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CHILDREN'S FIRST WORD

COMBINATIONS

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CONTENTS

ABSTRACT

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A descriptive analysis is presented of the syntactic patterns in 16 corpora of word combinations from 11 children learning either English (six children), Samoan, Finnish, Hebrew, or Swedish. The mean utterance lengths range up to about 1.7 morphemes. There are both reanalyses of corpora in the literature and new corpora.

The data indicate that each child has learned a number of positional formulae that map components of meaning into positions in the surface structure. Each formula expresses a specific, often quite narrow, range of relational conceptual content. In each corpus, the bulk of the combinations are generated by a small number of such formulae; the differences between one corpus and another are considerable, and their nature indicates that the formulae are independent acquisitions. The formulae are not broad rules of the kind usual in transformational grammars; and the semantic categories are usually much more specific than those of case grammars or those proposed by Schlesinger (although Schlesinger's views are supported in other respects). Also, there is no evidence for grammatical word classes. In general, the evidence indicates less grammatical competence at this stage of development than children are being credited with in much current work.

Two kinds of phenomena involving free word order are noted. One kind, not previously reported, is called a "groping pattern": positional formulae are sometimes preceded by an earlier stage in which the components are unordered. The lack of order is due to the child groping to express a meaning before he has learned a rule that determines the position of the elements. The other kind is due to the learning of two formulae, one for each order: longitudinal study of some cases indicates that the two orders were learned at separate times and that they may have subtly different semantic content.

I. INTRODUCTION

In the early sixties several investigators influenced by generative grammar gathered corpora of word combinations from children in an effort to discover regularities in their speech that would indicate the acquisition of syntactic rules. In 1963, Brown and Fraser reported a distributional analysis of a corpus from a 25-month-old child, Eve; in the same year, I made some claims about the structure of children's first word combinations based on an analysis of three children, and Miller and Ervin (1964) reported some observations of a similar nature to mine. The years since then have seen a great deal of work on early syntactic development. In particular, data have become available on the first stages of development for several more children, some of whom show phenomena not seen in the first few subjects recorded in the literature. Moreover, the new data include children from several languages and language groups. In addition, new ways of thinking about and describing language have been developed in the linguistic and psycholinguistic literature; these ways involve semantics particularly, and are therefore relevant to aspects of language to which little attention was paid in the early work on syntactic development. Thus, unlike the earlier work, most of the recent work, beginning with Bloom (1970), uses the apparent meaning of the child's utterances as a guide to the syntactic analysis, under the assumption that the grammatical structure of an utterance is in some simple relation to the type of meaning it conveys. A variety of proposals about the nature of early syntax and the relations between semantic and surface structure have been entertained and discussed (e.g., Antinucci & Parisi 1973; Bloom 1970, 1973; Bowerman 1973a, 1973b, 1974; Brown 1973; Ingram 1971; McNeill 1970; Schlesinger 1971a, 1971b, 1974), but no consensus has been reached.

The early work introduced two principal concepts: telegraphic speech (Brown & Fraser 1963), and "pivot grammar" (Braine 1963). Essentially,

1

the latter claimed that children's first productive rules were always of constant-plus-variable form, in which one word (the "pivot") recurred frequently in the same position in combinations, and the other word varied (e.g., as in *more car, more cereal, more cookie*, etc.). Neither of these concepts proved satisfactory. "Telegraphic speech" was purely a descriptive concept that made no claims about the rules children were acquiring, and children were described (Bloom 1970; Bowerman 1973a) whose first word combinations manifestly did not exhibit the constant-plus-variable format required by pivot grammar.

In the more recent work three main theoretical positions can be discerned. First, there is the view that the child is acquiring rules formally similar to those of orthodox transformational grammars. Most grammars that have been written for individual children have been of this type. The underlying structures are assumed to be syntactic in nature (rather than semantic): relations like subject and verb phrase, verb and direct object, etc., are claimed to be acquired, and sentence structure is composed of these rather than of semantic categories like agent, action, patient, etc. The connections between syntax and meaning are given by rules of interpretation like the projection rules of Katz and Fodor (1963), although work on child language has not progressed to the point of actually formulating interpretive rules. This general position is adopted by Bloom (1970) and McNeill (1970), although there are several differences between these authors (e.g., McNeill insists on the innateness of many syntactic categories and relations; Bloom allows more than McNeill for differences among children in the early rules acquired, responsible for differences between corpora).

A second view is that the child is acquiring categories and rules of the kind found in case grammars. Case grammar claims that nouns can be semantically related to verbs in only a relatively small number of ways, called "cases." "Agent," "instrument," "objective," and "locative" are typical cases. (A more precise statement of case grammar is given later.) The child would be acquiring such categories and also rules determining their placement in sentences. Bowerman (1973a) argues that corpora provide better evidence for such case categories and rules than for the syntactic relations proposed by Bloom and McNeill.

The third position is that the child is acquiring rules that map conceptual categories and relations into positions in utterances. The most explicit proposal along these lines is by Schlesinger (1971a), who posits eight position rules that children acquire and which would account for regularities found in early word combinations. These rules specify utterance positions for such categories as "agent," "action," "direct object," "modifier," "head," "negation," etc. (all of which Schlesinger construes as semantic categories).

Apart from these main positions, there has been extensive speculation about the cognitive structures that give rise to the early one- and two-word utterances. Some authors have identified these with the structures of Piaget's final stage of sensorimotor intelligence (e.g., Brown 1973; Sinclair-deZwart 1971, 1973). On the other hand, highly embedded treelike cognitive structures, formally similar to the phrase markers of linguistic theory, have also been posited as the semantic representations underlying very early utterances (e.g., Antinucci & Parisi 1973); however, there has been much criticism of the data base and methodology supporting such claims, especially for the one-word utterances (Bloom 1973; Brown 1973; Schlesinger 1974).

A detailed discussion and comparison of the three theoretical positions outlined above has recently been provided by Brown (1973). His discussion does not decide between them: he finds merits and defects in all three positions. However, his assessment is not based on detailed analysis of the characteristics of individual corpora; rather, it is based on general features of corpora that are not presented. It is an unfortunate property of the recent literature that the sources that contain corpora of text materials are widely scattered, often not easily accessible, and, with some outstanding exceptions (e.g. Bloom 1973; Bowerman 1973a), distinct from the interpretive papers. In this situation, child utterances tend to be cited to illustrate proposed interpretations rather than to demonstrate their validity. Conclusions have not usually been presented in a context where the reader has access to the supporting corpora of word combinations and can evaluate all the steps in the argumentation from the data to the conclusions. This distance between data and interpretation no doubt contributes to the lack of consensus about the nature and possible bases of the structures found in the early word combinations. For these reasons, the time is ripe for a comprehensive review of the nature of children's first word combinations, starting with a survey of the available corpora themselves. One can now hope to arrive at some reasonably definitive conclusions, not dangerously limited by the fragmentary nature of the data available nor by too restrictive a range of theoretical frameworks. The present work was undertaken with the thought that a larger and more detailed data base than that used in previous work would yield clear conclusions.

The body of the *Monograph* is divided into three parts. The first part is a detailed review, corpus by corpus, of the corpora available to me, either from my own files or from published sources. The second part studies the similarities and differences between corpora and arrives at conclusions about the kind of rule system the children are acquiring. The third part is a critical discussion of other existing theories, in relation to the facts of the corpora and to the conclusions arrived at here.

When put together, the corpora have, I believe, a clear and rather straightforward story to tell about the nature and basis of children's first syntactic structures. This is that the first productive structures are formulae of limited scope for realizing specific kinds of meanings. They define how a meaning is to be expressed by specifying where in the utterance the words expressing the components of meaning should be placed. That is, the formulae are realization rules that map semantic elements into particular positions in the surface structure. The formulae are limited in scope, in the sense that they are not broad rules of phrase or sentence composition, like the rules $S \rightarrow NP + VP$ or $VP \rightarrow V + NP$ that are typical of current grammars written for both adults and children; their range of content tends to be much narrower than this and is semantically (i.e., conceptually) defined. Each formula is concerned with a specific and often rather narrow kind of semantic content. The data indicate that there are about a score or more of such simple positional formulae that are common in early corpora of text materials from children. The main part of early syntactic development consists in learning one such formula after another. Different children acquire formulae in a different order, and thus there are often differences between one child and another early in development, due to each child having acquired a different sample from this common core of formulae.

If these conclusions are valid, it must follow that none of the three theoretical positions summarized above is correct, although Schlesinger's is most nearly adequate. All would err in the same direction: they attribute to the children categories and rules that are substantially more abstract and broader in scope than the data indicate the children possess. That is, at the outset of syntactic development children's syntactic competence is more limited and much more concretely based than current theories suppose.

II. THE AVAILABLE CORPORA

This section surveys available corpora of word combinations, some gathered by the writer, the others taken from published sources. The purpose of the survey is to provide a data base, as large and as detailed as is currently possible, on which the discussion in the subsequent sections can be founded. The review begins with the corpora from Andrew, Gregory, and Steven in Braine (1963), which provided the basis for the "pivot grammar" concept. The original data that led to this concept are reviewed and to some extent reanalyzed. Two corpora from successive stages of development of Bowerman's subject Kendall and a corpus from her Finnish-speaking subject Seppo (Bowerman 1973a) are then considered, followed by the corpora from Kernan's Samoan-speaking subjects Sipili and Tofi (Kernan 1969); in each case the author's original treatment of the corpora is discussed, and the data are reviewed and partly reanalyzed. Following this, several new corpora from my files representing stages of development of my son Jonathan and two stages of another boy David are presented and analyzed as well as a corpus from a Hebrew-speaking child, Odi. Material from a recently available corpus representing several stages of development of a Swedish child Embla (Lange & Larsson 1973) is then reviewed. A final subsection of this survey of corpora discusses children who have figured importantly in the literature but for whom a complete corpus of word combinations has not been published.

Most of the corpora come from tape recordings of a child's speech, often in play sessions with the investigator and a parent present. In effect, they constitute a kind of time sample of the child's speech. The tape recordings are transcribed and associated with more or less detailed notes on the apparent meaning or situational context of utterances. The word combinations of each corpus comprise the understandable word combinations from the transcriptions. Where necessary, further details are given as each child is

introduced, and of course a more complete account of the origin of the published corpora is available in the original sources. The corpora from Andrew and Jonathan were not tape-recorded but came from specially kept records, as described in the relevant subsections below.

The corpora are all from the children at an early stage of syntactic development. They either represent the first word combinations or are slightly more advanced. The longest mean length of utterance is 1.7 morphemes. (The mean length of utterance is of course computed on the transcription, which contains single-word utterances as well as word combinations.) The ages range from 20 to 26 months. In terms of Brown's (1973) classification of developmental stages of language development, the corpora represent early or middle stage I. Corpora from more advanced stages of development were deliberately excluded in order to keep the amount of material within manageable bounds and to focus on the beginnings of syntactic development.

All the corpora were originally gathered with the same goal: to study early syntactic development by obtaining a sample of the word combinations uttered by a particular child, so that the sample could be inspected to see what regularities it exhibited. The regularities that have usually been sought, and which the analyses to come also seek, are similarities of form or content of any kind among sufficiently large groups of combinations: for instance, the presence of many combinations expressing the same kind of conceptual relation, especially when the relation appears to be expressed in the same way, for example, through the same word order of components; or recurrences of the same word or morpheme, or of words apparently expressing the same meaning, within many different combinations, with or without positional consistency. The terms "many" and "sufficiently large" suggest the need for statistical decision criteria, and the question of how often some specific kinds of recurrences should be manifest in order to be taken seriously is discussed in the first subsection below.

In the case of some of the published corpora, the investigator's original treatment of the data deserves comment. Grammars that generate the utterances of the corpus constitute the primary data analysis. However, exactly how the grammar was arrived at in these cases is not specified. The inferences from the corpus to the rules of the grammar are not spelled out, and there is hardly any detailed comparison of grammar and corpus in which each rule of the grammar is considered individually, in order to show that it is required by the corpus. Inspection of the corpus reveals that some of the rules are supported by large numbers of word combinations and are almost certainly productive, whereas other rules are probably not productive because they are exemplified in only one or two utterances that could

well have been rote learned. One can surmise that the grammar was arrived at by a trial-and-error procedure that terminated when the utterances of the corpus were generated. But such a procedure can yield rules that are unevenly supported by the data. The resulting grammar is bound to over-estimate the number and complexity of a child's productive rules. I return to this critical point when discussing the relevant corpora.

ANDREW, GREGORY, AND STEVEN

The concept of pivot grammar was derived from corpora of word com-binations from three children (Braine 1963). The corpus from Andrew is retabulated in table 1. Beginning at the single-word utterance stage, An-drew's mother maintained a seriatim record of his spontaneous comprehen-sible utterances, together with a gloss indicating their apparent meaning. The corpus represents the first 5 months of word combinations from this record.

In all three children most of the word combinations fell into a consistent

TABLE 1

ANDREW'S WORD COMBINATIONS

more car[a]	no bed	other bib	boot off	see baby
more cereal	no down[c]	other bread	light off	see pretty
more cookie	no fix	other milk	pants off	see train
more fish	no home	other pants	shirt off	
more high[b]	no mama[d]	other part	shoe off	hi Calico
more hot	no more	other piece	water off	hi mama
more juice	no pee	other pocket	off bib	hi papa
more read	no plug	other shirt		
more sing	no water	other shoe	airplane all gone	airplane by[h]
more toast	no wet[e]	other side	Calico all gone[f]	siren by
more walk			Calico all done[f]	mail come
outside more	down there		all done milk	mama come
	clock on there		all done now	what's that
all broke	up on there		all gone juice	what's this
all buttoned	hot in there		all gone outside[g]	mail man
all clean	milk in there		all gone pacifier	mail car
all done	light up there		salt all shut	our car
all dressed	fall down there			our door
all dry	kitty down there		byebye back	papa away
all fix	more down there		byebye Calico	look at this
all gone	sit down there		byebye car	pants change
all messy	cover down there		byebye papa	dry pants
all shut	other cover down there		Calico byebye	
all through	up on there some more		papa byebye	
all wet				

[a] "Drive around some more."	[e] "I'm not wet!"
[b] "There's more up there."	[f] Said after the death of Calico the cat.
[c] "Don't put me down."	[g] Said when the door is shut: "The outside is all gone."
[d] "I don't want to go to mama."	[h] "A plane is flying past."

pattern: a few individual words were singled out and used in a particular utterance position in combination with a variety of other words. The words recurring in a constant position (e.g., *all*, *more*, *no*, *other*, etc., in table 1) were called "pivot" words. It was argued that the strangeness of some of the combinations meant that they had not been copied from adult speech and that a productive pattern was involved. It was concluded that the productive patterns consisted of three utterance forms: X, P_1X, and XP_2, where X was the class of single word utterances, and P_1 and P_2 were the pivot words of first and second position, respectively. The interpretation offered was that the construction was based on the learning of the positions of the pivot words, that is, that children begin to combine words by learning that a few words belong first and some others second, and, in the absence of other learning that could restrict generalization, the position complementary to that of the pivot could be occupied by any single-word utterance in the child's vocabulary. Evidence was also put forward indicating that pivot words developed one after another during the first few weeks of word combinations, that is, the language gathered complexity by the children learning new pivot forms.

Certain aspects of these corpora went unremarked in my original article, and certain others have been the subject of some misunderstanding in the literature. It is desirable, therefore, to take a second look at some of the phenomena presented by the three children. Let us look first, in table 1, at the combinations with *more* and *no*. One notices at once that some of these combinations are clearly inventions, that is, it is most unlikely that Andrew has heard adults say *no down* "don't put me down," *no wet* "I'm not·wet," *more car* "drive around some more," or *more hot* "another hot thing." The second obvious property of these combinations is the positional consistency; *no* always occurs first, and *more* occurs first 11 out of 13 times. Sets of combinations that have these two properties (namely, positional consistency and productivity) I shall now call "positional productive patterns."

Let us look now at the combinations with *all* in table 1. These combinations have the property of positional consistency (i.e., *all* always occurs first). It is unlikely, however, that the pattern is productive for the following reason: because the set of English words that can co-occur with *all* is rather small, and because most words in Andrew's vocabulary could not co-occur with *all* in adult English, it would follow that, if Andrew had some formula for making combinations with *all*, one should expect that his use of the formula would yield some—probably several—strange combinations he could not have heard; yet the combinations are all familiar English adjectival or participial phrases. It is extremely unlikely that so many combinations with

all could arise in such a small corpus simply by haphazard imitation of adult phrases, so we have to assume that Andrew had registered the pattern property of *all* in first position and then preferentially registered new phrases of this pattern that he heard. Since the pattern is not productive, we have to assume that he also learned each combination individually. I shall call this kind of pattern a "positional associative pattern," because there is evidence both for position learning (the position of *all* in the example discussed) and for the learning of an association between the constant term (i.e., *all*) and each of the words occurring with it.

An important property of the positional productive patterns is that they are semantically consistent. *More* expresses observed or desired recurrence, and in the pattern *more* + X, the word occupying the X position indicates the thing or event that recurs, or whose recurrence is desired. Similarly, *other* + X seems to indicate or request some object different from the one at hand. We can infer from the productivity and semantic consistency of the patterns that they represent formulae for expressing the meaning associated with the pattern, formulae that map semantic elements into phrase positions, that is, that define where the words expressing the component concepts go in the utterance—for example, *more* + X is a formula for expressing recurrence of X. This is how new instances of the pattern get coined. In the case of the associative patterns there may also be a common meaning (e.g., *all X* may be associated with some aspect-like notion of completion of the state of affairs indicated), but, since productivity is absent, it is quite possible that the child has not registered this common meaning (although one cannot be sure whether he has or not).

Several people (e.g., Bloom 1970, 1971; Bowerman 1973a; Brown 1973) have noted that different sets of words seem to co-occur with different "pivots," for example, in table 1, *other* and *off* occur with English nouns, whereas *more* and *no* occur with some verbs and adjectives as well as nouns, and *all* does not occur with nouns at all. This fact has been used to argue that some knowledge of grammatical word classes (at least, nouns and verbs) is manifest in these early word combinations. However, no knowledge of grammatical class has to be attributed to the children to explain these facts. The restricted range of words that occur with *all* is explained by Andrew's having learned each combination individually, and learning of individual combinations probably also explains some of the words found with other "pivots." But the major source of the differences among the sets of words that occur with different pivots in positional productive patterns is obviously the meaning each particular formula is used to express. Words are not selected randomly but to accomplish a communicative purpose. Thus, since

acts and events can recur, as well as objects, it is not surprising that *more* is found with some English verbs as well as nouns; some other pivots would not readily make sense paired with English verbs.[1]

Now let us look at the combinations with *all gone* and *all done* in table 1. Here there is no positional consistency, since *all gone* and *all done* are sometimes first and sometimes last. However, there is some evidence of productivity since some of the combinations are clearly not copied from adults but are inventions. There is also semantic consistency: the combinations seem to express that something has disappeared or become inaccessible or "finished."

How might a set of similar word combinations with apparently free word order arise? In principle, there seem to be three ways: (1) The child might be trying to express a certain kind of meaning before he has learned rules specifying how that kind of meaning should be expressed; thus, Andrew might have found himself a few times in a situation where he wanted to express that something had disappeared or become inaccessible and knew the word for the object involved, and also the phrase *all gone* "disappeared," but lacked any formula telling him how these should be combined to express the complete idea. Since he didn't know what the order should be, he would be forced to output an unordered combination; hence by chance, the observed order is sometimes one way and sometimes the other. (2) The child might have learned two rules, one for each order; thus, Andrew might have learned two formulae, one realizing the order *all gone* + X and the other X + *all gone*. (3) The child might have learned a rule indicating that the word order was free (we now do not have to be concerned about whether or how this case really differs from the two-rule case). The last two of these ways account for free word order as a result of learning; the first explains it as due to lack of learning, that is, the lack of order is due to ignorance of order.

Where there occurs in a corpus a set of similar combinations, with apparently free word order, in which the lack of order can be attributed to the first of the three reasons above, I shall call the set a "groping pattern," because the child is groping to express a meaning before he has acquired a sufficient set of rules for its expression. Bloom (1970) and Leopold (1939–1949, vol. 3) have observed that, toward the end of the single-word utterance

[1] The meaning of the "pivot" words no doubt also determines whether or not they occur alone as single-word utterances. My original article (Braine 1963) has often been misunderstood as denying that they ever occur alone. Whether or not a pivot-word occurs alone surely depends on whether it makes sense alone. See Smith and Braine (in press) for extensive further discussion of the distributional criticisms of the original formulation.

stage, children often produce successive single-word utterances that appear to be semantically connected. For instance, Eric, looking at cars go by, says "Car. See" (Bloom 1970, p. 11). The groping patterns noted here appear to be a slightly more advanced form of the same phenomenon, differing only in that the two components are not placed under separate intonation contours.

How might one distinguish a groping pattern from the other potential cases of free word order? It seems reasonable that in a groping pattern the combinations should tend to have the following properties: (1) The number of combinations involved should be small, both absolutely and as a fraction of the total corpus (i.e., a groping pattern should not be highly productive). (2) The utterances should often be produced with evidence of uncertainty and effort, that is, haltingly, with repetitions or with hesitation pauses between constituents (i.e., fluency should be difficult in the absence of rules). One special kind of repetition of constituents seems worthy of note that I shall call the "circular" utterance and which would be hard to explain if formulae for realizing the combination had been learned: some examples (from Jonathan, see table 8) are *in there . . old apple . . in there . . old apple*, and *all wet . . mommy . . all wet* (" . . " indicates hesitation). (3) Over time, a groping pattern should be the first attempt by a child to express a particular meaning with the elements used; it should not therefore be preceded in time by a positional productive pattern (or any other kind of formula) that uses the same elements to express the same meaning. Also, a groping pattern should exist during a relatively brief span of time and be replaced by a positional productive pattern (as the child learns a formula for realizing the meaning he is trying to express). This third criterion is the one that is essential.

Andrew's combinations with *all gone* and *all done* seem to satisfy these criteria: the number of combinations does not seem too large (although, of course, numerical criteria are impossible to set until enough children have been discussed to provide some standard of what to expect). The combinations are indeed uttered hesitatingly (although there are no circular forms); and they are the first combinations with *all gone* and *all done* to appear, and later become ordered (i.e., the order *all gone* + X disappears). Hence I shall interpret them as a groping pattern.

