other "rule" completely take over. Most of the time, the various verbs were handled in the conventional way (only one Pattern G verb per child – *touch* for Christy and *fill* for Eva – appears to have been completely reinterpreted as a Pattern F verb for a time). This may be thought inconsistent with more widely recognized cases of overregularization, in which overregularized forms often come to dominate. However, it has become clearer in recent years that overregularization is not the all-or-none phenomenon it was once taken to be: Irregular forms rarely drop out, but rather continue to compete with their overregularized counterparts throughout the period of error making (Maratsos, 1979). The relative strength of the irregular and overregularized forms in this competition reflects a complex interplay of factors, such as how long the irregular forms have been part of the child's repertoire before their role in a broader system is perceived, how frequently they have been said or heard, whether the "irregular" forms are truly mavericks or belong to minor patterns of their own, and whether the child routinely activates a newly grasped systematicity in the course of sentence construction or perceives it only more passively. These factors would work by and large in favor of the children's generally correct treatment of Pattern F and G verbs.

2. *Manipulating focus.* Quite different from the overregularization account is the hypothesis that errors like those in Table 11.3 stem from the child's growing awareness of the differential pragmatic effects associated with the choice of F or G as direct object.

This explanation does not work well for the earlier phase of error making, for two reasons. First, many of the early errors result in pragmatic effects precisely *counter* to what we might expect the child to be trying to achieve if she were actively manipulating focus by putting the noun she wishes to highlight in the direct object slot (e.g., examples [15]–[16] in Table 11.3, where the moving object was incidental and the injury to the body clearly more salient in the child's mind). Second, errors like (10)–(11) in Table 11.3 cannot be accounted for in this way because there is *no* direct object and hence no object "in focus." The overregularization

account, in contrast, can handle both of these error types. In the latter case, for example, we simply infer that the child regards the "appropriate" treatment for G to be as oblique object, regardless of whether F is mentioned as well.

Later errors, in contrast, can more often be plausibly interpreted as reflecting attempts to manipulate syntactic assignment to get a desired focusing effect. Such errors seem especially likely to occur when the verb that is clearly optimal on semantic grounds does not allow the syntactic arrangement that is optimal on grounds of (for example) preceding discourse (cf. example [13] in Table 11.3 and discussion of a related example in Bowerman, 1981b). In these situations the adult will typically either give up the optimal syntactic arrangement in order to keep the verb or switch to a slightly less desirable verb to preserve the syntax (see Talmy, 1976a, for relevant discussion). The child, in contrast, may attempt to eat her cake and have it too. Intriguingly, errors that can plausibly be interpreted as motivated by efforts to control focus do not appear in my data until about age 5 to 6; this is precisely the age at which Karmiloff-Smith (1982) found children in a storytelling task beginning to manipulate focus with constructions of a different type as a function of prior discourse.

Summary: finding semantic generalizations that have relevance for syntax

To summarize, this section has sketched a history of acquisition for one set of sentence patterns which indicates that the child comes to link a particular kind of syntactic treatment with an abstract semantic configuration, describable in terms of the meaning relations holding between a verb and the noun arguments associated with it. This semantic–syntactic correspondence is apparently not grasped from the beginning of sentence construction, but instead is established only well after the child is capable of using the verbs in question in a completely adultlike manner. This means that the child's formulation of semantic categories relevant to syntactic relations is not limited to (or even necessarily most characteristic of) the very earliest stages of word combination, as has typically been thought. Quite to the contrary, children's "late" errors suggest that an important component of their grammatical development is their attempt to formulate relational semantic categories – caselike roles – that interact in a regular way with the syntax of the adult language.

11.6. Summary and conclusions

Research of the last few years has increasingly demonstrated the importance of reorganizational processes in the course of language acquisition. In this chapter I have documented and discussed one class of such re-

organizations: changes in which the child comes to see relationships between words or construction patterns that were originally learned and used quite independently of one another, and to integrate them as exemplars of a larger pattern of form–meaning correspondences.

The coalescing of fragments of knowledge into larger systems has implications for the question of how form and meaning are interrelated in the course of language development. In particular, it indicates that working out the semantic categories of a particular language may require experience with that language, and may in fact be accomplished only well after the "forms" to which the categories correspond seem at least superficially to have been acquired. In some cases, figuring out a meaning may serve to limit the overly free application of a form. This was illustrated in the present chapter with the example of the covert semantic class associated with verbs prefixable with *un-*. In other cases, the establishment of a meaning may have the converse effect of introducing real creativity into a domain where productivity has hitherto been somewhat limited. This was seen in the case of linking the causing-action–resulting-event meaning to the form "N_1-V_1-N_2-locative or stative term." And in still other cases, finding a meaning that corresponds with a form may serve no clear-cut purpose: Structure and regularity are induced "because they are there," apparently, not because they increase the child's communicative ability. The child's identification of a certain flexibility in syntactic role assignment with verbs of a particular semantic class illustrates this process (see Bowerman, 1982, on the implications of related changes for hypotheses about the driving force behind progress in language development).