The existence of some patterns with free word order in addition to order-consistent patterns means that we have to consider how far it is possible to tell the difference. Let us consider first what criteria are appropriate for classifying a pattern as a positional one. The simplest and most obvious criterion is that there should be statistically significantly more utterances in

one order than the other. If the .05 significance level is used, then a minimum of six utterances all in the same order are necessary before one can classify a pattern as positional; if one utterance goes against the dominant order, then eight are required in the dominant order; if two utterances go against the dominant order, then nine are required in the dominant order. Intuitively, this criterion seems sufficiently stringent. Unfortunately, it is not possible to set a statistical decision criterion as to when one can say fairly confidently that an order is free. However, it is relevant to note that one should not expect to observe an equal prevalence of the two orders very often, even when the order is completely free (i.e., genuinely random). (E.g., if we have 10 utterances, and the order within each is selected by tossing a coin, then five utterances will be in one order and five in the other order only 25% of the time, six utterances will be in one order and four in the other about 40% of the time, and the split will be seven to three or worse about 35% of the time; thus a split seven to three or worse is more likely by chance than one of five to five.)

Fortunately, it is not important that every pattern in a child's corpus be identified. So long as it is correct that positional and groping patterns are distinct entities, a claim that the data as a whole will support overwhelmingly, some uncertainties of diagnosis in particular children are immaterial and to be expected. There are bound to be cases where the number of utterances in a set is too few to make a reasonable estimate of whether the child has learned any pattern or not. One must expect cases where a positional pattern is clear but where one cannot reasonably estimate whether it is productive or associative; and the statistical considerations discussed guarantee that there will be cases where an order preference is observed that is too weak to meet the criteria for a positional pattern but too strong for one to have any real confidence that no order has been learned. What is ultimately important is that the kinds of patterns to be found in children's first word combinations be accurately enumerated. A set of utterances that is hard to classify is important only if it represents a kind of pattern not previously described or contains a potential counterexample to some generalization about children.

Before turning to other children, we will summarize the data from Andrew, Gregory, and Steven. There seem to be three kinds of patterning in their first word combinations: the positional productive, positional associative, and groping patterns described. Beyond these, about a quarter or more of the word combinations of each child partake of no detectable pattern. It seems reasonable to assume that most of the latter combinations have been copied directly from adult speech and reflect no pattern or rule learn-

ing on the part of the child, although there are occasional combinations for which adult-model utterances are not obvious and whose source is simply inexplicable (e.g., *pants change* in table 1 could be a reversal of *change pants*, but *pants changed* is also a conceivable adult model).

Among the positional patterns, the following meet the statistical criterion and may well be productive formulae. *See* + X (Gregory), *it* + X "it's (a) X" (Steven), and *there* + X "there's (a) X" (Steven) are patterns that draw attention to or identify something, which I have elsewhere referred to as "ostensive" (Braine 1971b); *want* + X (Steven) is a request form; *byebye* + X (Gregory) means that X has gone or is being abandoned; *more* + X, *other* + X, *no* + X, and X + *down* (*on/in/up*) *there* are in table 1. In addition to Andrew's *all* + X, there is one pattern that seems clearly associative, consisting of an English transitive verb + *it* (e.g., *do it*, *push it*, *close it*, *move it*): Gregory produced five instances of this pattern during the time period tabulated in Braine (1963), and a few dozen instances in the next few weeks, all of them forms he had probably heard. Andrew's combinations with *all gone* and *all done* are the only clear groping pattern in the three children.

The positional patterns of Andrew, Gregory, and Steven are all composed of a constant and variable term, that is, in each pattern there is one term, the pivot, that remains the same through the combinations of the set, and one that changes from one combination to another. (Of course, as noted earlier, it was this formal property that led to the original pivot formulation.) However, the other children to be reviewed indicate that children's positional patterns by no means always have this constant-plus-variable form. My 1963 claim that children always begin with pivot constructions is therefore an error of fact, due to having observed too small a sample of children's patterns at that time.

The corpora contain occasional utterances with a hierarchical structure more complex than the rest of the corpus. For example, in *other cover down there* in table 1, an instance of the pattern *other* + X is itself the X term of the pattern X + *down there*. It is important to note that this kind of hierarchical organization is directly explicable by the semantics of these patterns. *X down there* locates the object or act indicated by the X term; since *other X* defines an object (as being other than one at hand), it can appropriately serve as the X term of *X down there*. We do not have to invoke any special kind of syntactic learning to account for this sort of hierarchical organization; it is already entailed in the proposition that the child is learning positional patterns for realizing meaning.

13

KENDALL

Melissa Bowerman first studied Kendall when the child was almost 23 months old and had just begun to combine words. She was followed for over 2 days from morning to bedtime, and the word combinations she produced during that period constitute Kendall I. Her mean length of utterance (MLU) at that time was 1.10 morphemes. A second corpus, Kendall II, was gathered some weeks later. Both corpora are to be found as appendices to Bowerman (1973a).

Kendall I consists of 102 different word combinations. Of these, 10 were distinct word combinations only because they contain vocatives (e.g., *Mommy*, *telephone*, where Kendall is pointing out the telephone to her mother), repeated words, or separable negatives (e.g., *no, self*, where Kendall is rejecting help because she wants to do whatever it is by herself). Of the remaining 92 combinations, five are ambiguous in that they well may be possessives but a locative sense is also possible (e.g., *Bill car* "Bill's car" or "Bill in car"); a further four are semantically highly obscure (*inna Mommy*, where Kendall wants to come in past the screen door, Mommy being just inside; *door . . find*, where Kendall is leaving to find Daddy; *Daddy pat*, where Kendall is patting Mommy, and Daddy is sitting nearby; and *rocks . . broken*, in which the words are not identified with certainty and which relates to some broken sculpture she has been told not to touch). The 83 remaining combinations are tabulated in table 2. The footnotes provide glosses for all nontransparent utterances.

Bowerman's discussion of this corpus is brief; she uses the corpus to show that it could not reasonably be viewed as consisting of a collection of pivot constructions. She points out that the corpus does contain some words which occur with high frequency in particular positions (e.g., *Kendall*, *Mommy, Daddy* in first position, and *house* in final position), but these words do not function as semantic operators like, for instance, *more* in Andrew's corpus. Moreover, to describe the corpus by means of formulae like *Kendall* + X, *Mommy* + X, X + *house* would be to miss the real productive patterns. She argues that words like *Kendall, Mommy* and *Daddy* occur often first because they were used to name possessors and as subjects of verbs; *house* often occurs last because inanimate nouns were used to name objects possessed, or locations, or objects of verbs. She says that "Kendall's fairly consistent use of appropriate word orders suggests that she had learned something about the syntactic expression of possession and location and the relationships of subjects and direct objects to verbs" (Bowerman 1973a, pp. 42–43). My analysis of the corpus here is more detailed than that implied

TABLE 2

Kendall I: Word Combinations

Actor/Action Pattern			
Kendall sit	Mommy read	Daddy sit	Kimmy read
Kendall read	Mommy tie it	Daddy hide	Kimmy bite
Kendall walk	Mommy spider[e]	Daddy write	Kimmy BM[a]
Kendall bounce	Mommy oops[f]	Daddy walk	Bill talk
Kendall BM[a]	Melissa walk	Daddy teeth[j]	spider move
Kendall leave[b]	Melissa eye[g]	Daddy sock[k]	horse walk
Kendall foot[c]	Melissa away[h]	doggy . . sleepy[l]	horse run
Kendall Mommy[d] walk	Melissa car[i]	doggy bye[m]	ant away[h]

Possession			
Kendall chair	Mommy . . hand	Kimmy house	lady hat
Kendall house[n]	Mommy curly[o]	Melissa house	my penny
Bill house	Daddy book	doggy . . house	our car[n]
Bill book		animal house[p]	

Location			
Daddy here	pig water[q]	in Daddy[s]	back doggy[t]
Bill here	doggy slipper[r]	Mommy in[s]	tummy off[u]
penny inner[e]	slipper doggy[r]	Mommy bathroom[q]	

Other Combinations			
more walk	Kimmy girl[v]	tie it	hand clean[y]
more lights	animal dog[w]	carry it	go home
no more	that book	horse . . see it[x]	sit lap
Kimmy Pam[d]	Kendall hurt	find Mommy	purse away
lady man[d]	refrigerator on	close . . door	walk self[z]
open close[d]	slipper on	close . . bathroom	tie it self[z]
		taste cereal	

Source.—Bowerman 1973a, appendix B.
[a] "made bowel movement."
[b] Response to "Can you grab some leaves?"
[c] She wants to take her shoe off.
[d] "———— and ————."
[e] "Mommy is to watch the spider."
[f] "Mommy said oops."
[g] "Melissa is drawing an eye."
[h] "went away."
[i] "Melissa is getting into [Kendall's family's] car."
[j] "brushing teeth."
[k] Daddy left to find socks.
[l] Pretending to be a dog sleeping.
[m] "Doggy went away."

[n] A routine.
[o] Follows, after delay, "Mommy has curly hair."
[p] Refers to a barn.
[q] "———— in the ————."
[r] After talk about putting the slipper on the dog.
[s] As she shuts a parent in a room.
[t] As she puts a toy dog in back of her.
[u] "off tummy."
[v] "Kimmy is a girl."
[w] "A dog is an animal" (?).
[x] "See the horse."
[y] "Wash my hands."
[z] "by myself."

in Bowerman's remarks. It agrees with the main thrust of her discussion but disagrees on points of detail (e.g., that there is good evidence that Kendall has learned how to express location, or has a productive verb-object construction).

More than one third of the combinations consist of actor + action: the first word of the pair identifies some person or animal, and the second indi-

15

cates an act done by that person or animal. The pattern is a positional one since in all 32 cases the actor comes first and the word indicating the action comes second. Some of the combinations are clearly inventions, and it is therefore a productive pattern. It is not of the constant-plus-variable form since both components are variable from combination to combination. Since it is semantically consistent and productive, Kendall must have acquired a formula that expresses the idea, that some being is doing something, by placing the actor first and the word indicating the action second.

Like the patterns of the previous children, this pattern provides no evidence for any command of grammatical classes: the form of the pattern cannot be specified as noun + verb but can only be adequately stated using semantic terms like actor + action. Thus, the action term is an English verb in only a little more than half the combinations, and it seems that any word can serve as the action term provided only that its meaning indicates a salient feature of the action involved: note, for instance, *Mommy oops*, which comments on the fact that Mommy had just said "oops"; *Melissa eye* "Melissa is drawing an eye"; *Kendall BM* and *Kimmy BM*, where Kendall was having her diaper changed, and *BM* presumably refers to making a bowel movement (Kimmy is a friend). There are too many combinations of this sort for them to be ignored as data.[2] The fact that the actor term is an English animate noun is also easily explained as due to the semantic basis of the pattern. It should be noted that, while the actor-action formula seems wider in scope (i.e., covers a broader range of semantic content) than the formulae of Andrew, Gregory, and Steven, it is nonetheless considerably narrower than would be connoted by such descriptions as "subject-predicate" or "subject-verb" (since English sentence subjects are often not "actors").

One other set of combinations meets the statistical criterion for a positional pattern: these are the combinations expressing possession. The first term always indicates the possessor and the second term the object possessed. Although positional, this pattern is also not of the constant-plus-variable type.

A word is appropriate here about the use of the term "possession" in this article. This term, and the adjective "possessive," are used as generic terms that subsume (and do not distinguish) the specific semantic concepts "inalienable possession" (e.g., the relation of a person to his parent, or one of his body parts, or to the book of which he is author), "ownership," and "custody" (e.g., as in "George has a library book," "That's George's library book"). The latter terms will be used if the specific concepts are needed. It

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[2] The view that such forms are produced via a deletion transformation is discussed later on.

is quite likely that children of this age do not have these conceptual distinctions clearly, although it is also the case that they often get a lot of training on the distinction between custody and ownership (or on relative rights to things), especially if they have siblings near them in age! In the corpora in the literature, utterances of possessor-possessed form are sometimes classified as ambiguous as between the interpretation "——— has a ———" or "———'s ———" (e.g., in Kendall II, Bowerman classifies *doggy hole* as syntactically ambiguous between "doggy has a hole" and "doggy's hole"). Since the meaning is possessive anyway, and since there is no basis for reading the English syntactic distinction into the children's forms, such utterances are here simply treated as possessives.

Now let us consider the locatives in table 2. The three forms with reflexes of English *here* and *there* should probably be considered separately from the other eight combinations. In these forms *here* and *innere* always occur last, but there are too few such forms in the corpus to warrant discussion of a positional pattern, one way or the other. Of the remaining eight locatives, two (*pig water* and *Mommy bathroom*) have the standard English order of the object first and its location second; two other pairs (*doggy slipper* and *slipper doggy*, and *in Daddy* and *Mommy in*) show both orders; *back doggy* is an apparent reversal of the standard English order, and *tummy off* has the location on the wrong side of the preposition. The order inconsistency in the locatives is in striking contrast to the consistency in the actor-action and possessive patterns. Since locatives of this sort have acquired a stable object-location order in Kendall II, these locatives in Kendall I will be interpreted as a groping pattern. That is, I suggest that in Kendall I no formula has been learned for realizing locative statements—hence the vagaries of structure observed—but a formula is learned some time between Kendall I and Kendall II.

Among the remaining combinations there is a suggestion of a pattern in which conjunction or iteration is realized by juxtaposition of words, as indicated by the three combinations, *Kimmy Pam*, *lady man*, and *open close*, together with a fourth example, *Kendall Mommy*, that occurs as the actor constituent of *Kendall Mommy walk*. If valid, these represent a fourth kind of pattern in which the semantic relation is symmetrical and the surface structure necessarily neither groping nor positional. There does not seem to be any sufficient basis in the Kendall I corpus for hypothesizing further patterns.

Kendall II comprises a corpus of 152 combinations recorded when the MLU was 1.48. Of these, 26 seem to be useless for purposes of analysis because they are ambiguous or uninterpretable, leaving a corpus of 126.

(These 126 include all those to which Bowerman's appendix C gives a syntactic classification in terms of adult English categories, and also include some combinations which seem to me usable that she indicates to be ambiguous or which belong to her "miscellaneous or uninterpretable" category.) Bowerman herself provides no analysis or discussion of this corpus. The 126 combinations are tabulated in table 3.

It can be seen that the actor-action pattern continues to be highly productive. There are 41 such combinations, 38 in actor-action order and three reversals. In six of the combinations the action term now contains both verb and noun. The possessive positional pattern is again well represented.

The locative forms are more developed than in Kendall I. Again, the combinations in which the location is expressed by *here* or *there* are discussed separately from the combinations in which the location is indicated by an English noun or word other than *here* or *there*. *Here* or *there* occurs last seven times and first three times, so these combinations do not meet the criterion for a positional pattern. Since these are not Kendall's first combinations with *here* and *there*, they do not satisfy the conditions for a groping pattern. There is no interpretation of these forms that is even moderately certain; however, what I suspect is that there was really a positional pattern at Kendall I with *here* last (which a larger Kendall I corpus would have revealed), and that between I and II Kendall learned that *here* and *there* can occur first as well as last in English. If this speculation is true, the apparent freedom of order in Kendall II would be due to Kendall having learned both orders. A subtle semantic difference between the two orders is also possible: *here* first might be used primarily for showing an object (see "Jonathan," below, and the later subsection "Free Word Order?").

Turning now to the combinations where a word other than *here* or *there* indicates the location, we find 11 combinations, 10 in which the location occurs second and one that may well be a reversal. These meet the criteria for a positional pattern. Thus, for these combinations, the groping pattern of Kendall I becomes a positional pattern at Kendall II. The location is stated last in the pattern, and the entity located, stated first, can be either an object or an action (e.g., we have *play bed* and *sit pool* as well as *towel bed* and *Kendall pool*). There are also a few three-term combinations in which we have actor and action as well as location (*Ben swim pool*, etc.). The underlying semantic structure of these could be event-locative (e.g., an event that is expressed using an actor-action formula, *Ben swim*, and then located in the pool), or it could be actor-action (e.g., an actor, Ben, performing an action, *swim pool*, that has been generated from the locative formula); or, of course, it could be either of these, depending on the speaker's

TABLE 3

KENDALL II: WORD COMBINATIONS

Actor/Action			
Kimmy spit	Kendall bite	Kendall Kristin[f] sit	Melissa bounce
Kimmy come	Kendall break	Daddy pick up	Melissa read
Kimmy swim	Kendall turn	Daddy break it	Phil running
Kimmy blow	Kendall fix it	Mommy bounce	Pam running
Kimmy bite	Kendall bath[a]	Mommy sleep	Scott scream
Kimmy running	Kendall shower	Mommy read	cow moo
Kimmy eat	Kendall book[b]	Mommy break it	doggy bark
Kimmy eat hand	Kendall spider[c]	Mommy . . sew doggy	doggy woof[h]
Kimmy ride bike	Kendall turn page	Mommy pick up . . Kendall	
Kendall bark	see Kendall[d]	Mommy fix it . . ear	
Kendall swim	Mommy hit Kendall[e]	hug Mommy[g]	

Possessives			
Kendall rocking-chair	Kendall presents	Kimmy bike	pig tail
Kendall turn	Kendall dinner	Kimmy pail	cow tail
Kendall pail	Kendall doggy	Kimmy doggy	daddy tail . . nope
Kendall birthday	Papa door	doggy hole	

Locatives			
there cow	sit there	towel bed	lotion tummy
here mess	Kimmy change here[i]	play bed	ear outside
here moonbook	Kimmy kick there[j]	Kendall pool	Kendall down
mess here	Kendall innere	sit pool	where doggy go?
pillow here	Kendall innere bed	Kendall water	where pillow go?
	Kendall bed	water Ben[k]	

Actor-Action-Locative			
Ben swim pool	Kristin sit chair	Kendall play bed	Kendall crying there

Identification or Class Membership			
that Kimmy	that Kimmy ball	Mommy lady	Kendall monkey
that Scott	that . . candy	Daddy Shawn[l]	Kimmy monkey
that lady	that Daddy's	Kurt boy	Scott monkey too
that hole	that blow	hair wet	

Other Combinations			
more lotion	picture Kendall[m]	pillow fell	open . . lotion
Kimmy Phil[f]	Kendall picture[m]	thread break	Kimmy kick[o]
poor doggy	picture water	break Fur-book	Kendall pick up[p]
blue Mommy	shoe off	read . . book	look Kendall
big bed	fell off	writing book	doggy look it[q]
dear . . horsie	hat on	leave it heel	Kimmy look at Kimmy[r]
red Kendall	lotion away	bite finger	see running
		doggy sew[n]	

SOURCE.—Bowerman 1973a, appendix C.
[a] "Kendall takes a bath."
[b] "Kendall is reading a book."
[c] "Kendall looked at a spider."
[d] "Kendall sees."
[e] "Kendall hit Mommy."
[f] "——— and ———."
[g] "Mommy hugs."
[h] "Doggy says 'woof.'"
[i] "Change Kimmy here."
[j] "Kick Kimmy there."
[k] "Ben is in the water" or "In the water with Ben."
[l] "Daddy is named Shawn."
[m] "Picture of Kendall."
[n] "Sew doggy."
[o] "Kick Kimmy."
[p] "Pick up Kendall."
[q] "Look at the doggy."
[r] "Look at Kimmy."

19

communicative intent. The possibility of this sort of hierarchical organization is implicit in the suggested semantic basis of the formulae.

A new pattern that emerges in Kendall II is exemplified by the combinations concerned with identification or class membership. There may be two subpatterns here: *that* + X "that's (a) X," and X + Y "X is (a) Y." Both meet the statistical criterion for a positional pattern. Kendall I actually contains three utterances—not consistently ordered—that are forerunners of this set, but one could not foresee from the Kendall I corpus that these would be a growth point. This collection of utterances provides an excellent example of structural development by the emergence of new formulae, a phenomenon noted in Braine (1963).

There is another set of combinations in Kendall II that merits discussion. Among the "Other Combinations," and also elsewhere in the table, there are a number of combinations that include both an English verb and a noun which would be the object noun in the nearest adult English sentence. In 15 combinations, there is no actor constituent also present, and in these 15, seven have the adult object before the verb (*thread break, doggy sew, Kimmy kick, Kendall pick up, doggy look it, Kimmy change here*, and *Kimmy kick there*), seven have the usual English order (*break Fur-book, read book, writing book, leave it heel, bite finger, open lotion*, and *look Kendall*), and one has the object on both sides of the verb (*Kimmy look at Kimmy*).[3] The apparently free word order in this group argues that Kendall has not learned any rule that generates English verb-object forms in verb-object order. There are also seven combinations that contain an actor constituent as well as verb and putative object; six of these have the usual English actor-verb-object order (*Kimmy ride bike, Kimmy eat hand, Kendall turn page, Mommy sew doggy, Mommy pick up . . Kendall*, and *Mommy fix it . . ear*), and the other has the reverse order (*Mommy hit Kendall*). The fact that the actor constituent tends to occupy first position when it is present is accounted for by the well-learned actor-action schema, and does not imply that Kendall has learned anything about the proper position of the object noun. In sum, there is no verb-object formula for composing action phrases in Kendall II; at best there is evidence for a groping pattern, whose semantic basis is obscure.

The two assumptions, that there is an actor-action schema, but no verb-object formula, do not explain why the verb is in the middle in all seven three-term combinations. It is possible that Kendall has learned to put the term for the act in the middle, but there are also simpler explanations for

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[3] *It* has not been counted as an object noun, because the existence of forms like *leave it heel, doggy look it* ("look at the doggy"), etc., suggests that for Kendall *it* is part of the verb.

the absence of the subject-object-verb order. Thus, some of the verb-object forms may have been rote learned as wholes (e.g., *ride bike* in *Kimmy ride bike*, and *turn page* in *Kendall turn page*); in two the putative object may be last because it was added as an afterthought (e.g., *Mommy pick up . . Kendall*, *Mommy fix it . . ear*).

There are no other sets of combinations in Kendall II that offer adequate evidence for any undisclosed syntactic competence on Kendall's part.

SEPPO

Bowerman (1973a) also contains two corpora from a Finnish boy Seppo, one when he was 23 months old with a MLU of 1.42 morphemes and the other at 26 months with a MLU of 1.81; and in addition, a corpus from a Finnish girl, Rina, at 25 months when her MLU was 1.83. The corpora are from language samples taken at weekly intervals from both children over a fairly long period. The corpus from Rina and the second from Seppo are rather advanced for this review, so only the first corpus from Seppo will be discussed in detail. This consists of 111 word combinations. Of these, four consist of one word coupled with a vocative, and a further 30 seem uninterpretable in context. (The latter are the last three utterances of appendix E and the utterances numbered 22 through 48 of appendix G of Bowerman [1973a]; all are labeled by her as being of uncertain, unique, or uninterpretable structure.) The remaining 77 combinations have been tabulated in table 4.

Bowerman analyzes Seppo by presenting two grammars that generate the bulk of his utterances, one a transformational grammar that uses the formalism of Chomsky (1965), and the second a case grammar modeled on Fillmore (1968). Her main goal is to investigate whether these kinds of grammars can adequately represent children's language. She concludes that both are unsatisfactory in some ways, although she prefers the case to the transformational grammar. The adequacy of such grammatical systems of representation is considered in detail later on in this paper, and Bowerman's points are reviewed then.

A serious difficulty with Bowerman's presentation of her data is that she provides no discussion, prior to presenting the grammars, designed to establish what constructions can, on the evidence of the corpus, be reasonably taken as productive. There is no statement, apart from the grammars and the corpus, of the empirical facts that a grammar of Seppo should represent. The empirical bases in the corpus for the rules of the grammars seem very mixed: some rules are based on patterns that seem clearly productive; other

rules seem hard to justify. For instance, Bowerman's grammars represent Seppo as having a productive verb-object construction, a productive noun-plus-locative pattern, and a productive modifier-plus-noun pattern with the modifier either an adjective or a noun (i.e., an animate noun as possessor); all of these are disputable. A descriptive statement of the facts that is independent of any grammar seems particularly important since the grammars themselves are not claimed to be fully adequate. It is a necessary preliminary to a consideration of what kind of formal representation would be adequate. The remainder of this subsection attempts to provide such a descriptive analysis of the corpus.

In table 4 it can be seen immediately that more than half the combinations consist of actor and action: in 36 combinations the first word identifies some person or animal that performs an act indicated by the second component, and four combinations contain the components in a different order. In all essential respects the pattern is strikingly similar to Kendall's: it is positional, its productivity is clear from the fact that some of the combinations are obviously inventions, it has the same kind of content, and any part of speech of the adult language can do duty as the action term.

In discussing the locatives, the two forms with *pois* "away" will be ignored, and, as with Kendall, the combinations with *tuossa* "there" will be discussed separately from the locatives with forms other than *tuossa*. The forms without *tuossa* show all the earmarks of a groping pattern: of the seven combinations, four are in one order, two in the other, and there is one circular form; there is hesitation; there are the first locatives, and there is a later stage of development where the statistical criteria for a positional pattern are met (e.g., table 14 of Bowerman [1973a] shows that at time periods IV–VI there were 20 combinations of a noun with a locative noun, and in 18 of these the locative was stated second). The forms with *tuossa* could conceivably represent a groping pattern, since there is a later stage (Bowerman's third time period in her table 14) which meets the statistical criterion for a positional pattern. I return to these forms of Seppo's later on when all the data on the prevalence and basis of free word order at early stages of development are brought together.

Among the remaining combinations there are four possessives. Three are in one order and one in the other, and Bowerman reports that two had been said by the mother earlier in the recording session. These seem to be insufficient data to conclude that there is already a possessive positional pattern (although there is one in the later Seppo corpus). The three combinations with *rikki* "broken" suggest a possible groping for how to say that something is broken. The three combinations with *pois* used in the sense of

TABLE 4

SEPPO'S WORD COMBINATIONS

Finnish	English Gloss	Finnish	English Gloss
Actor/Action			
äiti . . avaa	mother opens	vauva aa-aa	baby sleeps
äiti lukee	mother reads	pupu heittää	bunny throws
äiti juo kahvi	mother drinks coffee	pupu leikkii	bunny plays
kuorii äiti	peels mother	pupu . . korjaa	bunny fixes
	= mother peels	pupu ajaa	bunny drives
isä itkee	father cries	pupu ajaa tuftuf	bunny drives train
setä tuu	man blows horn	pupu ajaa bm-bm	bunny drives car
setä polttaa	man burns	bm-bm pupu ajaa	car bunny drives
setä tanssii	man dances		= bunny drives car
tipu laulaa	chick sings	pupu laittaa bm-bm	bunny sets up car
laulaa tipu	sings chick	kissa pois	cat [goes] away
	= chick sings	kissa ajaa bm-bm	cat drives car
tipu katsoo	chick watches	ammu pois	cow [goes] away
tipu . . lentää	chick flies	pois api	[goes] away monkey
tipu . . ui	chick swims		= monkey goes away
tipu kuti	chick tickles	nöf pois	piggy [goes] away
tipu pois	chick [goes] away	nöf hakkaa	piggy pounds
tipu mamma	chick [eating] food	fantti lukee	elephant reads
täti mamma	lady [serving] food	fantti uffuf	elephant naughty
	[to bear]	nalle aa-aa	teddy sleeps
hauva pois	dog [goes] away	nalle ajaa . . kan	teddy drives tractor
hauva . . pippaa	doggy injures	humma aa-aa	horsie sleeps
		humma kukka	horsie [eats] flower
Locatives			
tipu kenkä	chick [on] shoe	pipi tuossa	sore there
auto talli	car [to] garage	tipu . . tuossa	chick there
talli . . bm-bm	[to] garage car	tuossa kenkä	there shoe
ankka vettä	duck [to] water	tuossa ammu	there cow
ankka puu	duck [to] tree	tuossa . . tuftuf	there train
ulo takki	[to] outside coat		
kuorma . . talli	truck . . garage	pois talli	away [to] garage
. . kuorma	. . truck	lauta pois	[off] plate away
Other Combinations			
isä kello	father['s] clock	bm-bm . . käy	car goes
setä kello	man['s] clock	auto auto auto . . käy	car car car goes
täti auto	lady['s] car	bm-bm kovaa	car [goes] fast
hauva . . tädi	dog lady's	kovaa kovaa ko-	[goes] fast . . car
		vaa kovaa . . bm-bm	= car goes fast
pikku kala	little fish		
mamma uffuf . . uffuf	food dirty dirty	ajaa bm-bm	drives car
rikki . . bm-bm	broken car	rake . . tuftuf	builds train
rikki . . auto . . rikki	broken car broken	laittaa . . bm-bm	sets up car
rikki . . bm-bm rikki	broken car broken	auto vetää	car pulls = pulls car
mamma pois	[take] food away	hinaa rikki rikki	tows broken broken [car]
kirja pois	[take] book away	rikki vetää	broken pulls
takki pois	[take] coat away		= pulls broken car
	= take coat off		
takki kiinni	[put] coat closed		

SOURCE.—Bowerman 1973a, appendixes E and G.

"take away" are consistent in order but are not enough to meet the criterion for a positional pattern.

Most of the forms not yet discussed have to do with the movement of vehicles. The first three of the four combinations which state that a car is going or going fast were classified by Bowerman with the actor-action forms, and this may well be correct, although one notes that there is a good deal of hesitancy and word repetition in this set as well as one order reversal. The remaining six combinations are apparently modeled on adult verb-object forms; to these we must add the seven cases of verb-object forms that serve as the action term of actor-action combinations. Adding them provides a corpus of 13 potential verb-object forms for discussion. The objects are not inflected to indicate their object status, but most of them are either baby words or, like *rikki*, not inflectable Finnish nouns. (Seppo lacks case endings other than the nominative.) Bowerman's grammar treats Seppo as having a productive verb-object construction, with verb preceding object. There are 10 different combinations among the 13: *ajaa tuftuf* "drives train," *ajaa kan* "drives tractor," *ajaa bm-bm* "drives car" (occurring three times), *bm-bm . . ajaa* (a deviant order that occurs in *bm-bm pupu ajaa*), *laittaa bm-bm* "sets-up car" (twice), *auto vetää* "car pulls" (= "pulls car"), *rikki vetää* "broken pulls" (= "pulls broken [car]"), *hinaa rikki* "tows broken [car]" (the towing and the pulling are the same action), *rake . . tuftuf* "builds train," and *juo kahvi* "drinks coffee." Seven of these forms clearly have to do with movement of the vehicle identified in the combinations (by driving or pulling/towing it), and *laittaa* (and conceivably *rake*) may also refer, in context, to movement of some sort. (*Juo kahvi* is clearly a foreigner in this set and could well have been learned as a unit.) There are two objections to the claim that Seppo has a productive verb-object construction. The first is that the order is not consistent since three of the combinations are not in the dominant order. The second is that the claim is far too general: most of the combinations have to do with a very specific semantic domain that is far narrower than implied by the term "verb-object." It seems to me that the most that could be claimed is that Seppo is groping for the means of expressing movement in a way that permits both the object that moves and the agent of the movement to be simultaneously expressed. It seems very relevant here to compare the four combinations with *käy* "goes" and *kovaa* "fast" with the combinations with *ajaa*, *vetää*, and *hinaa*. The play situation in which Seppo could appropriately say *kissa ajaa bm-bm* "cat drives car" would also be appropriate for saying *bm-bm käy* "car goes"; necessarily the car must go if it is being driven. In such a situation the term "actor" is inevitably ambiguous: the car is "actor" vis-à-vis the movement (i.e., it moves) but not vis-à-vis the causation

of movement (i.e., the driving). Such causative-noncausative oppositions are of course very common in natural languages (e.g., *George went to Boston: The boss sent George to Boston*, *The piece went in the puzzle: The child put the piece in the puzzle*, *The man fell: Something knocked the man down*, etc.). Verbs like *drive, pull, tow, send, knock down* are often called "causative" in contrast to verbs like *go, fall*, etc. (In this paper, I shall use the term "agent" only to refer to the semantic role of the subject of causative verbs; i.e., "agent" and "actor" will not be used synonymously.)

It seems to be a fact about the Kendall and Seppo corpora that the great bulk of the actions sampled in the actor-action pattern are essentially simple ones where the concept "actor" applies unambiguously (e.g., sleeping, walking, reading, making a bowel movement, saying "oops," etc.). Parts of the language where an actor-action schema might be hard to apply are, for the most part, simply not sampled. Thus, there are very few combinations modeled on adult sentences with inanimate objects as subjects, and few causative verbs are used. When the children do attempt sentences where something more than a simple actor-action schema is needed, there is ample evidence that they are unsure what the word order should be. Thus, Seppo's treatment of vehicles moving and being moved suggests that he is at best groping for a rule that would order these cases; in Kendall II it was noted that objects that do not fall into the actor role are not consistently positioned (e.g., *Kendall break, thread break, break Fur-book*, where it may be clear to Kendall that she is actor vis-à-vis the breaking but not clear what should be done with the thing that gets broken). Such phenomena can be taken as evidence that Kendall and Seppo have acquired an actor-action schema and also that they have acquired little beyond this schema that relates to the composition of action phrases.

SIPILI

Kernan (1969) provides corpora on two Samoan children. The corpus on Sipili contains 104 combinations; he was 25 months old and had a MLU of 1.52 morphemes. The corpus is tabulated in table 5.

Kernan uses a form of case grammar to describe the corpus, preferring this to either a pivot-construction approach or an orthodox transformational grammar, on the main ground that a case grammar incorporates semantics as part of the syntactic description itself. However, his grammar implicitly claims that several constructions (e.g., actor-action, verb-object, verb-locative) are productive that are only marginally represented in the corpus and for which no evidence justifying the assumption of productivity is given.

TABLE 5

SIPILI'S WORD COMBINATIONS

Samoan	English Gloss	Samoan	English Gloss

Article-like Identification Pattern

Samoan	English Gloss	Samoan	English Gloss
le ili	the fan	'o NAME[a]	
le ulu	the head	(15 different names)	
le isu	the nose	'o 'oe	'o you
le lole	the candy	'o a'u	'o me
le a'oga	the school	'o taliga	'o ears
le polo	the ball	'o lole	'o candy
le amo	the yolk	'o ma'a	'o coral
le lago	the fly	'o le va'a	'o the boat
le ota'ota	the rubbish	'o le pua'a	'o the pig
le apa	the tin can	'o le vai	'o the water
		'o le moli	'o the orange
		'o le apa	'o the tin can

Possessives and Possessive-like Forms

Samoan	English Gloss	Samoan	English Gloss
o a'u	of me = mine	sia 'oe	this [of] you
a a'u	of me = mine	lea 'oe	that [of] you
va'a a'u	boat me = my boat	pai Tafale	pie [of] Tafale
lole a'u	candy me	fale Sina	house [of] Sina
lole a a'u	candy of me	paluni mama	balloon [of] mama
polo a'u	ball me	matou mea	we (= our) thing
polo a a'u	ball of me		
nila a'u	bicycle me	ma NAME	and NAME
nila a a'u	bicycle of me	(nine different names)	
mea a'u	thing me	ma NAME	for NAME
mea a a'u	thing of me	(two different names)	
paluni a'u	balloon me	ma NAME	with NAME
paluni o a'u	balloon of me	(one name)	
a'oga a'u	lessons me	ma a'u	and me
taupega a'u	swing me	ma 'oe	and you
le a'oga a'u	the school me	ma lole	and candy
le isu o a'u	the nose of me		
o 'oe	of you = yours	paluni ma Fai	balloon for Fai
a 'oe	of you = yours	tapale ma 'oe e	hit for you[b]
lole 'oe	candy you		
lole o 'oe	candy of you	tapale 'oe	hit you
polo 'oe	ball you	sasa a'u	spank me
		fasi 'oe	beat you (= me)

Other Combinations

Samoan	English Gloss	Samoan	English Gloss
le: 'ai	not eat	(e) alu Va	go Va = Va goes by
le: 'ai Upuia	not eat Upuia[c]	alu fale	go home (command)
le: 'ai 'oe	not eat you[c]	fia ti'o	want defecate
le: 'ai lole	not eat candy	fai galuega	do work
le: ofi	not fit [me]	'aumai Keith	bring Keith
le: 'aua	no don't	'aumai Tasi	bring Tasi
		ave a'u	take me
polo lea	ball that (= there)	fa'asusu teine	nurse girl (?)
lole 'oe lea	candy [of] you there	matou tamaiti	we children
la'u lole lea	my candy there	tamaiti matua	children older
i ofu	in [the] shirt		= older children
		ta'avale ai lea?	whose car is that?

SOURCE.—Kernan 1969.
[a] 'o is glossed as "sign of the nominative."
[b] Kernan provided no gloss for e.
[c] Upuia (/you) is not to eat.

The discussion of the corpus here is primarily concerned with arriving at a description of the patterns that can be justified from the corpus.

The combinations that are listed under "Article-like Identification Pattern" mostly occurred in response to "What?" or "Who?" questions. The particles 'o "sign of the nominative" and *le* "the" often occurred as part of the question frame. These combinations obviously exemplify simple positional patterns and seem similar in their identifying functions and their constant-plus-variable form to the common formulae *it's* (*a*) *X*, *that's* (*a*) *X* of some English-speaking children. (On the other hand, 'o and *le* are not demonstratives or proforms in adult Samoan.) Kernan reports that it was not easy to get Sipili to talk, and the large number of identifying forms in the corpus well may be due to the use of "What?" and "Who?" questions in an effort to get him to talk.

The possessives also exemplify a small set of positional formulae. They have the item possessed first, and the majority have either *a'u* "me" or *'oe* "you" last, and the prepositions *o* or *a* "of" may accompany the pronoun or be omitted. Three possessives have a name rather than these pronouns. One combination *matou mea* has possessor and possessed in the opposite order from the other possessives; I think it comes from an alternative way of expressing possession in Samoan, of which this phrase has probably been rote learned. The combinations with *ma* as first component also conform to a positional pattern, but it is unclear whether they have one or several semantic values. *Ma* is variously glossed by Kernan as "and," "with," or "for," but he does not say whether these different glosses represent genuinely different concepts or whether Samoan has some custody-related concept expressed by *ma* that is difficult to translate always by a single English term. The gloss "for" and the combination *palugi ma Fai* "balloon for Fai" suggest that *ma* sometimes expresses a concept related to possession. (In English, the difference between *Fai's balloon* and *balloon for Fai* would have to do with the time of Fai's possessing the balloon, not with the fact of his possessing it.) However, since there are only two combinations of the full form *X ma Y* meaning "X for Y," one cannot conclude that this is already a productive formula for expressing possession. The remaining three forms *tapale 'oe*, *fasi 'oe*, and *sasa a'u* "hit, beat, or spank you or me" are presumably adult verb-object forms. However, they are very similar in surface structure to Sipili's possessives and also very similar in semantic content to each other and to *tapale ma 'oe e*, which is overtly marked as possessive. So the simplest assumption is that they belong to Sipili's possessive positional pattern. It is usual in languages for the concept of possession to be extended so that unpleasant or pleasant experiences are "possessed," and *tapale ma 'oe e* makes it plausible that this happened in Sipili's case, although of course one cannot be sure.

27

Among Sipili's other combinations there is a possible positional pattern with the negative *le:* in first position. However, the variety of forms negated is very narrow—four of the six combinations have to do with not eating—so it is unclear what has actually been acquired. There are also three locatives with *lea* "there" in final position, but these are insufficient to meet the statistical criterion for a positional pattern. It is hard to see much evidence for pattern in the remaining combinations, although Bowerman, in discussing this corpus, argues for a productive verb-subject pattern on the basis of the three combinations *alu Va*, *'aumai Keith*, and *'aumai Tasi*. These seem to be quite insufficient to support such a claim. One can see, in Bowerman's own subjects, Kendall and Seppo, what a corpus from a child with a productive actor-action pattern can look like, and Sipili's corpus is impressively different from these, with actor-action forms conspicuous by their relative absence. The lack of an early actor-action pattern is something shared with the corpora from Andrew, Gregory, and Steven.

TOFI

Tofi is the other Samoan child studied by Kernan. The corpus was recorded during three sessions when Tofi was 26 months old. Her MLU was 1.6 morphemes. Her word combinations are listed in appendix A of Kernan (1969). Of the 74 word combinations listed, seven are uninterpretable, a further six are combinations only because they contain vocatives or exclamations, and two combinations are phonological variants of each other. This leaves an effective corpus of 60 combinations, which have been tabulated in table 6. All vocatives and exclamations have been omitted. The headings under which combinations are listed are mine but are based on the glosses provided by Kernan. As with Sipili, my discussion will aim for a descriptive statement of the patterns that can be justified from the corpus.

Tofi is clearly more mature linguistically than the other children reviewed so far: she is older, her MLU is longer, the combinations in the table have more variety, and, as compared with the other children, a higher proportion of them are three words or longer. Given her maturity, a mere 60 different word combinations constitute an extremely small corpus to work with, and any conclusions about productivity and the probable bases for it must be more speculative than for the other children. A corpus at least twice as large would be needed to have data comparable to that available on the other subjects. Another fact that makes this corpus difficult to interpret comes from the structure of Samoan. The dominant word order in Samoan is verb-subject-object, although considerable freedom of order is possible (Schwartz 1972). This means that in Tofi's utterances one cannot expect

TABLE 6

Tofi's Combinations

Samoan	English Gloss	Samoan	English Gloss
Movement-to Locatives			
alu lea![a]	go there!	tu'u lalo!	put down!
alu Usu lea	go Usu there[b]	lifo lalo!	set down!
pa'u: pepe lalo	fall baby down[b]	mai lea!	bring there!
pa'u: pepe o sami	fall baby into sea[b]	('au)mai pepe lea!	bring baby there!
		mai mea lea!	bring thing there!
ave ese!	take elsewhere!	mai lole pepe!	bring candy [for] baby!
Actor/Action			
o nofo pepe	sits doll[b]	ti'eti'e teine	rides girl[b]
o nofo ia pepe	sits—emphatic—doll[b]	ave Siaoloau	take Siaoloau[b]
savali pepe	walks doll[b]	mai Usu	bring Usu[b]
pepe moe	baby sleeps	ma:lo: Usu	won Usu[b]
e (o) moe pepe	sleeps baby[b]	fa'ali'i pepe	is-headstrong baby[b]
Movement Verb (Noncausative) + Object Moved			
pa'u: mea	fall thing[b]	alu ta'avale	goes car[b]
pa'u: teine	fall girl[b]		
pa'u: lole	fall candy[b]	a'u Usu[c]	goes Usu[b]
pa'u: ta'avale	fall car[b]	pa'u: pepe[c]	fall baby[b]
Movement Verb (Causative) + Object Moved			
'aumai isi!	bring other!	'avatu pepe toi!	give baby-toy (= doll)!
'aumai mea isi!	bring thing other![d]	ese lima!	[move] away hand!
mai pepe!	bring baby!	tia'i mea!	get-rid-of thing!
mai lole!	bring candy	tia'i pepe 'oe	get-rid-of baby you[e]
tu'u lima!	put [down] hand!		
Other Transitive Verb and Object			
ta'ita'i lima!	hold hand!	fai pepe!	do baby!
si'isi'i pepe!	hold baby!	e (o) fo'e lole!	unwrap candy!
si'isi'i tama!	hold boy!	fi vae!	cross legs!
si'isi'i teine!	hold girl!	fi vae pena:!	cross legs like-this!
va'ai le lima!	look-at the hand!	vae tu'itu'i	feet hit![f]
Want			
fia moe	want sleep	fia pa'u: pepe	want fall baby
fia moe lava	want sleep very-much	fia ofu pepe	want clothes baby
fia moe pepe	want sleep baby	fia 'ai lole pepe	want eat candy baby
Other Combinations			
pepe gau	baby hurt[f]	'aua fa'ali'i!	don't be-headstrong!
uma mea	finished thing[b]	'o pepe	'o baby[g]
fea Punefu?	where [is] Punefu?	'o mata pepe	'o eyes baby (= doll's eyes)
fea pepe?	where [is] baby?	pepe 'oe	baby you (= your doll)
Keith lea	Keith there		

Source.—Kernan 1969, appendix A.
[a] "!" indicates that an utterance is a request.
[b] The noun and verb of the gloss should be interchanged to obtain the meaning: Usu goes, doll fell, doll sits, etc.
[c] Occurs only as part of a longer utterance in this corpus.
[d] Bring other thing!
[e] You got rid of the baby.
[f] hit feet, baby hurt/hurt baby; both combinations reverse the normal Samoan word order.
[g] 'o is glossed by Kernan as "sign of the nominative."

subject and object to be distinguished by sentence position unless both subject and object are present. There are only two sentences in the corpus which contain words representing both subject and object in adult Samoan. These are *tia'i pepe 'oe* "get-rid-of baby you" = "you got rid of the doll", and *fia 'ai lole pepe* "want eat candy baby" = "the doll wants to eat the candy." (Another possible translation of this last sentence is mentioned later.) In both cases the order is verb-object-subject, which is not the dominant Samoan order and hence suggests that Tofi has not acquired any rule ordering subjects and objects relative to each other. Kernan does not discuss Tofi's word order in relation to that of adult Samoan. His grammar for Tofi contains rules that freely generate three-term strings with the order verb-object-agent. Such rules are hard to justify given that they are based on only two utterances that apparently do not follow the dominant Samoan form.