The proposal that meanings may be worked out by the child in response to regularities in the structure of forms that he has already acquired is clearly inconsistent with the prevalent hypothesis that the meanings associated with forms are acquired prior to those forms on a purely nonlinguistic basis. However, this proposal in no way should be taken as a return to the linguistic determinism of earlier times. The argument is not that the child is incapable of structuring and interpreting the world without language; it is, rather, that the child's nonlinguistic way of viewing the world cannot serve *directly* as the semantic basis for language. The semantic system of a language is composed of a highly structured network of interrelated categories of meaning that vary in many nontrivial respects from one language to another. Acquiring these categories is ultimately dependent upon nonlinguistic cognitive abilities, of course, including the child's ability to pick out and combine the perceptual and other cues that define the needed categories, but we are still far from understanding how this transformation takes place. To judge from data of the sort discussed in this chapter, however, the child's early steps in learning the forms of language itself play an important ongoing role in the process.

In closing, one last issue should be mentioned: the extent to which there may be individual differences in reorganizational processes. Studies of adults and older children indicate that there is important variation among speakers both in the *depth* to which particular aspects of language structure have been processed (some speakers recognize structural regularities of which other speakers seem to be unaware; see L. Gleitman & H. Gleitman, 1970) and in details of how particular regularities are mentally represented (Sherzer, 1976). There is also evidence that speakers differ in their willingness to *act on* regularities they have perceived. For example, some people create and accept novel words of a given type more readily than others, even though they may all recognize the regularities in existing lexical items upon which the novel forms are based (Uhlenbeck, 1977).

Presumably preschoolers may also differ in these various respects. Thus some children may do a great deal of in-depth linguistic processing, ferreting out hidden regularities, whereas others do less, getting along indefinitely with relatively unintegrated, superficial rules. In addition, children may differ with respect to the particular domains of language in which they discover regularities. Some patterns are no doubt recognized by virtually all children, whereas others are grasped by fewer. And finally, children, like adults, may differ along the dimension of linguistic caution–innovativeness. This means that if a particular child makes no errors in a certain domain, we cannot necessarily conclude without further evidence that he has not discovered the pattern. An important set of problems for future research must be to determine the extent of these individual differences in development, to identify the domains of language structure they affect, and to discover what factors facilitate or impede the child's search for linguistic regularities.

Notes

1 For lack of more precise terms in English I use the words *recognize, realize, become aware*, etc., to refer to the child's passage from ignorance of a regularity in language structure to knowledge of it, as inferred from changes in her speech. However, I do not intend to imply that the child has any *conscious* awareness of these regularities or could in any way talk about or reflect upon them.

2 There are a few *un-* verbs in English that fall outside this semantic class. Some of these are now obsolete, such as *unsay* and *unthink*; Whorf's editor, Carroll, speculates that this may be because "they had to yield to the pressure of the cryptotype represented by such words as 'uncover, uncoil, undress, etc.'" (Whorf, 1965, p. 71, n. 12).

3 It has been argued that word formation is typically blocked when the language already has a word with the meaning that the new coinage would have (Aronoff, 1976; E. Clark & H. Clark, 1979). This may explain the unacceptability of *unbreak* (= *fix*), but not that of all potential *un-* verbs: E.g., *unmelt* overlaps

in meaning with *resolidify*, but it is not identical with it, and *unembarrass* is deviant even though there is no other verb expressing this meaning.

4 One noteworthy exception is the discussion by Brown (1973) and Kuczaj (1978) of how children learn to restrict progressive *-ing* to "process" verbs (thus *jumping* but not **wanting* or **needing*). Children make almost no mistakes with *-ing*, which might mean either that they recognize the semantic distinction between process and state from the beginning or that they simply learn, verb by verb, which verbs can be *-ing*-ed (Brown, 1973). Kuczaj (1978) presents evidence supporting the latter hypothesis; however, he also shows that the child does eventually discover the semantic basis for the distribution of *-ing* and that he can apply it appropriately to novel verbs. This analysis accords well with the findings presented here for *un-*.

5 The terms *Figure* and *Ground* have wider application in Talmy's analyses, and he chose the terms purposefully for their Gestalt connotations. However, the reader should be forewarned that the noun phrase that functions as Figure may sometimes be backgrounded relative to the one that serves as Ground, as I discuss shortly.

6 If the "F as direct object" pattern is basic, then the prepositions – *with* or *of* – that introduce F when it is oblique object in the inverted pattern can be seen as "demotional" markers: Like *by*, which introduces a "demoted" sentence subject in passive sentences, *with* or *of* introduce Figures that have been demoted from their more "usual" syntactic role. The choice between *with* and *of* is semantically determined: *of* if F moves away from G (except for a subclass of verbs like *explode, spout, erupt,* which take *with*) and *with* elsewhere (see Talmy, 1972, and Fillmore, 1977, for discussion). Intriguingly, children appear sensitive to this semantic basis for the choice between *of* and *with* from the beginning of the period of error making, and rarely confuse the two (see [13] in Table 11.3 for an example of a rare mistake). *From* is frequently used in place of *of*, however.