The most transparent positional pattern in table 6 is the one headed "Movement-to Locatives." The first word is always a movement verb (*go, fall, take, put, set, bring*), and the last word always indicates the location to which the movement takes place. The object that moves may or may not be stated, but if it is stated it goes between the verb and the locative. (The moving object would of course be the subject noun in adult Samoan in the case of the intransitive verbs and would be the object noun in the case of the causative verbs *take, put, set,* and *bring*.) It should be noted that Tofi's locative pattern is semantically different from the locative pattern in Kendall II: Kendall's locatives always say where some object or action is located, and the located item is frequently indicated by an adult noun; Tofi's locatives indicate direction or goal of motion and are always partnered with adult verbs.

The next four sets of combinations in table 6 all represent kinds of adult verb-noun sequences. There are, first, some actor/action forms which are very like those of Kendall and Seppo, except that in Samoan the actor is last and the action first. Then there is a group of combinations in which a noncausative movement verb (*go* or *fall*) is followed by the object moved. The next group also consists of movement verb and object moved, but in this set the verbs are all causatives, and the utterances are almost all requests. Fourth, there are some other combinations of an adult transitive verb and object noun, which are also almost all requests; of this last set, *e (o) fo'e lole!* "unwrap candy!" is an oft-repeated request, and *fi vae!* and *fi vae pena:!* "cross legs (like-this)!" are probably also rote learned, but the four combinations with *ta'ita'i* and *si'isi'i* "hold" could well be part of a productive pattern. It seems likely that there are at least two different positional patterns represented in these four sets, one pattern in which the second component

is the actor, and the other in which it is the patient of the action. However, it is hard to be sure that this is so since the positions of actor and patient are not differentiated in Tofi's speech because of the structure of Samoan, as noted above. Nevertheless, it is clear that when Tofi requests that something be moved she uses a Samoan causative verb (e.g., *mai* "bring"), whereas when she reports movement she uses the intransitives *alu* "go" and *pa'u* "fall." This fact indicates that she must distinguish causative and intransitive movement verbs on some basis. This fact in turn suggests that she may have some sort of agent-patient contrast. The two patterns probably are: one, a sequence of action + actor, which would include the combinations of *go* and *fall* with both animate and inanimate actors; the other, a sequence of act + patient, used as a request to somebody to carry out the act on the patient. In the act-patient pattern, the acts are most commonly movements of objects and the patients the objects that are moved; however, the semantic domain of the pattern includes some manipulations of objects, notably holding, that are not necessarily movements.

The corpus provides some evidence for one further positional pattern, a request pattern in which the first component is *fia* "want." The semantic status of *pepe* "baby" in four of the combinations is not clear: for example, *fia moe pepe* "want sleep baby" could mean either "baby wants to sleep" (the translation gives by Kernan), or "I want the baby to sleep." Given that the "baby" is apparently a doll, Tofi's intent seems bound to be obscure. The corpus contains no instances in which she assigns to others wants that are clearly not her own.

The remaining combinations contain too few instances of any potential pattern to justify discussion.

JONATHAN

Jonathan I is a corpus of my son Jonathan's word combinations during the month of June just prior to his second birthday (early July). Jonathan II covers the month of July. A sample of his August word combinations comprises Jonathan III, and of September Jonathan IV, but these two corpora will not be presented and discussed in their entirety. Prior to June he had produced no more than three or four word combinations in my presence, so that, although it is not possible to compute a MLU for the first two corpora, the Jonathan I corpus represents as early a corpus as any in the literature. Except as noted below, the corpora were not tape-recorded but collected in a notebook and include all phonologically clear word combinations that were not echoes of adult phrases or sentences and that were uttered in my

presence when I had notebook and pencil available. The same combination was not written down twice unless a different gloss was appropriate. In addition to material from notes, the Jonathan III corpus includes two tape recordings of approximately $\frac{1}{2}$ hour each from the third week of August. These recordings permitted computations of the MLU, which was 1.4 words in one recording and 1.7 in the other. One might estimate a MLU of around 1.6 for August and presumably lower MLUs for July and June. A tape recording made during the third week of September had a MLU of 2.2, and this provides a rough estimate for Jonathan IV. No analysis of these data has previously been published, although an analysis exists of Jonathan's phonology prior to the stage of Jonathan I (Braine 1974a). The first corpus of 82 word combinations is tabulated in table 7.

Table 7 indicates a number of sets of combinations that meet the criterion for a positional pattern, several being of the constant-plus-variable form. There is a possessive pattern similar to the possessives of children previously reviewed. The two groups of combinations with *big* and *little* in initial position of course express size. It may be observed that most of the words occurring with *little* also occur with *big:* this coincidence is due to the fact that Jonathan often contrasted two objects in consecutive utterances, for example, *big stick* followed immediately by *little stick*, indicating the relative sizes of the two sticks. This sort of behavior seems sufficient evidence for the

TABLE 7

JONATHAN I: WORD COMBINATIONS IN JUNE

mommy bread[a]	big lamb	more juice[b]	red car	see car
mommy shoe[a]	big dog	more bee	blue car	see plane
daddy shoe[a]	big blue	more stick	green car	see tower
daddy car[a]	big bread	more book	red block	
daddy book[a]	big tower	more catch[c]	blue block	eat banana
daddy pipe[a]	big duck	more plane	blue ball wool	eat grape
daddy banana[a]		more dice	green light	
	little stick	more duck		ball there
big plane	little rock	more ball	hot light	more there
big book	little ball	more blue	hot stick	up stairs
big car	little plane	other ball	hot pipe	down there
big sock	little lamb	other book	clean diaper	
big stick	little blue	other banana	old carrot	all wet
big rock	little key	other shoe	hurt toe	all gone
big ball	little duck			shoes on
big chicken	little bread			orange juice
			all gone stick	
			all gone rock	
			all gone blow[d]	

[a] Possessive: "mommy's bread," etc.
[b] *more* remarks on or requests more or another of something.
[c] "Play catch with a different ball."
[d] "No more matches to blow out" (i.e., box empty).

productivity of these size-attribution formulae. The pattern *more* + X is also clearly productive. The pattern consisting of color-word + object name is semantically somewhat peculiar in that he did not use the color terms correctly. Some of these combinations were part of a routine, which he might initiate by indicating an object and prefixing a color word (usually incorrect), for example, *red car* (when the car was, say, blue); the adult would then correct the color, and Jonathan would echo the adult phrase *blue car*. He might then pick up some other object (a green block, say) and use the same color word to yield *blue block*, which might then be corrected, etc. The routine also was played often with the color words alone (i.e., without the objects being named). The combinations in the corpus with *other, hot,* and *allgone* in initial position do not meet the statistical criterion for a positional pattern but do so if the first two corpora are combined. They represent patterns that emerged slightly after the ones just discussed. The remaining combinations provide insufficient evidence of any pattern learning.

Jonathan II contains 197 word combinations. The relatively large size of the corpus is partly due to the fact that the first 2 weeks in July were spent at the seaside, so that other work activities did not interfere with data gathering, and a very substantial fraction of his total output of combinations in these 2 weeks is contained in the corpus. Except for five combinations that are ambiguous, the corpus is tabulated in table 8.

July yields 26 more possessives, of which 24 are ordered with the possessor first and two in the reverse order. One of the deviant forms, *juice daddy* "juice for daddy," is soon repeated in the normal order, and conceivably Jonathan could be correcting himself. The possessives have been listed in the order in which they were produced, and it can be seen that there are several cases of adjacent combinations with the same object and different possessors. This is because Jonathan often made such contrasts in successive utterances. (A similar contrasting of sizes was noted above.)

The corpus clearly shows the positional patterns with *big, little, hot,* color words, *more, other,* and *allgone,* that were established or adumbrated in the June corpus. Two new schemas of the same sort, *hurt* + X and *old* + X, emerge that meet the statistical criterion for positional patterns. *Two* + X is a newly developed very active pattern apparently indicating "more than one." The nine combinations with *wet* or *all wet* seem to indicate a groping pattern, since they show hesitancy and contain both orders as well as three circular combinations. The occurrence of this set is of some importance in that it counts against a possible hypothesis that might be posited, namely, that Jonathan was not operating with the independent formulae *big X, little X, hurt X, old X,* but rather had learned a formula of a more abstract

TABLE 8

JONATHAN II: WORD COMBINATIONS IN JULY

Possessives				
daddy coffee	Elliot juice	daddy tea	Elliot cookie	Mommy butter
daddy shell	mommy mouth	mommy tea	Elliot diaper	daddy butter
mommy shell	Andrew book	daddy door	Elliot boat	
Andrew shoe	daddy car	daddy book	daddy eat[a]	this Nina[b]
daddy hat	daddy chair	mommy book	juice daddy	
	daddy cookie	daddy bread	daddy juice	

Property-Indicating Patterns			
big balloon	little hat	all wet . . water . . all wet	blue shirt
big hot	little duck	all wet pants	red balloon
big shell	little shell	all wet . . mommy . . all wet	blue stick
big juice	little ham	daddy all wet daddy all wet	
big pants	little water[c]	all wet ball	hurt Andrew
big lion	little light	shirt wet	hurt fly
big water[c]	little wet	wet nose	hurt knee
big light	little step	shoe wet	hurt plane
big step	little boy	wet diaper	hurt hand
big jump	little bird		
big boy	little tobacco[d]	hot sand	old cookie
big bird	little banana	hot fire	old apple
big tobacco[d]	little spilt	hot tea	old cup
big banana	little hurt	hot ball	old stick
			old egg

Recurrence, Number, Disappearance				
more glass	other door	two spoon	two diaper	one daddy car
more boy	other pin	two fly	two tobacco[d]	
more raisins	other ball	two shoe	two raisins	all gone big stick
more shovel	other hand	two bird	two daddy door	all gone stick
more "O"[e]		two pipe	two daddy	all gone bee
	two plane	two door	two mommy	all gone stone . . all gone
	two stick	two cup	two squirrel	
	two ducks	two car	two bread	

Locatives					
sand ball	"ON"	daddy . . hot ball[f]	"TO"	dog house	"ON"
hand hair	"IN"	ball daddy[f]	"TO"	feet light	"TO"
ball house	"IN/TO"	stick car	"IN"		
man car	"IN"	rock outside	"TO"	in there . . old apple . .	
fly light	"ON"	hand eye	"IN/TO"	in there . . old apple	
sand toe	"ON"	stone outside	"TO"	milk in there	
sand water	"IN/TO"	key door	"TO"	down there car	
sand eye	"IN"	raisin cup	"IN/TO"		

Actor/Action			
mommy sit	daddy work[g]	boy walk	Andrew sleep
daddy sit	daddy sleep	man walk	daddy work[h]
Andrew walk	daddy walk	Elliot sleep	stone daddy[i]

TABLE 8—*Continued*

Other Combinations

have it egg	boom-boom tower[j]	bounce ball	hat on	mommy girl[q]
have it milk	boom-boom car	broke pipe	socks on	daddy boy[q]
have it fork	boom-boom coffee	ride car[k]		
	boom-boom plane	walk car[k]	out car[k]	orange juice
dirty face	boom-boom chair	ride daddy[l]	out chair[n]	apple juice
dirty mouth		walk daddy[l]	back car	grape juice
dirty feet	eat dessert		back raisin[o]	drink water
clean socks	eat fork	daddy window[m]	back eat[p]	butter honey
spilt bread	bite top	window byebye[m]	up bed	sock shoe
spilt raisin	bite block			sit down
				lie down

[a] Occurs twice in the apparent sense of daddy's food; once it refers to a piece of bread he has taken from my plate.
[b] "This is Nina's."
[c] The amount coming from the faucet.
[d] Can of tobacco.
[e] He wants another letter "O."
[f] As he throws the ball to me.
[g] "Daddy is at his desk."
[h] "Daddy is going to the office."
[i] After I threw a stone outside.
[j] "The tower fell down," etc.
[k] "in the car."
[l] "with daddy."
[m] He wants to go to the window to wave byebye to daddy.
[n] "out of the chair."
[o] "Put raisin back."
[p] "Back to eat."
[q] "——— is a ———."

sort, PROPERTY + X, of which *big X*, *hot X*, etc., would be instances. If he had learned this abstract formula, then *wet X* would be an instance, and he should not be groping for the position of *wet*. Hence it looks as if these formulae are substantially independent acquisitions. (Smaller semantic groupings are not ruled out by this observation: e.g., *big X* and *little X* might plausibly be instances of a more general SIZE + X, especially in view of the systematic way he contrasts the two sizes. Also, *more* and *other* are semantically similar and need not be independent formulae.) One final point to be made about this group of patterns is that, for those that indicate properties, the translation into normal English could just as well use the copula form ("the plane is hurt," "the stick is old," etc.) as the adjective-noun form that is like Jonathan's pattern. Thus, *big* and *little* comment on size; the plane is hurt because it has just crashed (*boom-boom plane* was his preceding utterance); *old carrot* comments on the carrot's being partially chewed and left over from yesterday.

As before, locatives with *there* will be discussed separately from those with the location realized in other ways. There were two combinations of the form *X there* in the June corpus and three more containing *in there* or *down there* in July. These have no particular order and suggest a groping pattern. I return to these combinations later. Locatives that do not contain *there* are completely absent from the June corpus but show a very active positional pattern in July, with 18 combinations, 17 in the order object + location. In some of these the locating is, as it were, static: the sand is on the ball,

the man is in the car, etc. In others, marked "To" in table 8, the object is being caused to move to the location stated: the rock is being thrown outside, the feet pointed to the light. In several, the object has just been put or moved to the location, and one cannot tell whether the utterance is concerned with the movement or its end result. What is of interest is that there is no indication that Jonathan is coding these two senses independently: both seem to develop at the same time and to be ordered in the same way.

The July corpus contains several apparent actor-action forms. An interesting fact about these forms is that they seem semantically rather close to locatives: in every case there is a characteristic location associated with the action, such that if, in each combination, one were to substitute the word for this location in place of the action word, one would obtain a combination that would be unhesitatingly classified as locative. Thus, if *chair* were substituted for *sit, outside* for *walk, desk* for *work* (in the first *daddy work*), and *bed* for *sleep*, the resulting combinations would be locatives and they would have been perfectly appropriate to the situational contexts of the actual forms. This fact makes one wonder whether, in July, Jonathan's actor-action pattern is really distinct from his locative pattern. Kendall's and Seppo's actor-action forms are not of this locative-like sort. Moreover, in August Jonathan has a number of actor-action combinations which are semantically clearly distinct from locatives and quite similar to Kendall's and Seppo's.

The other combinations contain nothing that meets statistical criteria for patterning. However, the three combinations of the form *have it* + X are the initial forms of an object-requesting positional pattern that developed in late July and became very active in August. *Boom-boom* + X is quite possibly also a positional formula for saying that something fell down. It may be noted, too, that of the few English verb-object forms in the June and July corpora, five are semantically alike in consisting of *eat* or *bite* followed by the item consumed; conceivably there is some minor pattern here.

The Jonathan III corpus comprises 190 word combinations from August; the September corpus consists of several hundred word combinations collected in the third week in September. Neither corpus is tabulated, and only some points of development out of the July material will be discussed. I have already noted the advent of actor-action combinations that look very similar to Kendall's and Seppo's and also the productive *have it* + X request form. The only completely new formula to develop in August was *this* + X, used as a request for a particular object, sometimes explicitly contrasted with *other* (e.g., *this jam* vs. *other jam*).

An interesting fact about the August corpus is that several of Jonathan's property-indicating patterns that were quite active in July yielded relatively

few combinations in August. Thus, there was only one instance of *two* + X, three of *old*, none of *hot*. He had certainly not forgotten these formulae since there are some instances of each in September. What I suspect happened is that these were patterns that he took pleasure in exercising shortly after they had been learned, but that after a few weeks talking about size, number, etc., ceased to be novel, and by August became an ordinary part of his repertory, to be used only when needed.

The combinations containing *there* and *here* are relevant to the question of the prevalence and basis of free word order at early stages of development. In order that the discussion of this question shall have available as complete data as possible on the developmental sequence, table 9 gathers together all combinations in June through September that contain either *here* or *there* coupled with a content word. The table makes several distributional facts evident. The first is that utterances in which *there* is preceded by a preposition (third col., table 9) have a developmental history of their own: there are no combinations with *in there* or *down there* in June; in July we find both orders, hesitation, and one circular utterance; in August and September we have a positional pattern with *in there* and *down there* following the content word or phrase. Thus the combinations with *in there* and *down there* manifest the now familiar sequence of a groping pattern replaced in time by a positional pattern. In August and September *here* and *there* without a preposition occur both initially (first col., table 9) and finally (second col.). However, there is a distributional difference between these two positions: when *here* and *there* occur first the content word or phrase is always an English noun or noun phrase, but when they occur last they follow English adjectives and verbs as well as nouns. For August and September combined, the difference in the proportion of nouns or noun phrases occurring in the two positions (12/12 vs. 6/16) is easily statistically significant (χ^2 with Yates's correction = 9.0). This difference and also the sheer number of combinations and their apparent fluency make it clear that the existence of two orders is not due to a groping pattern. The explanation that I propose is that two positional patterns have been learned, *here/there* + X and X + *here/there*, and that there is a subtle semantic difference between them. X + *here/there* indicates the location of X, or the location requested for X; naturally what is located can be an action (*bounce, jumping*) or a state of affairs (*hot, wet, allgone*) as well as a thing, and hence one finds some English adjectives and verbs serving as the X term as well as English nouns. In the case of the opposite pattern, *here/there* + X, there are some cases which do not seem to be semantically locative. For example, *there more* "there's more" commented on a vain effort of mine to tune the radio to eliminate static from the loud-

TABLE 9

JONATHAN: WORD COMBINATIONS WITH THERE AND HERE

There+X	X+*There*	X/Preposition+*There*
	June	
	ball there more there	
	July	
		milk in there in there . . old apple . . in there . . old apple down there car
	August	
there more there other one there cereal here milk here balloon	jam there more jam there butter here more milk here wet here wet there bounce here see light there	red light down there man down there door down there
	September	
there book there other book there rhino there hammer there Jonathan pipe here ball here boat	jumping there all gone there make all gone there hot there boy there touch there turn there tea there	wheel back there this dice . . in there too big . . in there flower in there Jonathan in there chalk in there daddy sit down there

speaker; the utterance indicated the continued existence of the static and had little to do with place. *Here boat* "here's a boat" occurred as Jonathan was enumerating a series of objects. All cases are consistent with the hypothesis that the pattern *here/there* + X was used to show or to draw attention to things, indicating their presence or existence. Since it is primarily things that are shown one would expect English nouns overwhelmingly as the X item in *here/there* + X. Thus, again, we do not need to assume any command of the English parts of speech on Jonathan's part to explain the distributional differences among the patterns.

Since the patterns X + *down/in there* and X + *here/there* are both genuinely locative, and both seem to become active positional patterns at about the same time, they may well not be independent patterns; perhaps they

should be expressed by a single, somewhat more complicated, formula: X + *here/(down/in)there*. However, collapsing into one formula requires one to make the plausible assumption that it is an accident that the observed combinations with *down there* and *in there* contain few verbs and adjectives.

ODI

Odi is an Israeli girl who was followed in weekly tape-recorded play sessions from 23 to 26 months of age. The corpus to be discussed is tabulated in table 10; it comprises the 121 different word combinations recorded during the first five play sessions, which covered a 2-week period surrounding Odi's second birthday. The MLU is about 1.4.

The table employs a normalized transcription: words are rendered in the standard Israeli adult pronunciation, except where this would be grossly misleading about Odi's command of inflexion. Odi's pronunciation is, of course, much less complete than that shown: her speech lacks certain phonemes and rarely includes more than the last one or two syllables of multisyllabic words (e.g., *mexapeset tipot af* = [peset potaf], *ze iparon Ima* = [ze on ima]). Vocatives, that sometimes occur both initially and finally, have been omitted.

The table reveals several patterns of the constant-plus-variable type that meet the statistical criterion for positional patterns: *ze* + X, *hine* + X, and *tire/tiri* + X seem to be formulae for indicating or identifying things that are translation equivalents of formulae noted in other children; *efo* + X and *ten/tni li* + X are request forms.

There is evidence for two groping patterns in the corpus. One is among the locatives: in the six combinations in which the location is expressed by a Hebrew noun, in the left-hand column of the table, three have the normal order with the location second and three have the opposite order. This set is essentially similar to the locative groping patterns of Kendall I and Seppo. (The combinations tabulated under "Locatives" in the right-hand column appear to be rote-learned common Hebrew phrases and patternless.) The other groping pattern has to do with the expression of possession. Adult Hebrew expresses possession through the prepositions *šel* "of" and *le* "to," with the possessor expressed by a name following the preposition, or a pronoun suffixed to it (e.g., in the adult language, *sefer šel Aba* "book of Daddy" = "Daddy's book"; also, *yeš sefer le-Aba/yeš le-Aba sefer/le-Aba yeš sefer* "there-is to Daddy [a] book" = "Daddy has a book"). There are five cases in the corpus where a two-word phrase containing both possessor and possessed is embedded as the X item in one of the identifying patterns: *ze iparon Ima* "ze

TABLE 10

ODI'S WORD COMBINATIONS

Hebrew	English Gloss	Hebrew	English Gloss
	Indicating or Identifying Patterns		
pil ze	elephant that[a]	tire kos	see glass
telfon ze	telephone that	tiri rakevet	see train
ze gal	that wheel[a]	tiri kise	see chair
ze agala	that baby-carriage	tire susim	see horses
ze kapit	that teaspoon	tire ofnayim	see bike
ze gumi	that rubber	tiri rakevet gal	see train wheel
ze tiktak	that clock	tire yofi	see pretty
ze sakin	that knife	tiri yofi	see pretty
ze masrek	that comb	tire en	see not-there
ze kufsa	that box	tire kəkəkə	see gallop[c]
ze svivon	that top	tire perax nafal	see flower fell
ze dod	that man	tire kan	see there
ze buba	that doll	tiri buba kova	see doll hat[b]
ze iparon	that pencil	hine migdal	here tower
ze od	that another-one	hine masmerim	here nails
ze enenu	that not-there	hine aviron	here airplane
ze lax	that yours	hine sus	here horse
ze Ima	that Mommy['s]	hine kova	here hat
ze iparon Ima	that pencil Mommy[b]	hine Axi	here Axi
ze Ima miškafayim	that Mommy glasses[b]	hine Ruti	here Ruti
ze Axi tapuax	that Axi apple[b]	hine buba	here doll
ze oznayim buba	that ears doll[b]	hine roš	here head
ze seret	that ribbon	hine bayit	here house
ze traktor	that tractor	hine od	here more
		hine Noa-le	here Noa-le[d]
	Request Forms		
ten la ⎫		efo buba?	where doll?
ten li ⎬[e]	give me	efo Aba?	where Daddy?
tni li ⎭		efo sus?	where horse?
tni li katsefet	give me cream	efo Ima?	where Mommy?
ten li kova	give me hat	efo kova?	where hat?
ten li mayim	give me water	efo mazleg?	where fork?
tni li te	give me tea	efo čokolad?	where chocolate?
ten li oto	give me car	efo kufsa?	where box?
tni li "Elisa"	give me "Elisa"	efo uga?	where cake?
ten li ze	give me that	efo buba-le?	where doll-le?[d]
ten/tni li od	give me more	efo od?	where more?
	Locatives		
yad sefer	[in] hand book[f]	hine kan	here there
gafrurim yad	matches [in] hand	hine šam	here there
seret . . regel	ribbon [on] foot	šam hine	there here
regel seret	[on] foot ribbon[f]	po yeš	here there-is-some
Aba salon	Daddy [in] drawing-room	yeš po	there-is-some here
yad sal	[in] hand bag	yeš kan	there-is-some there
kan migdal	there tower	ma yeš kan?	what is-there there?
doda šama	lady there		

TABLE 10—*Continued*

Other Combinations			
od migdal	more/another tower	sus . . kəkəkə	horse gallop[c]
od ofnayim	more/another bike	Odi alo	Odi hello[i]
odpaam "nadned"	more "nadned"[g]	arye se . .	lion goes . .
odpaam svivon	more [spin] top		
od svivon	more [spin] top	se "nadned"	make/do "nadned"[g]
od dod	more [to the] man	se bayit	make house
od le-doda	more to lady	se brrr	[train] goes brrr
		si odpaam	do again
kova-le	hat-le[d]	azov agala	leave carriage
Noa-le	Noa-le[d]	mexapeset tipotaf	looking-for nosedrops
buba-le	doll-le[d]	kxi zoti kan	take that there
en tipot-af	no nosedrops[h]	kax od	take more
en . . masmer	no nail[h]	masrek sim	comb put = put comb
en li	no; I-haven't any[h]		
en li koax	I have no energy[h]		
lo te	no tea[h]	gam ani	also me = me too
lo kova	no hat[h]	katsefet uga	cream [and] cake
lo yodaat	[I] don't know	yeš od	there's more
		ma ze?	what's that?
		ma yeš?	what's the matter?

[a] In this column, "that" has the sense "that's . . ." or "that's a . . .": "that's an elephant," etc.
[b] Possessives: Mommy's pencil, Mommy's glasses, Axi's apple, doll's ears, doll's hat.
[c] Clicking with mouth to indicate horse galloping.
[d] -le is a diminutive.
[e] *li* is the first person dative pronoun; *la* in *ten la* is an error; Odi sometimes repeats *li* (e.g., ten *li li*) or says *li li* for *tni li*.
[f] I.e., book in hand, etc.
[g] *Nadned* "swing" refers to a song she wants.
[h] *En* usually means nonexistence and *lo* denial or refusal, but Odi also uses *en* and *en li* (lit. "there-is-not-any-to-me") where *lo* is called for; *en li koax* and *lo yodaat* are set rote-learned phrases.
[i] = Odi is telephoning (see text).

iparon *šel Ima*" "that's pencil of Mommy," *ze oznayim buba* "that's [the] ears [of the] doll," *ze Ima miškafayim* "ze miškafayim šel Ima" "that's Mommy's glasses," *ze Axi tapuax* "ze tapuax šel Axi" "that's Axi's apple," *tiri buba kova* "tiri et ha-kova šel ha-buba" "see the doll's hat." In two of these five cases, Odi preserves the standard order of possessed-possessor, and in the other three she reverses it. Later tapes contain scores of possessives (most of them preceded by *ze*, as here), all in the standard Hebrew order. (As time proceeds the preposition *šel* occurs more and more frequently.) Thus, in the emergence of Odi's possessives we seem to have an initial groping pattern preceding a positional pattern.

The remainder of the corpus, listed under "Other Combinations," contains several groups of combinations that do not meet the statistical criterion for positional patterns but where a positional pattern could conceivably be being adumbrated. Thus, there are five combinations with *od (paam)* "more," three combinations with the Yiddish-borrowed diminutive *-le*, and a few negatives. There are also three actor-action forms which are of interest

41

although they are few in number because they contain clear evidence of invention on Odi's part. For example, in one case Odi was pretending to telephone with a toy telephone; I asked her what she was doing and she replied *Odi alo*. In Israel, *alo* "Hello" has a single characteristic usage: as the initial word spoken when picking up the receiver when the telephone has rung. We took her reply to mean "Odi is telephoning." An additional eight combinations are modeled on adult verb and object, one of which reverses the dominant order. Some of them contain a generalized action word, *se* or *si* (from *laasot* "do, make"), followed by a word identifying an action; these may well involve some invention by Odi (e.g., *se* "*nadned*," a request that a certain song be sung, is not likely to have been spoken by adults), and could exemplify a minor positional pattern. The remaining forms are set phrases that are probably rote learned.

A final fact of interest about the corpus is the possibility of a masculine-feminine contrast in some imperative verb forms: *tire* "see," *ten* "give," *se* "make, do," and *kax* "take" are Hebrew masculine imperative forms, contrasting with the feminine *tiri*, *tni*, *si*, and *kxi*. (There are two other masculine imperatives in the corpus, *azov* "leave alone" and *sim* "put," for which the contrasting feminine forms are not present, although the feminine *simi* occurred in the next tape.) While we could not always tell who Odi was talking to independently of the verb form, when we could tell she was almost always talking to someone of the sex appropriate to the verb form. There were enough clear cases to make it unlikely that the observed rarity of error was a statistical accident. There were no errors observed for *tire/tiri*, which was the most frequent pair. This sort of contrast does not occur in any of the corpora from other children I know of. It should be said that Odi certainly does not have a rule for generating masculine and feminine imperatives, or for making a feminine form from a masculine one (or vice-versa), so there must have been some separate learning of the individual forms. But the existence of the contrast, and the fact that she apparently applies it without models to people outside the family (my assistant and myself), argue that she distinguishes the sex of people on some basis and has registered its linguistic relevance when addressing people using these verbs (at least *tire* and *tiri*). It seems to follow that she must have a pair of lexical entries for each verb form, each entry associated with a sex of the addressee.

DAVID

David is a child whom I began following when he was 19 months old, just before his first word combinations appeared. Records were initially kept

by his parents who wrote down David's single words and word combinations that they could identify with confidence. After about a month, many of David's utterances began to contain short syllables that could not confidently be identified with English words, and the need to analyze the nature and distribution of these obscure syllables made the use of tape recordings mandatory. About half the recordings were of play sessions in which I played with David with a parent also present; the others were made by the parents and included mealtimes, playing, having a bath, etc. The David I corpus (table 11) comes from several sessions totaling 2 hours of recording during a 3-week period when David was about 21 months old, and the David II corpus (table 12) covers 3 hours of recordings over a 4-week period when he was 22 months old. A few combinations that were uninterpretable are omitted from the tables. The mean lengths of David's utterances ranged around 1.3 during the David I sessions and around 1.7 for David II.

The combinations listed are not a direct transcription of utterances on

TABLE 11

DAVID I: WORD COMBINATIONS AT 21 MONTHS

Indicating or Identifying Forms			
here wowwow	here pink	here this	here, Daddy, soap
here flower	here jump	here milk	
here bead	here break it[a]	here apple	this one here

Requesting Expression + What Is Requested			
want fix it[b]	want light	want daddy fix it[d]	can-I (truck)
want car	want jump	want open door[e]	can-I-have this
want cookie	want milk	want this	can-I-have soap
want balloon	want baby	want this one here	
want book	want read	want this . . (egg)	gimme . . this . . toy
want (egg)	want Brad	want this . . soap	please get down
want pocket[c]	want soap	want more	[u] get down[g]
want ball	want it	want more milk . . Daddy[f]	[u] get (out)[g]

Other Combinations				
more balloon	sit down	help it	gimme	where apple
more open door[e]	go away	fix it	no mike[h]	where wowwow
more book	come here	break it	no wanna	this one
(David play)	open door[e]	drink milk	I can't	

NOTE.—Parentheses indicate uncertainty of identification.
[a] Indicating broken object.
[b] "I want it fixed."
[c] Wants something from the pocket.
[d] *Daddy* may be an interpolated vocative (see discussion in footnote to the main text).
[e] *Open door* means simply "open" or "open it," e.g., the lid off a box.
[f] He seems to want Daddy to have more milk.
[g] [u] may be *you*, and then these would mean "you get down!" and "you get out!"
[h] After being told not to touch the microphone.

TABLE 12

DAVID II: WORD COMBINATIONS AT 22 MONTHS

Indicating or Identifying Forms

here milk	here cookie	here one	this light
here fix it[a]	here wowwow	here one book[d]	this one book[d]
here car	here more	here this book[d]	this book[d]
here hat	here comb	here more book	this here book[d]
here music	here broke	here more milk	this one cookie
here open door[b]	here hello[c]	here, Daddy, hat	that hello[c]
here dingdong	here ball	here, Mommy, hat	that light
here light	here book	here, Daddy, milk	that baby

Requesting Expression + What Is Requested

want milk	want baby	want more	Can-I fix it[e]
want car	want come on[h]	want more hat	Can-I-have ball
want get	want get down	want more cookie	Can-I-have bite
want fix it[e]	want play	want more milk	Can-I-have put in[k]
want blow[f]	want my turn	want more . . noodles	Can-I-have break it[l]
want ball	want dessert	want more spoon	I-can't get out[m]
want soap	want open	want this	I-can't open door
want that	want break it	want this . . music	I-can't get open door[n]
want candy	want my hat	want this . . light	I-can't get it
want hat	want music	want this book	I-can't (fix) it
want it	want hot dog	want open door	I-can't come in[o]
want book	want spoon	want baby sister	gimme ball
want light	want fingers[i]	want come in	gimme that
want cookie	want Daddy	want make byebye	gimme that . . blow[f]
want tight[g]	want baby bib[j]		[u] hello[p]

Other Combinations

more music	help it	hold tight[g]	my fingers
more hat	broke it	go nightnight	my hand
more cookie	break it	look (at) that	baby toy[j]
more put in[k]	fix it	look (at) light	pretty music
more spoon	like it	look (at) chicken	no like it
	hold it	open door	I no like it
I get	roll it	open door please	no want it
get ball	hit me	drink milk	I no want it
I get ball	gimme	fix it that	I can't
get car	excuse me	(duck) . . fix it	what happen
I get car	get out[m]	all finish that	you're welcome
get hat	come in		this one
I get book	come on	Daddy sit	good boy
get book	come here	crying baby	all gone
I get mike	get out here[m]	baby cry	all finish(ed)

[a] Indicating object to be fixed.
[b] Indicating object to be opened.
[c] Indicating or identifying toy telephone.
[d] Indicating which book he wants.
[e] Request to have it fixed.
[f] "Let me blow the match out."
[g] Wants to "hold tight" (i.e., stand up in the bath).
[h] "I want you to come on."
[i] Apparently asking to have his fingers wiped.
[j] Possessive.
[k] Has been putting tinker-toys in their box; apparently wants to put somewhere the pieces the adults are using.
[l] Apparently wants to break up the tinker-toy contraption.
[m] *get out* usually means "get (take) it out."
[n] Presumably a variant of *I can't open door.*
[o] To his father, whom he has been calling to come into the bathroom, which he cannot leave because he is being prepared for bed.
[p] He is instructing me to talk on his toy telephone; there is imperative intonation, and [u] may be *you.*

44

the tapes, since a great deal of variation in form that is present on the tapes is omitted in the tables. There was a good deal of phonetic variability that has been ignored.[4] In addition, all initial and final vocatives, of which there were many, were stripped from David's utterances before they were tabulated. Many vocatives were stereotyped expressions, for example, *here Mommy*, *Hi Daddy*, *right Daddy?* Final vocatives were somewhat more frequent than initial, but there were several combinations that occurred with both initial and final vocatives, for example, *come here Daddy* and *Daddy come here*, *Mommy come in* and *come in Mommy*, *help it Daddy* and *Daddy help it* ("Daddy help me"), *dessert Daddy* and *Daddy dessert* (a request for dessert). In both positions, the vocatives sometimes were, and sometimes were not, intonationally separated from the words they preceded or followed. The few vocatives that occurred in the middle of combinations are recorded in the tables.

In both corpora, most of David's productive patterns fall into two semantic groups: they either consist of an indicator word followed by what is indicated, or a requesting expression (e.g., *want, can-I*) and what is requested. *Here* + X is the most frequently used pattern for indicating something and the only such pattern in the first corpus; usually David is showing or offering whatever it is to a parent. The item shown is almost always an object but occasionally an action, for example, *here jump* accompanies an act of jumping to which he is drawing attention. In a variant form of this pattern, the name

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[4] Many of David's utterances contained an extra syllable; this was usually [ə] or [də], but the vowel could be any unrounded vowel and the consonant was often [n] rather than [d] when there was another nasal consonant in the utterance. These extra syllables occurred before words, either at the beginning or in the middle of utterances; they occurred before English verbs as freely as before nouns and so are probably not properly transcribed as *a* or *the*. The syllables have no discernible semantic import, and utterances with [ə], [də], or no intrusion were in completely free variation. The extra syllables are omitted in the tables and will be ignored in discussing David's patterns. Bloom (1970) has an extensive discussion of extra initial syllables of this sort in her subjects. Some other features of David's speech are also not recorded in the tables. A palatal sound ([ty~ky~ č~c~š~s], or occasionally their voiced counterparts) sometimes appeared at the ends of words. Conceivably, it was a reflex of the English plural or possessive, but in David's speech it had no discernible meaning, and utterances with and without it were in free variation. The sound was often phonetically obscure, and different transcribers by no means always agreed on its presence or absence. In addition, the word *want* in the tables transcribes a highly variable group of sounds [wən~wan~əwən~awan~aɪwan~aɪwant~ aɪən~a:n~ə:n~ən~ə̃~əmə~ənə~əmən~amən] that have in common that David is requesting something and that they are often spoken with imperative or pleading intonation. Some of these obviously contain a reflex of the pronoun *I*, and some do not; for many it is impossible to tell from their phonetic shape whether they do or not. They seem to be equivalent for David, and so a common transcription is called for.

of the person to whom he is handing the item is inserted between the components (e.g., *here, Daddy, soap*). A second pattern, *this (one)* + X, that emerges in the David II corpus, is used to identify which object of a class he is interested in; as such it occasionally serves as one of the components of another pattern (e.g., *here this book*). *This, this one,* and *this here* appear to be equivalent. It is interesting that this pattern is adumbrated in the David I corpus by the occurrence within other combinations of *this* or *this one* followed by a word in apposition further specifying the item indicated or wanted (*want this . . egg, want this . . soap, gimme . . this . . toy, want this one here*). *That* emerges late in the David II period, and there are only a few occurrences which seem to have an identifying function ("that's a . . ."); there is one combination (*gimme that . . blow*) which is very similar to the appositional forms just cited with *this*.

Want + X is the dominant request pattern in both corpora. What is wanted is usually an object but often an action; in the latter case it does not seem to matter who the actor is, since the desired actor is sometimes David (e.g., *want blow, want jump*), but sometimes not (e.g., *want fix it* "I want it fixed," *want open door* "I want it opened," *want come on* "I want you to come on").[5] It is always David who does the wanting at this stage of development. *Can-I (-have)* + X? is another request formula that is represented in both corpora. *Can-I* and *Can-I-have* appear to be in free variation at David I and II and may indeed be phonological variants: [knaɪ~knaɪv~ kənaɪ~kənaɪæ~kənaɪæv~knaɪhæv]. The evidence indicates that *I* has no independent morphemic status in this formula: *can I fix it?* is not a request that David be allowed to fix it but a request that it be fixed, that is, the addressee, not David, is to do the fixing. Although it is hard to find any semantic difference between the *want* and *can-I* request formulae, they are associated with clearly different typical intonation contours: *want* + X usually has imperative or pleading intonation, *can-I (-have)* + X almost always has a question intonation. *I-can't* + X is a third formula that emerges at David II; the X item indicates an action of some sort that David can't do and seems to want done. The formula is always treated by the adult addressee as a request;

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[5] There is one utterance, *want Daddy fix it,* which seems to contain an embedded sentence. This is the only occurrence of a noun-verb sequence following *want* in 5 months of recordings that included several hundred utterances containing *want*. I am therefore inclined to doubt that *Daddy fix it* can really be an embedded actor-action form. An alternative possibility is that *Daddy* is an interpolated vocative as in *here, Daddy, soap.* This possibility is supported by the fact that the preceding utterance was *want, Daddy,* in which *Daddy* could hardly be other than vocative.

however, it typically carries declarative intonation. For these last two formulae, the intonation may well be learned as part of learning the formula. Other potential requesting patterns are represented in the corpora, but none have enough examples to meet the statistical criterion for a positional pattern.[6]

David has some further positional patterns among the "Other Combinations" in the tables. The pattern *more* + X appears to express observed or desired recurrence, as in previous children, and it occurs several times as one of the components of another pattern (e.g., *here more book, want more hat*). In David II there is also a pattern in which (*I*) *get* is followed by the name of an object. The utterances with *I* in this set are usually pronounced with a clear [aɪ]. However, the tapes are not clear as to whether there is a meaning contrast between *get* and *I get*. Sometimes it is not clear from the context who the actor or intended actor is; when it is clear, the actor is almost always David in the case of both *get* and *I get*, although there is one utterance of *get* where the actor seems not to be David. It is also not clear what David's *get* actually means: for instance, in one case where he says *get ball*, he has the ball, and the action he seems to be announcing is throwing, not getting. These combinations with *get* include most of the English verb-object forms that occur in the corpora (outside the pattern with *want*).

There is one other set of combinations that meets the statistical criterion for a positional pattern: the combinations of English verb + *it*. This pattern appears clearly to be associative rather than productive, and there is no evidence that *it* has any meaning separate from the verb for David: for example, one finds *fix it that* rather than *fix that*, and when David says *help it* he means "help me." In the unpatterned remainder of the corpora, it seems worth observing that although most of the verb forms that occur may look like imperatives, and are indeed usually requests, several are odd in various ways and unlike normal imperatives (e.g., *hold tight!* is a request to be allowed to stand up in the bath; *come here!* on one occasion was a command to his mother to roll a ball to him; i.e., it is not the addressee that is to approach). There is phonological evidence that many of the combinations with *it*, and from the unpatterned remainder, are really word-sized units for David: the intrusive syllables [ə] and [də] mentioned earlier never occurred between

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[6] However, the three combinations with [u] are of some interest, since one of them, [u] *hello!* in David II, is clearly an invention on David's part, implying productivity. (Note that David's use of *hello* to refer to telephoning is similar to Odi's.) If the pattern is valid, it probably comes from having heard imperatives that begin with *you* and would suggest that he may have learned that one way of requesting somebody to do something is to put a phrase indicating an action into the frame *you* (—)!

47

the components of phrases like *fix it, help it, gimme, open door* (e.g., the tapes contain [əfɪkɪt], [də?ʌpəndɔ:], but not [fɪkə?ɪt] or [ʌpəndədɔ:]), although the syllables are common elsewhere between words.

EMBLA

A corpus of word combinations has recently been published for a Swedish girl, Embla, by Lange and Larsson (1973, appendices A–J). The corpus is based on 10 tape-recorded sessions made at about 2-week intervals between ages 20 and 25 months. The MLU for the first five sessions taken as a whole was 1.52 morphemes. The sixth session had a MLU of 1.37, the seventh 1.73, and for the last three sessions the MLU was over 2.0. Lange and Larsson's analysis of the data consists of two transformational grammars and a commentary on them. The grammars are similar in character to those of Bloom (1970), Bowerman (1973a), and Brown (1973); one grammar is for the first five sessions, and the other is for the last five. Lange and Larsson's commentary is not designed to provide a descriptive analysis of the corpus that assesses what constructions are productive, and some of the rules of both grammars are based on only one or two examples and seem hard to justify. A descriptive statement of the probable productive patterns is needed, and I shall therefore approach Embla in the same way as the other corpora. The question of the appropriateness of a transformational grammar for describing a child's rule system is discussed in a later section.

The first session yielded only seven different word combinations. One of these was *en bil* "a car." The other six occurred as Embla put one toy after another in a bowl of water, saying: *spaden bada* "spade bathe," *bil bada* "car bathe," *kissen bada* "pussy bathe," and *renen bada, bada renen,* and *bada ren* "bathe/reindeer."[7] (In the same situation in the second session there is *bada katten* "bathe cat.") Since both X + *bada* and *bada* + X occur without evidence of contrast in meaning, it seems likely that this group of combinations should be interpreted as a groping pattern.

The first rule-governed structures appear in the second session, and the 50 combinations from sessions 2–4 are collected in table 13. These comprise all the combinations from these sessions from Lange and Larsson's appendices I and J, except that vocatives and anaphoric negatives are omitted. The

[7] The final *-en* of *renen* is part of the definite article as are most final *-n* or *-t* on nouns in Swedish. Lange and Larsson (1973) find no evidence that Embla has grasped this fact of Swedish morphology, and so I shall omit the article in all glosses of Embla's utterances. Likewise, verb tense is ignored in glosses, e.g., *ramla* in tables 13–15 could have been glossed "falls" or "fell" rather than "fall," and *gå* "go" could sometimes have been glossed "goes" or "went."

TABLE 13

EMBLA: WORD COMBINATIONS DURING SESSIONS 2, 3, AND 4

Swedish	English Gloss	Swedish	English Gloss
Actor/Action			
Mamma bygga	mother build	Mamma laga	mother fix
Åke bygga	Ake build	Mamma laga sätet	mother fix seat
Embla bygga	Embla build	Mamma bort	mother away
Vi bygga	we build	Mamma ta bort	mother take away
Mamma bygga mer	Mother build more	aporn ät apple	ape eat apple
Embla bygga ny	Embla build new	anka bada	duck bathe
Mamma hjalpa	mother help	flickan bada	girl bathe
barn simma	child swim	bada katten	bathe cat
Locating or Identifying Forms			
där är Nalle	there is Teddy	där är hästpappan	there is fatherhorse
där är dörr	there is door		
där är den	there is it	den är gul	it is yellow
där föl	there foal	och den är blå	and it is blue
där pappa	there father	den bilen	it car
där måne	there moon	den ramla	it fall
där tarta	there cake	den vill stå	it wants [to] stand
där går	there go	det är ju mamma	it is of-course mother
där trillat	there fallen	titta ramla	look fall
Other Combinations			
alla bilarnana	all cars	göre det	do it
alla bil	all car	läsa den	read it
många måne	many moon	bygga ny	build new
många bollar	many balls	baka kaka	bake cake
en gubbe	an old man	och baka kaka	and bake cake
stor pippi	big bird	baka kakor	bake cakes
kalven pappan	calf [and] father	plocka blomma	pick flower
ett år	one year [old]	bilen stå	car stand
katten ora	cat['s] ear	gå mat	go [to] food
var är dörr?	where is door?	hälla ut	pour out
med alla barna	with all children	pippi in	birdy in
nej kossa	no moo-cow	här på hasten	here on horse
		har gått sönder	has gone broken

SOURCE.—Lange & Larsson 1973, appendices I and J.

table contains two patterns that meet the statistical criteria for positional patterns: an actor-action pattern that seems quite similar to Kendall's and Seppo's, and a pattern with *där (är)* "there (is)" in initial position and the indicated object second. There are also five instances of another possible identifying pattern with *den (är)* in first position. The remaining combinations are too heterogenous to be taken as evidence for any further rule learning by Embla at this stage.

Table 14, which combines sessions 5, 6, and 7, shows Embla's develop-

TABLE 14

EMBLA: WORD COMBINATIONS DURING SESSIONS 5-7

Swedish	English Gloss	Swedish	English Gloss
		Actor/Action	
Mamma smaka	mother taste	Embla gå	Embla go
Johan gick	Johan went	Embla försöka	Embla try
Embla låna	Embla borrow	Pappa laga	father fix
Fatima låna	Fatima borrow	Embla gjorde	Embla did
Mamma torka	mother wipe	Han tittar	He look
Embla få	Embla get	Embla opp	Embla up
Mamma dricka	mother drink	Embla sitta uppe	Embla sit up
Mamma mata	mother feed	Mamma ta den	mother take it
		Locatives with Gå	
gå Martin	go [to] Martin	gå Moderna	go [to] Modern [museum]
gå Mamma	go [to] mother	gå där	go there
gå in	go in	gå inne—där	go inside—there
		Actor + Gå + Locative	
Embla gå in	Embla go in	Embla gå i lagårn	Embla go in cowhouse
Embla gå Moderna	Embla go [to] Modern [museum]		
		Locatives with Där	
där filt	there blanket	sit där	sit there
där ögat	there eye	gå där	go there
där inne	there inside	blomma där	flower there
är där	is there	hitta där	find there
		hälle ut där	pour out there
		Conjunction	
och mala	and paint	och Embla	and Embla
och öga	and eye	och Pappa	and father
och vatten	and water	och Mamma	and mother
och kossorna	and cows	och svans	and tails
och sked	and spoon	och lilla hästen	and little horse
hästar och kosso	horses and cows		
		Negatives	
inte gul	not yellow	ingen napp	no pacifier
inte juice	not juice	vill inte	want not (= don't want)
inte lejon	not lion	jag vill inte	I don't want
inte mormor	not grandmother	vill inte ha den	don't want [to] have it
inte stor	not big	Älg säger inte mu	Elk says not (= doesn't say) moo
inte gått sönder	not gone broken		

TABLE 14—*Continued*

Other Combinations			
mer vatten	more water	klappa Martin	pat Martin
mer vatten mer	more water more	gulla katten	pet cat
mer russin	more raisin	äta vatten	eat water
russin till	raisin more	äter blåbär	eat blueberry
annan tallrik	other plate	äter bär	eat berry
andra hästen	other horse	hälla i vatten	pour in water
andra ögat?	other eye?	glomt mössa	forgotten cap
		prata mormor	talk grandmother
Embla('s) Pappa[a]	Embla's father	ramla korven	fall hot-dog
Embla's Mamma	Embla's mother	ligga golvet	lie [on] floor
Embla's kudden	Embla's pillow	heter hästen	is-called horse
pojken pappa	boy['s] father		
Embla ha juice	Embla have juice	den stora bjornallen	the big teddybear
Embla ha det	Embla have it	stora nallen	big teddy
ha blåbär	have blueberry	stora hästen	big horse
vill ha korgen	want have basket	och lilla hästen	and little horse
		vad är det?	what is that?
det är Mamma	it is mother	hälla ut	pour out
det är pojken	it is boy	ranla på	fall on
det häst	it horse	få bada	may bathe
gubben är glad	man is happy	fråga mer	ask more
han är barfota	he is barefoot	gå sönder	go broken
Johan ledsen	Johan sad	har gått sönder	have gone broken
en blå tallrik	a blue plate	också hästen	also horse
blå overall	blue overall	precis boken	exactly [as] book
en gris	a pig	lite mu	somewhat moo
Pappa Bjorn	Father Bjorn	i huset	in house

SOURCE.—Lange & Larsson 1973, appendices A–J.
[a] Also occurs followed by the name of the parent.

ment about 6 weeks later, and represents about the middle of stage I, by Brown's (1973) criteria. It can be seen that the actor-action pattern continues to be highly productive. A pattern for making two-term action phrases has emerged, consisting of *gå* "go" followed by a word for the location to which the movement takes place; three-term strings, actor + *gå* + locative, arise when this pattern is embedded as the action-term of the actor-action pattern. There is an interesting development within the locatives with *där:* in sessions 2–4, *där* always occupied initial position, but now *där* is found in both positions. The two tables together suggest that two positional patterns were learned at different times: the pattern *där* (*är*) + X was learned at session 2 and the reverse pattern X + *där* at session 5. Thus, the data from Embla are similar to those from Jonathan in indicating that the apparent freedom of position of *där* or *there* was due to the separate learning of each order.

Other new patterns that emerge in sessions 5–7 are a conjunction pattern, *och* + X, and a negative pattern, *inte* + X, that becomes manifest in

session 7; these negatives are the advance guard of an efflorescence of nega-
tives that occur in session 8, but the details of the patterning in that session
will not be discussed. The "Other Combinations" in table 14 contain some
groups which could represent additional patterns but which, with one excep-
tion, do not meet the statistical criteria for a positional pattern and lack
strange combinations that would suggest invention on Embla's part.

Among the "Other Combinations" the group that particularly warrants
discussion is the set in the right-hand column, which has a verb in the first
position and in second position a word that in several cases would be the
object noun in adult Swedish. The set is sufficiently numerous to meet the
statistical criterion for a positional pattern. There is one combination, but
only one (*äta vatten*), that is strange enough to suggest invention by Embla.
The question arises, therefore, whether Embla has some sort of productive
verb-object pattern. Table 14 reveals no obvious semantic basis for such a
pattern, since the forms seem semantically quite heterogeneous (e.g., they
are not all act-patient sequences). Since the data from subsequent sessions
might be expected to clarify the nature of Embla's verb-object forms, all
combinations from session 8 that contain a Swedish verb and nouns that
would, in the adult language, be classifiable as either subject or object of
the verb have been tabulated here as table 15.[8] (Other forms from sessions
8–10 will not be discussed, since Embla's language in these sessions is too ad-
vanced for this article.) The combinations in the left-hand column of table 15
show that the actor-action pattern evident in the previous sessions is manifest
in session 8; however, the forms in the right-hand column indicate a striking
variability in word order in realizing some verb-noun relations. The cases
where there is order variability seem to be cases where an agent-nonagent
contrast is possible. Thus, vis-à-vis *ramla* "fall," the object that does the ac-
tion (i.e., that falls) is not usually the agent of the falling. Similarly, vis-à-vis
gömma "hide," the object that is the "actor" in the sense that it disappears
from view need not be the agent that brings about the disappearance; here
the language requires that actors that are agents be distinguished from actors

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[8] The table omits forms with *ha* "have." It also omits three combinations ("*kissa*"
sa barnet " 'pee' said child," "*tittut*" *säger den apan* " 'boo' says that ape," "*åka bil*" *säger
barnet* " 'go car' says child") that are the advance guard of a pattern that became quite
productive in sessions 8–10, consisting of a citation form, followed by *sa* or *säger*, followed
by a word identifying the speaker of the citation. The set is a good example of a pattern
that is specific to a particular verb (or to a particular kind of action). This word order
(object-verb-subject, according to the usual adult grammar) occurs nowhere else in the
corpus.

TABLE 15

EMBLA: ACTOR/ACTION AND ACTION/OBJECT COMBINATIONS FROM SESSION 8

Swedish	English Gloss	Swedish	English Gloss
Mamma köra	mother drive	vagnen stå	baby-carriage stand
Åke köra	Åke drive	välte vagnen	tilted carriage
Embla köra	Embla drive		
Embla gå köra	Embla go drive	vagnen ramla	carriage fall
Emblas Mamma köra	Embla's mother drive	barnet ramla	child fall
		ramla barnet	fall child
den köra	it drive	(nu) han ramla	(now) he fall
Mamma stoppa	mother put	ramla mamman	fall mother
Mamma hjälpa	mother help	ramla den	fall it
Embla bada	Embla bathe		
den bada	it bathe	(och) Mamma gömma	(and) mother hide
barnet gå upp	child go up	(och) vagnen gömma	(and) carriage hide
barnet titta	child look	gömma dockorna (inte)	(not) hide dolls
Embla får titta	Embla may look		
Mamma ligga (också)	mother lie-down (too)	(inte) gömma barnet	(not) hide child
(inte) Mamma tvätta	(not) mother wash	kissa barnet	pee child
		(inte) sitta barnet	(not) sit child
Mamma hjälpa den	mother help it	den (inte) sitta	it (not) sit
Mamma köra barnet	mother drive child	ta av mossa	take off cap
Kurre äter notter (inte saft)	Kurre [a squirrel] eats nuts (not juice)	ta av jackan	take off jacket
		(inte) tvätta håret	(don't) wash hair

SOURCE.—Lange & Larsson 1973, appendices A–H.
NOTE.—Constituents parenthesized are not part of either the verb or nouns and are ignored in the text discussion.

that are patients (i.e., that are caused to perform the act indicated by the verb). Again, for baby carriages that stand up or are tilted (*vagnen stå*, and *välte vagnen* in table 15), the action has an agent other than the baby carriage itself. It seems likely, therefore, that Embla's uncertainty about the word order in these forms indicates that she is at best groping for the expression of agent-patient distinctions: either she has not made the conceptual distinction between agent and patient, or she has not learned rules that map words in these categories into sentence positions; she is still predominantly using a primitive actor-action schema where agent and nonagent are not differentiated. Thus, the evidence from table 15 indicates that the combinations with adult verb-object order in table 14 should not be taken as indicating mastery of some general verb-object or act-patient positional pattern. Some other explanation of the order consistency in table 14 is required. The explanation I propose is that some of the combinations have been learned individually (and follow the order of the adult language for that reason), and, in addition, Embla may have learned some patterns specific to words representing particular actions, for example, *äta/äter* + X "eat + X,"

where X is the object consumed orally. A rule of narrow scope of this sort would account for the one apparent invention, *äta vatter* "eat water."[9]

The important fact to come out in this discussion of Embla's verb-object forms is that the data from Embla resemble those from Kendall and Seppo in showing a period of confusion in how to realize the agent-nonagent distinction, at a time when an actor-action pattern is very clearly present and prior to the development of any productive verb-object positional pattern.

OTHER CHILDREN IN THE LITERATURE

There are no phenomena that I know of in the older diary literature that conflict with those reported here. The recent literature contains discussions of a number of children comparable in linguistic maturity to those discussed but for whom a complete corpus has not been published. Miller and Ervin's (1964) data are essentially similar to those reviewed. Brown (1973) and Brown, Cazden, and Bellugi (1969) contain partial grammars for three subjects, Adam, Eve, and Sarah, who were slightly more mature when first seen than most of the children discussed here. Very little data are available on the corpora beyond the grammars and some frequency tabulations. There is nothing in the little information that does exist to suggest that these corpora would differ in any important way from those reviewed, except for being at least as complex as the most mature considered here.

Bloom (1970) contains a very rich discussion of three children, Kathryn, Gia, and Eric, with more than one stage being presented for Gia and Eric. The stages of development are quite comparable to those of the corpora reviewed. Although the complete corpora have not been published, Bloom provides a great deal of information about them, with a copious citation of combinations that amounts to a half or more of each corpus. It is apparent from her account that if the corpora were tabulated as in tables 1–15 above, they would, with one possible minor exception, look very similar to those reviewed. Eric seems to have many constant-plus-variable forms, like those of Andrew and Jonathan, and Kathryn and Gia appear to resemble Kendall, Seppo, and Embla in developing an early actor-action construction. The way in which Kathryn and Gia may be a little different is that their corpora appear to have a relatively much greater number of combinations modeled on adult verb-object forms than the corpora of Kendall, Seppo, and Embla.

[9] I am struck by the fact that most of the combinations with *ha* "have" in table 14 promise oral consumption (note the similarity between *ha blåbär* "have blueberry" and *äter blåbär* "eat blueberry"): conceivably Embla may have acquired a pattern *ha/äter* + X, having to do with custody of X, especially for purposes of oral consumption.

Kendall, Seppo, and Embla all have very productive actor-action schemas, but few verb-object forms, and the evidence is against any productive verb-object construction. Kathryn and Gia appear to have as many or more verb-object as actor-action combinations, and the actor-action schema may not have developed first. However, the available data provide no clues to the semantic basis of Kathryn's and Gia's combinations modeled on adult verb and object.

Solberg (1971) contains data from early corpora on two children, Urpica and Huaman, who were acquiring Quechua, a polysynthetic language spoken in the Peruvian Andes. Quechua is remarkable for a rich array of derivational suffixes, and it uses suffixation to express a wide variety of ideas. Only the general character of the corpora is clear from Solberg's discussion: the bulk of the combinations in both corpora belong to positional patterns consisting of a variable term first and a constant second, where the constant is a derivational suffix. She notes the similarity in form to pivot constructions. Although it is not clear whether the patterns are predominantly productive or predominantly associative, there is evidence that some of them are productive because, as Solberg points, both children often contrast the same lexical stem joined to different suffixes in successive utterances. Thus, a general similarity of form is indicated between these corpora and those reviewed above. However, there may well be undisclosed interesting differences in detail, since there are no instances of the productive use of affixation in the corpora reviewed. Publication of the corpora would be valuable.

In sum, where the other children in the literature are described in sufficient detail to judge, their corpora appear to have similar properties to those reviewed. Nevertheless, there is also evidence for interesting differences in detail from the children sampled here, suggesting that the present corpora do not encompass the range of individual differences possible.

III. THE STRUCTURE COMMON TO ALL CORPORA

This section discusses the nature of the similarities and differences among the corpora and the inferences that can be made from them. It begins with a classification of the semantic bases of the positional patterns found in the corpora, and the existence of wide individual differences in the order of emergence of patterns is noted. There is then a detailed consideration of evidence on how broad or narrow the semantic bases of patterns are, and how independent the acquisition of one pattern is from another, questions that are crucial to determining the nature of the rule system acquired. This discussion is followed by comments on the kind of meaning encoded in utterances; in particular, the extent to which the purpose of an utterance is reflected in its form is considered. Data are then assembled and discussed on two problems in interpreting the corpora: freedom of word order, and the basis of early verb-object forms. Finally, the conclusions on the nature of the rule system to which the data point are drawn.

THE SEMANTIC BASES OF POSITIONAL PATTERNS

A salient feature common to all the corpora is that the bulk of the combinations fall into positional productive patterns. Classifying the patterns broadly according to their semantic content, the corpora contain the following kinds:

1. Patterns that draw attention to something, for example, *see* + X or *here/there* + X; or identify something, for example, *it/that* + X; or assign class membership, for example, X + Y "X is (a) Y" in Kendall II.

2. Patterns that remark on specific properties of objects, for example, *big/little* + X, *hot* + X, *old* + X.

3. A pattern expressing possession: X + Y "X's Y" or "X has a Y."

4. Patterns that note plurality or iteration, for example, *two* + X, Embla's *och* + X.

5. Patterns concerned with recurrence, or alternate exemplars of a type, for example, *more* + X, *other* + X.

6. Patterns concerned with disappearance of objects, for example, *allgone* + X.

7. Patterns expressing negation, for example, *no* + X.

8. A pattern expressing actor-action relations.

9. Patterns concerned with location, for example, X + (preposition) *here/there*, X + Y "X is in, on, has moved to Y."

10. Patterns that request, for example, *want* + X, Jonathan's *have-it* + X.

The list is not exhaustive. It has a general similarity to the lists of Bloom (1971), Brown (1973), and Schlesinger (1971a), although there are some differences that are discussed later.

Although the meanings commonly found in the early word combinations have been much discussed, the usual emphasis in the discussions (e.g., particularly, Brown 1973; Slobin 1970, 1973) has been on similarities among children. It is undoubtedly true that, as English-speaking children develop, they acquire more and more patterns and thus become more similar to each other in output and tend to converge on a common "simplified" English. Brown's (1973) grammars represent an idealized child speech obtained by amalgamating the corpora from his three separate subjects at the end of stage I (i.e., at a time when each child has developed forms expressing many of the common meanings). This emphasis on similarity and on the description of a group norm of speech tends to suggest that individual differences between children are small. Yet the differences among the corpora reviewed earlier are often quite great; for example, there is no overlap between the patterns found in Andrew's corpus and those in Kendall II. These differences themselves require attention, and it will be argued later that they provide important information from which a great deal can be inferred about the nature of the linguistic system the children are acquiring.

The overwhelming similarity among the corpora is one of form: one finds positional patterns, mostly productive ones, in all children, the productive patterns sometimes being preceded in time by groping patterns. Children differ considerably in the kinds of contents expressed by their productive patterns and in the order in which they acquire them. Certain kinds of contents seem to be popular and recur in many children. Others are less popular and appear in fewer children. Thus, at any point, the range of individual differences appears to be circumscribed by the fact that the meanings expressed by each child's productive patterns are a sample from a probably

open-ended set of possible conceptual relations, with formulae expressing certain relations more likely to have been acquired than others.

EVIDENCE ON THE SCOPE AND INDEPENDENCE OF POSITIONAL PATTERNS

A group of closely related questions are now discussed. Just how broad or narrow are the semantic bases of positional patterns, and how can one resolve cases where more than one interpretation might appear to be possible? To what extent are apparently different patterns interrelated? Thus, how can one tell whether two possibly different patterns are really the same pattern or not; or whether two patterns are related in that one is prerequisite for the other, or both are subpatterns of some broader pattern? Inferences to the nature of the child's rule system depend crucially on the answers to these questions.

Two kinds of evidence can be brought to bear on these questions. One kind is intrachild: it consists of the inferences that can be made from within a corpus or from within corpora representing successive stages of development of the same child. So far, only this kind has been used. The other kind is evidence from individual differences, for example, from comparisons of the corpora of different children. Let us make explicit the methodology underlying inferences from both kinds of evidence and see how far it will carry us in answering the questions just posed.

Intrachild Evidence

The identifications of positional patterns that were made in analyzing the corpora were based entirely on evidence from within the corpora themselves and show the kinds of inferences that can be made from intrachild evidence. This subsection seeks merely to clarify the bases of inference.

First and most obviously, two patterns were considered to be different if they expressed manifestly different semantic relations. Of course, this basis for inference will not resolve questions about the identity of patterns that express similar relations: for instance, it will not tell us whether *more* + X and *other* + X in Andrew and Jonathan are really one pattern or two; or whether attention-drawing patterns like *see* + X and *there* + X, if both are present, are one pattern or two.

Second, there are a variety of distributional grounds for inferring differences in pattern. For example, in Andrew's *more* + X the X items comprise both English verbs and nouns, whereas in his *other* + X, the X items are always nouns. Hence, the patterns cannot be the same: *other* apparently

applies only to things, whereas *more* applies to actions also. The analysis of Jonathan's combinations with *there* was also based on distributional evidence, and another kind of distributional argument was used to show that his attributional patterns were independent and not exemplars of a more general PROPERTY + X.

A third basis for inference comes from the utterances that are clearly inventions. In the analyses of corpora, inventions were primarily used to demonstrate productivity of patterns. However, they can also bear on questions of pattern identity. For example, the possibility has been suggested that actor-action combinations can be "produced with a number of different rules based on the individual lexical terms involved (e.g., 'the name for one who rides (goes, jumps) precedes the name for the action of riding (going, jumping)'). In other words, the child might see no similarity among the initiators of diverse actions" (Bowerman 1974, p. 201). Bowerman points out that a broad actor-action formula implies that the child should be able to coin new actor-action forms involving previously unlabeled actions. However, inventions like *Kendall foot*, *Mommy oops*, and others in Kendall I seem to indicate just this ability and thus argue for one broad pattern and not a collection of narrow-scope patterns confined to particular actions.

Finally, evidence from a succession of corpora from a child separates new learning from old learning and thus provides another basis for inference.

Of course, for any corpus there are likely to be questions about pattern identity which simply cannot be resolved on the basis of evidence internal to the corpus.

Evidence from Individual Differences

The important information to be had from studying individual differences is information about correlation and independence of patterns. It includes questions of pattern identity but goes beyond them. Thus, if we wish to know whether two hypothetical patterns, A and B (say), are independent, or dependent in that they are really one pattern, or dependent in that the development of one is necessary for the development of the other, we can study how their order of emergence varies among children. If A appears before B in some children but B before A in others (or if A appears without B in one corpus and B without A in another), then we can infer that A and B are separate patterns that can be independently acquired. A grammar written for children should represent the patterns by separate rules. If A and B appear simultaneously in all children (or if any corpus that has one always has the other), then the hypothesis that they are really one pattern is confirmed; similarly, the hypothesis that one pattern is a necessary condition

for another predicts a constant order of development. In short, individual differences provide evidence on the unity and dissociability of patterns.

For example, if one looked only at Kendall I, one might think that perhaps actor-action forms and possessives develop together (a conceivable ground being that both tend to have animate entities in first position). However, other corpora indicate that the patterns are dissociable: Seppo's corpus shows a very productive actor-action pattern and little evidence for a productive possessive, Sipili has a possessive pattern without an actor-action pattern, and Jonathan develops possessives before he has a distinct actor-action pattern. Several other examples of dissociation are cited later on. It is also possible to find examples of lack of dissociation where it perhaps might have been expected. Thus, within the actor-action pattern, some of the action words are verbs and some are nouns in the adult language. Some discussions in the literature analyze these as involving different semantic relations (e.g., Schlesinger 1971a; also, though more equivocally, Bloom 1970, Bowerman 1973a, and Brown 1973): the noun-verb forms are classified as actor-action (or agent-action) and the noun-noun forms as actor-object (or agent-object). One might, therefore, inquire whether the noun-noun and the noun-verb forms are dissociable. They do not seem to be: children with a clear actor-action pattern seem to have both, suggesting a single pattern rather than two independent patterns.

Unfortunately, the series of children on whom complete corpora are available is not yet large enough to reach conclusions about all the hypotheses one might like to investigate. However, even within the small number of corpora reviewed here, for most pairs of patterns one can find a corpus that has one pattern but not the other, and find another corpus that has the second pattern but not the first. In general, the corpora provide striking evidence that the patterns are separate entities that can be acquired independently of each other. Moreover, both the intrachild evidence and the evidence from individual differences indicate that the semantic domain associated with a pattern is often surprisingly specific and concrete. Thus, there is little evidence for broad grammatical categories, for example, we do not find subject-predicate structures emerging as a unit but, rather, actor-action and locative patterns apparently developing independently; similarly, we do not find modifier-head noun phrases developing together but, rather, a collection of patterns like *other* + X, possessor + possessed, *big* + X, *two* + X, etc., which are independently acquirable, without any evidence in the corpora that they have any relation to each other that would justify a broad category like modifier. Even within a relatively restricted semantic domain like the locative, we find evidence for dissociable patterns: Tofi's corpus pro-

vides good evidence for a pattern "movement + location-to-which-movement-takes-place," but little evidence for the more common locative pattern where the second element states the location of the first; even within the latter type of locative, there is some evidence that the pattern where the location is expressed by *here* or *there* can have a developmental history independent of the pattern where the locative is expressed in other ways.

It has been suggested to the writer, as a qualification on the use of individual differences to investigate correlation or independence of patterns, that children might differ in the breadth or abstractness of the relationships they perceive and use as the basis of generative patterns. Thus, one child might acquire two potentially related patterns sequentially as independent acquisitions, but another child who acquired them simultaneously might have seen an abstract similarity across the patterns that allowed him to acquire them as reflections of a single rule.

Three comments on this idea seem appropriate. First, it assumes much of the previous conclusion that a substantial degree of independence exists among patterns, at least for many children. Second, given a large enough collection of corpora, a tendency for some children to acquire two patterns as reflections of a single rule should show up as a statistical tendency for the patterns to be acquired simultaneously more often than the hypothesis of independent acquisition would predict; this is a kind of dependency among patterns that an analysis of individual differences might or might not confirm. Third, the available corpora do not suggest individual differences of this sort. They suggest that actor-action patterns, identification patterns, recurrence patterns, etc., have much the same semantic content in one child as another, so that one can properly speak of the same patterns recurring in different children (though usually not in the same sequence). Thus, the data suggest similarity across children in the semantic basis of patterns but variability in their order of emergence.

MEANING AND PRAGMATIC PURPOSE

It has often been noted that one-word utterances may name something, or request something, or comment on some event or state of affairs (as, e.g., in the one-word utterances that have been called "holophrases" and described as having "sentence" or "predicative" meaning [e.g., De Laguna 1927]). While some of the children's positional patterns are specific to one of these purposes (e.g., patterns that request, patterns used to identify something), many patterns can be used for more than one purpose, just like the single-word utterances. Thus, *more X* may either request or comment on re-

currence; similarly, locatives and actor-action forms can sometimes request as well as describe.[10] Thus, the data indicate that a particular aspect of meaning, namely, the purpose for which a child uses an utterance, may or may not be part of the semantic representation of a pattern.

Bloom (1970) has shown that three different meanings are common for children's negative utterances: nonexistence, rejection, and denial. There are a number of instances of rejection in Andrew's corpus (e.g., *no bed* "I don't want to go to bed"), and one instance of denial (*no wet* "I'm not wet"); nonexistence is exemplified in Kathryn's *no pocket* "there isn't a pocket [in mother's skirt]" (Bloom 1970, p. 172).[11] These three different meanings of negation seem to represent three different purposes for which negative utterances may be used. Thus, rejection is a negative request, denial is the negation of a descriptive comment, and nonexistence is the negative of an utterance drawing attention to something. This point can be perspicuously rendered in terms of the performative analysis of child language (which I am not necessarily advocating) proposed by Antinucci and Parisi (1973). They argue that a performative verb (e.g., "I request that," "I state that") is always part of the semantic representation of an utterance. Thus, a request would have an underlying form like "I request that X"; the rejection meaning of negation would be obtained when the embedded structure is negated ("I request that neg-X"). Denial and nonexistence would both have the form "I state that neg-X," but in denial X is a descriptive comment and in nonexistence X indicates merely the presence of something (e.g., as in the affirmative pattern *there X*). It appears that some children may use a single negative pattern *no* + X to render all the three meanings: the different meanings then reflect the different uses of the pattern (in terms of the Antinucci-Parisi analysis, they depend on the performative verb into which the pattern is embedded). Other children may have a separate negative pattern associated with a particular meaning or purpose, for example, Bloom's subject Eric had a special negative pattern *no more* + X to indicate nonexistence.

It is important to distinguish the cognition in the child's mind that is the point of departure for an utterance from the semantic representation of a positional pattern. For both child and adult, it is no doubt the case that the surface form of an utterance does not reflect the entire cognitive content that stimulates the speaker to speech. We know little about the form of the underlying cognitions for adults and still less for 2-year-olds, but there is no

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[10] The difference is, of course, usually reflected in intonation (e.g., a request may have imperative intonation, or a pleading or whining tone).

[11] There are occasional negative utterances that are hard to classify into one of these types, e.g., Andrew's *no plug* "I mustn't touch the plug."

reason to doubt that the child's positional patterns provide for the expression of only part of the cognitive content. In particular, as just noted, the purpose of an utterance is often not part of the semantic representation of a pattern.

Several authors (e.g., Bloom 1973; Schlesinger 1974) have recently argued that one must distinguish between "cognitive" or "conceptual" content on the one hand, and "semantic" content on the other. If I understand them correctly, semantic content refers to that part of the cognitive content that is expressed by means of the linguistic system. Thus, semantic categories and relations are concepts, but not all concepts are semantic categories or relations: semantic categories are concepts that enter into the linguistic system, either because they figure in the input conditions to linguistic rules, or because they serve as the meanings of words. The semantic categories of interest here are those that figure in the input conditions to rules. The semantic representation of a positional pattern states the kind of cognitive content that can be expressed by that pattern. From a formal point of view, the semantic representation is the input condition to a rule and is not necessarily a representation of all that was in the child's mind.

It is not clear that the best way to handle the purpose of utterances in child language analysis is to postulate a performative verb in the cognitive representation of utterances. It is hard to see how to bring data to bear on this question. The performative analysis is sometimes attractively neat (as above, in the case of negatives), but, as Schlesinger (1974) points out, it is part of a speculative theory that tries to represent all the cognitive content that gives rise to an utterance without distinguishing that which is systematically expressed in speech from that which is not. There may be other equally good ways of handling utterance purpose. However, as far as this paper is concerned, it is sufficient to note that purpose may be either encoded or ignored in productive patterns.

SPECIAL PROBLEMS IN THE CORPORA

Two problems have arisen several times in the description of individual corpora: the basis of the apparently free word order that periodically appears in the corpora, and the nature of the first verb-object formulae. I now discuss these in turn.

Free Word Order?

The idea that the first rules are based on position is not new (Braine 1963; Schlesinger 1971a), and it has been argued that rigid word order is a universal tendency in child language (e.g., Slobin 1966). Brown's (1973) counterarguments stress the inconsistency in the data. McNeill (1966) at-

tributed the apparent inflexibility of order to children's initial ignorance of transformational rules, so that the supposedly ordered innate deep structures were directly reflected in their speech. Slobin (1973) offers a different explanation, and also weakens his previous statement of the universal, by arguing that children have a universal tendency to pay attention to word order in the language they hear, a claim also made by my "discovery procedures" model (Braine 1971a). However, the previous work offers no understanding of either the prevalence of free word order in children's speech or of its basis.

In the discussion of Andrew, Gregory, and Steven, three ways were suggested in which free word order might arise: (1) from ignorance of order; (2) from the learning of two positional patterns, one for each order; and (3) from the learning of a rule in which the order was free. The corpora provide plenty of evidence for the first of these in the groping patterns. But these hardly threaten the claimed universality of positional patterns because they are so temporary and give way to positional patterns. Indeed, they strengthen the universal, and especially the Braine-Slobin type of explanation for it, by indicating that the basis for the second, ordered stage must be the learning of position, based on registration of the surface order in the language to which the child is exposed.

However, there are a few cases in the corpora of patterns where both orders of constituents are found which cannot be interpreted as groping patterns. In the cases where the longitudinal data were complete enough to permit diagnosis of the basis of the apparently free order (the patterns with *here* and *there* for Jonathan, and *där* for Embla), the data clearly indicated that the basis was the learning of two positional patterns, one for each order. In Jonathan's case, it also appeared that the two orders conveyed slightly different meanings, and, as a result, the constituents of the two positional patterns were slightly different.

The question now arises whether all cases of free word order that are not groping patterns are cases of separate learning of each order, like Embla's and Jonathan's. At first sight, Bowerman's discussion of the longitudinal data on Seppo (who, it will be recalled, was acquiring Finnish, an inflected language with some freedom of word order) suggests that he might be a counterexample.[12] However, close inspection of Bowerman's table 14 (Bowerman 1973a, p. 163) reveals a number of cases in which Seppo's multiple orders could well have the same basis as Jonathan's. It seems that four periods of

[12] Her discussion is not addressed to the issue raised here but is directed against McNeill's (1966) idea that children have inflexible word order because they speak ordered deep structures directly. I think her points are cogent against McNeill.

development may be possible for any pair of constituents: an initial stage (often absent) with low productivity and variable word order that is interpretable as a groping pattern; a stage in which there is a statistical bias toward the order that is dominant in adult speech to the child, the bias being strong enough to meet the criteria for a positional pattern; followed by a stage in which there is a marked increase in the frequency of the nondominant order to the extent that this order becomes more common in the child's speech than in the adults', the increase being interpreted here as due to the learning of the other positional pattern; and, finally, a stage in which the relative frequencies of the two orders in the child's speech converge on those in the adults'. Table 16 provides data on three cases of the development of constituent order in Seppo's speech. The first case concerns the position of the sentence subject (i.e., for the most part, the position of the actor in actor-action combinations). At time I, a positional pattern is apparent in both two-term (subject-verb) and three-term (subject-verb-object) strings. At

TABLE 16

FREQUENCIES OF NONCONTRASTING WORD ORDERS IN
SEPPO'S SPEECH AND IN HIS MOTHER'S

ORDER	TIME						MOTHER'S SPEECH
	I	II	III	IV	V	VI	
	Position of Subject						
Subject and verb:							
Subject first	32	25	24	74	56	41	47
Subject last	4	8	15	11	5	8	5
Subject, verb, and object:							
Subject first	7	3	3	9	8	17	33
Subject not first	1	1	1	0	1	3	2
	Order of Verb and Object						
Two-term strings:							
Verb-object	3	11	10	6	13	3	16
Object-verb	1	1	5	7	5	7	3
Three-term strings:							
Subject-verb-object	7	3	3	4	6	17	32
Subject-object-verb	0	0	0	5	2	0	1
	Position of Prolocative						
Noun-prolocative	2	10	1	18	4	13	14
Prolocative-noun	3	6	10	11	16	17	41
Verb-prolocative	0	3	1	10	5	6	3
Prolocative-verb	0	1	7	6	7	10	8

SOURCE.—Bowerman 1973a, p. 163, table 14.
NOTE.—The total time period covered is about 6 months, from a MLU of 1.42 at time I to 2.36 at time IV Time I is the time of the corpus shown in table 4.

time II, and still more at time III, there is an increase in the proportion of combinations employing the nondominant order, which could reflect the learning of this order. Times IV–VI then seem to show a regression back toward the relative proportions in the mother's speech. A similar pattern with slightly different timing is evident in verb-object order: there is a clear positional pattern at time II, followed by a dramatic increase in the frequency of the object-verb order at time IV, followed by a swing back toward the adult proportions. It is very unlikely that these developmental changes in the proportion of each order are accidental, because the pattern in the two-term strings is exactly replicated in the three-term strings (except for the anomalously few two-term verb-object strings at time VI, for which I have no explanation). One finds much the same pattern again for the prolocative. There is a clear positional pattern at time III, preceded by what could be a groping pattern; a sharp reversal of the preferred order occurs at time IV, presumably due to learning the second order, followed by a shift back toward the adult proportion at times V and VI. Again, the developmental trends found with noun-prolocative combinations are replicated in verb-prolocative pairs.

In general, the evidence from Seppo, Jonathan, and Embla suggests that all cases of free word order that are not groping patterns may, if sufficiently analyzed, turn out to be cases of separate learning of each order. If so, the third possible basis for free word order, the learning of order-free rules, does not exist, and ALL early learning can then be interpreted as a learning of positional patterns.

Verb and Object

Most of the the corpora contain some combinations modeled on adult verb and object. Some previous investigators have tended to assume that their children had a productive verb-object construction, but in each case there has been reason to question this assumption. However, inferring the bases of these combinations has been a persistent problem. Let us now review the data bearing on the development of verb and object.

The corpora provide no evidence that children of this age are acquiring anything that could properly be called a syntactic relation between verb and object. The evidence is that the adult English verb-object pairs that appear in the corpora belong to a variety of independent positional patterns. Several of these patterns are associated with particular verbs, or particular actions. *See* + X, *want* + X, and *have* + X are patterns of this sort, each with a specific semantic content. Embla developed a special pattern relating to citation forms.[13] In two of the corpora there was a suggestion of a pattern related

[13] See n. 8 above.

to oral consumption associated with *eat, bite, drink*. It is possible that semantically specific patterns of this sort are the basis of many adult English verb-object forms in child corpora.

There was no case in the corpora reviewed in which the data clearly establish that a child had acquired a positional pattern of broad semantic scope that could generate a wide range of adult verb-object forms. In three of the corpora there were errors in word order providing direct evidence for the absence of such competence. However, this absence is probably an accident of sampling, since Bloom's subjects Kathryn and Gia appear to have had such a pattern at a stage about equal in linguistic maturity to most of these corpora. Evidence for the existence of one broad semantic relation of this sort in children's speech comes from the development of Gvozdev's son Zhenya. When he began to use the accusative case, he marked only direct objects that were patients of the action indicated by the verb; the actions involved were mostly concerned with the transfer or relocation of objects (e.g., "give," "carry," "put," "throw"); the accusative case ending was not added for other actions (e.g., "read," "draw," "make") where the objects are not patients of the action.[14] There is evidence in the corpora that some of the children were sensitive to this same act-patient relation, also mainly in connection with movements of objects. The best evidence comes from Tofi, who may well have acquired a positional pattern for expressing the relation. Seppo's and Embla's order errors in connection with movement verbs suggest they may have been groping for how to express the same relation. On the other hand, the corpora, even taken with Gvozdev's observation, say very little about how broad the conceptual category "patient" is for children: objects that are moved lie at the core of the category, but for both Zhenya and Tofi the category seems to be somewhat broader than "object moved," for example, Tofi appears to include objects held as well as moved. Perhaps "act + patient" is equivalent to "act + object-moved-or-manipulated-during-the-act."

It would seem that the emergence of the "patient" category must logically imply a contrasting "agent," and also imply some command of the distinction between causative and noncausative action terms. Logically, these developments should go hand in hand. It is also tempting to think that the act-patient schema, when it develops, is a schema for composing the action phrases that are the second component of the actor-action schema. Such a view would be in line with the usual constituent analysis of adult subject-verb-object forms. There is nothing to contradict either of these views in

[14] Gvozdev (1961, p. 173). I am indebted to Bowerman (1973a, p. 191) and, ultimately, to Slobin for the reference.

these corpora: the actor-action schema develops first in these children, and the most obvious way for act-patient forms to develop is for the agent to be differentiated out of the actor category, by a differentiation of actors that are causes from other objects that move, and for the act-patient form to express the action that the agent brings about. Moreover, the data suggest that errors in ordering adult verb-object pairs tend to occur at a particular stage of development, after the actor-action schema is established, before there is any productive pattern for generating a broad class of adult verb-object forms, and in association with early attempts to express actions where a causative-noncausative contrast is possible. However, the data in these corpora are limited because of the small number of forms they contain modeled on adult verb and object. Also, the differentiation hypothesis would seem to require that a productive actor-action pattern should always precede a productive act-patient pattern; although true of these corpora, it is by no means certain that this is a universal of development, for example, it may not be true of Bloom's subjects Kathryn and Gia.

Outside of the act-patient relation, the corpora have nothing to say about the development of semantic relations of broad scope that are correlated with verb and object in the adult language. Instances of such relations hardly exist in the corpora.

There is a possible basis for the development of some verb-object forms that has not yet been considered. Consider verbs like *read*, *eat*, and *sing*. The object nouns of such verbs are not patients in the sense of representing things that are moved or manipulated. The verbs represent human actions, and consequently a child with an actor-action schema would know that the adult subject noun should be placed first. (Unlike causative movement verbs, no confusion as to which noun should count as actor is possible.) To order all three terms, the child only has to learn a rule for ordering the verb and object with respect to each other. To do this, it would suffice that he be able to distinguish the word that represents the act (i.e., the verb) from the word that represents what is read, eaten, sung, etc.; he then need learn merely that the word for the act goes in the middle, after the actor; the word for what is read, eaten, or sung would then have to take the third position, since this would be the only untaken slot. The important logical point behind this possibility is that, so long as there is no ambiguity about the actor, there always exists a semantic basis for ordering verb and object that does not presuppose that the child has registered some caselike semantic relation between the verbs and the object nouns. There is no good evidence in the corpora to indicate that this possible basis for verb-object order is used by children. However, it may be suggestive that in Kendall II the verb is always placed

in the middle in the three-term combinations, but the order of verb and object seems to be random when the actor-term is omitted. However, there are other explanations for this phenomenon, as noted in the discussion of Kendall II.

In general, these corpora unfortunately provide only a little information about the basis of the development of verb-object forms in children. Corpora that portray the first clearly productive verb-object forms are needed.

THE NATURE OF THE RULE SYSTEM: LIMITED-SCOPE FORMULAE

Both the analyses of the individual corpora and the evidence from individual differences among the children indicate that the productive patterns are substantially independent acquisitions. The most straightforward interpretation is, I believe, the one summarized in the introduction to this paper: that the children are learning, seriatim, a number of formulae of limited scope, each formula being a rule that maps elements of a semantic representation into positions in the surface structure. The formulae are limited in scope in that each is concerned with a specific, often quite narrow, range of relational conceptual content.

If this interpretation of the data is correct, then the linguistic system the children are acquiring is not a generative grammar in the strict sense. It is, rather, a transducer, that is, a system of mapping rules, each rule mapping a particular semantic relationship into a set of word combinations. In order to generate the word combinations in the usual sense of a generative grammar, one would need a system of rules that generated the semantic relationships as well as rules that mapped them into surface form. The limited-scope formulae do not generate the semantic content of the positional patterns; they merely pair semantic content with surface form, that is, each formula maps a given kind of semantic content into speech. Thus, the formulae constitute a transducer rather than a complete generative grammar.

As noted earlier, in the discussion of the purpose of utterances, we know little about the cognitions that stimulate a child to speech. They may well contain elements that are not represented in the final utterance. From a formal point of view, therefore, the semantic representations of the positional patterns have to be viewed as input conditions to the mapping rules. That is, for a given formula to operate, the cognitive content to be expressed must contain an identification of an object, or a recurrence relation, a possession relation, an actor-action relation, etc. The formula then provides the cognitive content with a surface form by mapping the components of the semantic representation into utterance positions. It may be noted that the mapping

rules are not the same as the transformational rules of a transformational grammar, since the input to orthodox transformational rules is an ordered string of elements (a phrase marker) whereas the input to the children's rules is conceptual in nature, and there is no reason to suppose that its components have any linear order. Schlesinger (1971a) has previously argued that a child grammar should have the form of a transducer rather than a generative grammar (though he does not use the term "transducer"). The details of his proposals are discussed later.

A complete generative system (i.e., rules that generated the semantic contents of patterns together with the mapping rules of the transducer) would be a system of the kind known in the linguistic literature as "generative semantics." However, the attempt to specify a generator of all possible ideas that a 2-year-old could express in words seems like an overly ambitious undertaking at the present time. It seems to me that the transducer is a more reasonable goal of theory construction. However, even to formulate a grammar that consisted only of mapping rules of the kind needed, one would have to propose a notation for representing the semantic content of the productive patterns. It is difficult to do this without highly speculative assumptions, and I shall not propose any formalism in this paper. The truth of the general claim, that the children are acquiring rules that map the components of semantic representations into positions in the surface structure, in no wise depends on the detailed adequacy of any particular notation.

IV. OTHER THEORIES OF THE RULE
SYSTEM ACQUIRED

The previous chapter argued that the most straightforward interpretation of the data presented by the corpora is that each child has acquired a collection of largely independent formulae of limited scope that map components of meaning into positions in the surface structure of utterances. Other views of the nature of the children's rule system are now considered and their merits and defects discussed in relation to the limited-scope-formula theory. We begin with a detailed critique of the influential view that the children are acquiring the rules of the phrase-structure component of an orthodox transformational grammar. There is then a comparison of two proposed explanations of the undeveloped nature of many action phrases in the corpora, especially of the absence of verbs. We then review the theory that the children are acquiring a case grammar. Following this, Schlesinger's view that children are acquiring realization rules that map meaning into form, and my early pivot-grammar hypothesis, are each discussed in relation to the present proposal. Finally, a possible objection to the limited-scope-formula theory is considered.

THE TRANSFORMATIONAL-GRAMMAR THEORY

The transformational-grammar theory holds that the children are acquiring the rules of an orthodox transformational grammar, that is, a grammar that follows the formalism of Chomsky (1957; or 1965) and has a phrase-structure component that has the categories VP, NP, noun, and verb and contains the rules S → NP + VP, VP → V + NP, and the like.[15] Two gram-

[15] A broader interpretation of the term "transformational-grammar theory" is possible: this would claim merely that the children's rule systems could be expressed using the mathematical formalism of a transformational grammar. I do not think that this broad interpretation could be refuted by data. It should be noted therefore that the arguments in this subsection bear on a relatively restricted kind of transformational grammar, one that has the syntactic categories and phrase-structure rules stated; this is, however, the kind of transformational grammar universally adopted by linguists who follow Chomsky (1965).

mars written in the early sixties (my [1971b] grammar of Andrew for a stage of development later than that of table 1, and Brown & Fraser's [1963] grammar of Eve) contained only a phrase-structure component. More recent grammars (Bloom 1970; Bowerman 1973a; Brown, Cazden, & Bellugi 1969) contain lexical feature rules and a small number of transformations in addition to the phrase-structure component. However, the main burden of generating word combinations is always carried by the phrase-structure component, and the discussion will focus on that. With one exception, the transformational rules are unimportant. (The exception is the reduction transformation of Bloom and Bowerman, which is discussed in the next subsection of this paper.)

Two influential arguments against the transformational-grammar theory, and one in favor of it, are based not on the evidence of child speech but on broader considerations having to do with strategy of theory construction. Schlesinger (1971a) considers how to account for speech production in adults as well as children and argues that a production model would be difficult to construct, and would operate very clumsily, if the linguistic rule system it contained had to be a transformational grammar. In his opinion, a rule system of the kind now known as "generative semantics" would be much easier to incorporate into a production model and is therefore preferable in principle. This general opinion is widely shared among people who have tried to build psychological or computer models (e.g., Kintsch 1972; Winograd 1972). Another argument against the theory, that has been strongly made by several people (e.g., Bowerman 1973a, 1973b; MacNamara 1972; Sinclair-deZwart 1973), is that a grammar with a semantic base would make language acquisition easier to understand, since the semantic categories could be identified with cognitive categories emerging in the child's early conceptual development. On the other hand, an influential argument in favor of the transformational-grammar theory, cited by Brown (1973), is based on the presumption that a transformational grammar is necessary to account for the adult language. This presumption is itself very controversial but is certainly based on much stronger evidence than is the transformational-grammar theory of child speech. The argument is that a theory of the development from child to adult would be much simpler if one assumes that the child has a linguistic system of the same general character as the adult.

Discussions of the transformational-grammar theory that are based on the child data themselves have so far also been inconclusive. Schlesinger (1971a) argues that the available data are perfectly consistent with the view that children are learning realization rules for expressing semantic intentions. Nor has anyone claimed that the child data alone force one to prefer

a transformational grammar over other linguistic systems. Kernan (1969) criticizes Bloom's transformational grammars on the ground that, although she uses the meaning of the child's utterance to arrive at the grammar, she does not incorporate the meaning into the grammar; he opts for a variant of case grammar. It is true that all of the transformational grammars in the child literature lack a semantic component and are, therefore, certainly incomplete. However, as Brown (1973) points out, this lack is not itself evidence against the transformational-grammar theory, since a complete grammar of this type would contain projection rules that provide a semantic interpretation for every pair of constituents (i.e., subject-verb, verb-object, modifier-noun, etc.) generated by the phrase-structure rules. To make an objection like Kernan's stick, one would have to show the nonfeasibility of such projection rules.

Bowerman's Critique

The most fully developed critique that is based on examination of child corpora is Bowerman's (1973a, 1973b). She constructs transformational grammars for her subjects and then seeks out their deficiencies. (Two of her three grammars are for corpora more linguistically developed than those reviewed above.) Her first argument attacks the VP constituent: she considers subject-verb-object and subject-verb-locative sentences and finds that there is no basis in the child data for viewing them as hierarchically organized, with verb-object and verb-locative as the predicate constituent of a subject-predicate sentence structure. Taken alone, this argument disturbs only the VP-constituent of the transformational-grammar theory. Bowerman then points out that the kinds of evidence that support the existence of the category "deep-structure subject" in the adult language simply do not exist in the child corpora. Moreover, the first emergence of major syntactic categories like "subject of verb" and "object of verb" typically seem to be tied to particular meanings. "Subjects" are actors vis-à-vis the verb ("agents" in Bowerman's terminology), and object NPs tend to be "patients" of the verb. She cites Gvozdev's data (described earlier) on Zhenya's first case-marked category of direct objects in which the action indicated by the verb was usually one of transfer or relocation of the objects, involving verbs like *give, put, throw, carry,* etc.; as noted earlier, Tofi may have acquired a verb-patient relation similar to Zhenya's, in connection with much the same semantic group of verbs. Thus, the syntactic categories "subject" and "object" do not seem to be needed to describe the data. Bowerman concludes that "using the transformational framework for writing grammars for children forces us to postulate deep structure constituents and grammatical relations which have

not been justified and which thus may not correspond to the characteristics of children's linguistic knowledge. We do not need such powerful and abstract grammatical concepts as 'subject' and 'predicate' to represent the facts of children's speech early in development, and to write grammars which give them formal representation is to rely too heavily upon concepts needed for an adequate explanation of adult speech without recognition that the phenomena which necessitate them may be absent from child speech" (1973a, p. 194).

The corpora reviewed clearly support Bowerman's conclusion. But her critique, as she points out, does not prove that the transformational-grammar theory is inconsistent with the corpora but only that a semantically based theory might be at least equally good. It seems to me, however, that a stronger conclusion than Bowerman's is possible, namely, that there are facts in the corpora with which the transformational-grammar theory is demonstrably inconsistent, indicating that the children are not acquiring an orthodox grammar.

Strengthening Bowerman's Critique

The corpora indicate that actor-action phrases and phrases consisting of a noun followed by a nondeictic locative do not necessarily develop simultaneously. Suppose, therefore, a child who has developed a productive actor-action positional pattern, but has not yet developed locatives. An orthodox grammar would generate the actor-action combinations by the rules (1) and (2):

$$S \rightarrow NP + VP \tag{1}$$
$$VP \rightarrow (V) + (NP) \tag{2}$$

Now suppose that at some later time this child is found to have a locative positional pattern. An orthodox grammar would account for the development of the locatives by expanding rule (2) to (2').

$$VP \rightarrow \begin{Bmatrix} (V) + (NP) \\ \text{Locative} \end{Bmatrix} \tag{2'}$$

Now notice that the ordering of the constituents of the locative pattern is given not by the new rule but by rule (1), which was learned at the earlier time. It follows, therefore, that if the locatives emerge after the actor-action pattern, they must emerge with their components properly ordered, that is, A GROPING PATTERN FOR LOCATIVES SHOULD NEVER BE OBSERVED IN A CHILD WHO ALREADY HAS A PRODUCTIVE ACTOR-ACTION PATTERN. But in both Kendall I and Seppo we find

a groping pattern for locatives coexisting with a productive actor-action pattern. This finding is not consistent with a grammar containing the syntactic categories subject and VP.

The same argument would of course also predict that a groping pattern for actor-action combinations should be impossible in children who already have a productive locative positional pattern. There are no corpora that refute this prediction in the small set of children reviewed, but such cases may well appear as corpora become available for additional children.

This same line of argument would apply particularly strongly if one found a child with two different "subject-predicate" patterns that were oppositely ordered, one in the normal order with the "subject" first, and the other with the "subject" second and the "VP" first. Essentially this seems to be present in the Jonathan II corpus. There is a clearly productive normally ordered locative pattern and some evidence (though less good) for an actor-action pattern. But alongside these there are five combinations of the form *boom-boom* + X, each of which notes that the object in question fell down. This is just the kind of meaning that is normally expressed by means of a subject-predicate utterance, and, if the order had been reversed, no one writing an orthodox grammar would have the least hesitation in representing those utterances as subject-predicate forms. The same corpus also contains several combinations of the form *allgone* + X, which are also perfectly open to analysis as subject-predicate forms with the subject second. The conclusion has to be that "subject" and "VP" are not categories of Jonathan's grammar. In sum, there is evidence from three of the children reviewed that the syntactic categories "subject" and "VP" do not exist in children's rule systems. The putative "subject-predicate" forms are really a number of unrelated patterns that are independently acquired and independently orderable.

The form of the argument is quite general. Thus, wherever an orthodox grammar has a set of rules of the form A → B + C, C → D, E, F, . . . , then once a child has developed one of the patterns BD, BE, BF, . . . , none of the other patterns of the set should go through a groping stage as it emerges; nor should they emerge with their constituents consistently in the opposite order to those of the first pattern.

There is one other instance within the available corpora where this form of argument can be used to refute rules. In one or another corpus one finds a number of combinations in which the first component is a possessor, or a word like *other*, *two*, *big*, *hot*, etc. Grammars for children have usually represented these combinations as NPs of modifier-plus-noun structure. It follows then that, once the first such "modifier" has developed, no groping

pattern should be possible for any of the subsequently emerging modifiers. However, the combinations with *wet* and *all wet* in Jonathan II provide a clear case of such a groping pattern and thus refute the "modifier" category.

Are There Part-of-Speech Categories in Children's Grammars?

Apart from its empirical inadequacy, the transformational-grammar theory is undesirable in another way that has to do with the notation used in phrase-structure grammars. Phrase-structure rules have a single category symbol on the left-hand side of the arrow and either words or one or more category symbols on the right-hand side. Orthodox grammars provide a standard vocabulary of category symbols: NP, VP, N, V, etc. The notation itself forces one to posit such categories in a child's speech, since there is no way to describe the patterns in a corpus without using the categories. Thus, a commitment to transformational grammar discourages worry about whether children actually have such categories. We have seen that there is good evidence against both the VP and the modifier categories. While I can find no evidence that clearly refutes the other categories, there is plenty of ground for concern about the assumption that they are real syntactic categories for young children.

Consider first the NP category. As just noted, combinations of the form possessor + possessed, *big* + X, *little* + X, *hot* + X, etc., are customarily analyzed as NPs. This categorization is arbitrary. In the adult language, the most common semantic role of an NP in a sentence (regardless of whether it is subject, object, indirect object, or whatever) is to indicate the entity or range of entities that stand in a particular relation to some verb or preposition, that is, in logical terminology, to indicate the argument of a predicate. The children's possessive and attributive combinations mostly occur in isolation and do not seem to serve this function. Thus, when Jonathan said "Mommy book" and "Daddy book," he was noting, of one book, that it was Mommy's, and of another that it was Daddy's; similarly, when he said "big tobacco" and "little tobacco," he was commenting on the fact that one tobacco can was big and another small. In neither case was he indicating which books or tobacco cans were involved in some activity or state of affairs; rather he seemed to be predicating possession or size of the books and cans in question. From a semantic point of view it would be more reasonable to develop these phrases from S nodes than from NP nodes. Thus, these isolated phrases are not evidence for an NP category. In general, if we are willing to assume that the semantic category "argument of a predicate" exists in the children's semantic representations (there is no known way of writing semantic representations without this assumption), then the corpora provide no

evidence for an NP category that is not identifiable with the semantic category.

Let us now consider the noun and verb categories. Virtually all work on child language has assumed, often without even cursory discussion, that noun and verb categories exist at least as early as the language has any combinatorial structure at all. The assumption stems in part from the fact that the notational system requires word-class categories, and in part from certain empirical facts about the corpora. The relevant empirical facts are that in many positional patterns the set of words found in one of the positions often belongs to a particular part of speech in the adult language. Thus, in patterns like *big X*, *hot X*, etc., the X item is almost always an English noun; in possessor + possessed, both components are English nouns; in the actor-action pattern, the actor component is a noun; and there are other examples of part-of-speech consistency. Of course, there are also patterns where there tends to be a rather striking lack of consistency: for instance, in *more* + X, the X item is often a verb, and other words appear that are neither nouns nor verbs; similarly, the action term in the actor-action pattern has no part-of-speech consistency. However, these variable cases have not been seen as counterexamples to the claim of part-of-speech consistency; instead, the rules generating these combinations are written to preserve part-of-speech consistency, and then various devices are adopted (optionality of constituents, or a reduction transformation that deletes a category) which have the effect of destroying the part-of-speech consistency that was written into the phrase-structure rules. Thus, the commitments of the notational system are preserved whether or not they clearly fit the distributional data. In the cases where the corpora show part-of-speech consistency, this consistency can be readily accounted for without positing noun and verb categories in the children's speech. The X item in patterns like *hot X* and *big X* is almost always an English noun, not because the child has a noun category as such but because the semantic representations of the patterns call for an entity in the X position that is big or hot, and it is a fact about the world that entities that are big or hot are most often concrete objects, and words representing concrete objects are characteristically nouns in the adult language. All cases of part-of-speech consistency in productive patterns seem easily accounted for in this manner, that is, as a joint consequence of the semantic representation of the pattern and the actual properties of the child's world. Part-of-speech consistency also turns up, outside productive patterns, in the patterns that were called "associative." As noted earlier, in the discussion of Andrew's corpus, the combinations in associative patterns have each been learned individually, so the part-of-speech consistency is here accounted for as a result

of rote learning of expressions in the adult language. In sum, there is no real evidence that noun and verb categories exist in the children's linguistic systems.[16]

Summary

The essential points of the critique of the transformational grammar theory are that there are phenomena in the corpora that are incompatible with the VP, subject, and modifier constituents of an orthodox grammar; and that there is no good evidence for the NP, noun, and verb categories, since all the phenomena that tend to support these categories are easily explained without assuming that the categories exist in the children's linguistic systems.

REDUCTION RULES VERSUS HOLOPHRASTIC LEXICAL INSERTION

Early in the recent era of work on language acquisition, Chomsky (1964) and Lees (1964) argued that a child typically commands a much more complete grammar than is manifest in his speech, and that the telegraphic quality of early child language is due to erasure processes, caused by the child's limited information-handling capacity, that eliminate structure during the internal computation of the sentence and the passage of the nerve impulses to the speech organs. While the Chomsky-Lees arguments were influential, the counterarguments that deny the existence of any wholesale erasure seem overwhelming (see Braine [1971b, sec. 2.41–42]; Brown [1973]; and Bloom [1973]; against the view that one-word utterances are reduced sentences). Moreover, no detailed spelling out of these erasure processes was ever attempted to show how they could account for the developmental data.

However, two reduction rules that bring about a limited form of erasure have been proposed by Bloom (1970) and Bowerman (1973a). Bloom's reduction transformation obligatorily deletes a category from any deep-struc-

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[16] Some readers have raised the question whether similar arguments could not be raised against the NP, noun, and verb categories for the adult language. For the adult language, the syntactic category, NP, is not in perfect correspondence with the semantic category, argument of a predicate, and hence cannot be equated with it. An obvious example of noncorrespondence is found in idioms, e.g., in *kick the bucket, the bucket* is not an argument of a predicate, *kick;* rather, the phrase as a whole has predicate status (equivalent to "die"), even though the components retain their grammatical individuality as verb and NP. Also, some marking of words in the lexicon for grammatical status as noun or verb has to be assumed for the adult language because, inter alia, of differences in form due to derivation, e.g., *refuse* has to be marked as verb and *refusal* as noun in order to block **George refusaled to come,* and **George's refuse to come.* . . . Thus, the grammatical categories NP, noun, and verb, have to be assumed to exist in adults' linguistic systems.

ture string three categories long. One of its effects, therefore, is to limit sentence length to two categories, in line with the idea that a child has difficulty producing utterances that are above some maximum complexity determined by the maturity of the child (Brown & Bellugi 1964; Brown & Fraser 1963). Bowerman's reduction rule deletes verbs only, and the deletion is optional.

A major motivation behind both rules is to explain the underdeveloped nature of many action terms in the corpora, especially the absence of verbs in some combinations. Thus, consider Kendall's *Melissa eye*, where *eye* is apparently being used to indicate the action of drawing an eye. The reduction-rule analysis assumes that the child's grammar generates the underlying form *Melissa draw eye* or *Melissa*-verb-*eye* and that the verb has been deleted by the reduction rule. According to this analysis, the child has mastered the rules necessary to generate three-term actor-verb-object forms at a time when there are few or no such forms in his speech.

I have discussed the reduction rule in detail elsewhere (Braine 1974b) and also offered an explanation for primitive action terms like *eye* in *Melissa eye* that does not assume any erasure of structure. The relevant arguments can be summarized as follows:

1. There is no statistical evidence for a performance constraint that tends to place a ceiling on utterance length in children's speech. The shortness of utterances in early corpora can readily be explained without assuming any such constraint, and the claim that there is such a constraint cannot therefore be used to support the reduction transformation.

2. Independent of the question whether or not a length constraint exists, there are good reasons for doubting that the undeveloped nature of many action terms is due to the child's being unable to process more complex forms (Brown 1973, pp. 238–239).

3. Children's undeveloped action terms can be accounted for by assuming that they lack complete command of the English rules for making action phrases and construct them by seizing on some salient feature of the action for which they have a word available. The choice process is the same as that by which words are selected in the earlier one-word utterances that have been called "holophrases" and that often have been thought to have the kind of meaning that sentences normally have (e.g., De Laguna 1927). This conception is in line with a suggestion by Sinclair-deZwart (1973, p. 23), and is developed in Braine (1974b) where the choice process was called "holophrastic lexical insertion," defined formally as the insertion of a word into a higher node of the rule system than it appropriately could be inserted in the adult language (i.e., into a phrase or sentence node). In the early one-word holophrases, the word for what is salient is inserted directly into the

S node; in two-word utterances like *Melissa eye* it is inserted into the action node. These utterances are less primitive than the one-word holophrases because the holophrastic process is confined to the action phrase that is the second component of the combination.

4. One way in which the holophrastic-insertion hypothesis is superior to the reduction rule is that it can readily account for the heterogeneity of the semantic roles played by action terms in early corpora. Action terms that are not English verbs are most frequently found in the patterns actor + action, *more* + X, and in negatives expressing rejection (*no* + X). Table 17 presents a selection of such combinations from a number of children to show their variety. The table shows that the word used as the action term can have many different semantic relations to the action. Thus, it is often the patient of the action (e.g., *more page*, *Daddy teeth*, and several other combinations); but in *no Mama*, *no chair*, *more truck*, *more train*, *more outside*, *Jonathan up sky*, *Daddy work*, and *Betty head*, it is in a locative relation to the action, and more than one kind of locative is involved; in *Kathryn bear*, it is in a dative relation to the action; in *more car*, *Mommy oops*, and *Odi hallo*, still other relations are

TABLE 17

EXPRESSION OF ACTION IN WORD COMBINATIONS

Utterance	Situation or Gloss
No mama	"I don't want to go to mama." (Andrew I)
ə no chair	She doesn't want the lambs to sit on the chair. (Kathryn I)
More car	As the car parks after a drive; wants to keep driving. (Andrew I)
More page	Requesting the adult to turn over book page. (Andrew II)
More outside	Asking to go out in the yard again. (Andrew II)
[Gia more read book]	
	Picking up book that she and L. had read previously. (Gia II)
. . . more book	
More truck	Gives L. label and truck, to put label on truck again. (Gia II)
More train	Looking for a second wire man to put on the train. (Gia II)
Mommy jacket	Pointing to her drying jacket that mother had washed. (Gia II)
Lois baby record	Asking L. to play "baby record" for her. (Gia II)
Kathryn ə bear	Giving a raisin to the toy bear. (Kathryn I)
Mommy ə Muffin Man	Apparently asking mother to sing the song. (Kathryn I)
Mommy oops	"Mommy said 'oops'." (Kendall I)
Melissa car	Melissa was getting into Kendall's family's car. (Kendall I)
Daddy teeth	"Daddy brushing teeth." (Kendall I)
Kendall spider	"Kendall looked at a spider." (Kendall II)
Daddy work	Daddy had just left to go to work. (Jonathan II)
Jonathan tree	"Jonathan climb tree." (Jonathan III)
Jonathan up sky	Craning his head back looking up at the sky. (Jonathan IV)
Betty head	Betty was moving a tractor along the top of Stevie's head. (Stevie)
Cindy bottle	Cindy is bringing in a bottle of milk. (Stevie)
Odi hallo	Response to "What are you doing?" She is telephoning. (Odi)
Tipu mamma	"Chick [eating] food." (Seppo)
Täti mamma	"Lady [serving] food [to bear]." (Seppo)

involved. The holophrastic-insertion hypothesis predicts such variety because the word choice is determined pragmatically and not by the syntactic or semantic relation of the word to the action. According to the most common form of the reduction rule, however, if the word serving as the action term is not the verb, then it should be the object of the action. This follows from the fact that in Bloom's grammars for Kathryn and Gia the only rule that generates action phrases is the rule $VP \rightarrow V + NP$, and hence in Blooms' grammars deletion within action phrases is always from verb-object sequences; Bowerman's reduction for Seppo I also deletes only from verb-object sequences (though her rule for Seppo II deletes the verb from verb-locative also). Thus, current formulations of the reduction rule fit the data poorly.

5. Another disadvantage of the reduction-rule analysis is that it must assume an implausible developmental discontinuity in the mechanism generating utterances. Bloom (1973) argues convincingly that the one-word "holophrases" are not generated by reduction from sentential structures but by choice of a word that directly reflects a cognition of the kind that is later expressed by a combination of words. The holophrastic-insertion hypothesis is essentially an extension of this mechanism to a later stage of development. However, Bloom assumes that the one-word action phrases in the combinations of her subjects Kathryn and Gia are essentially different from the earlier one-word holophrases. According to the holophrastic-insertion hypothesis there is continuity: the type of lexical insertion is always the same; it merely becomes more restricted in its locus of appearance as the child acquires more of the linguistic structure of the language.

6. Even within the combinations, the reduction-rule analysis may be forced to assume two kinds of generation. Bloom is unwilling to posit underlying subject-verb-object structures unless there is evidence in the corpus that both subject-verb and verb-object combinations are productive (Bloom 1970, 1973). If this criterion is followed, forms like *Melissa eye* in Kendall I cannot be generated by reduction because there is no evidence for a productive verb-object pattern in Kendall I. They would therefore have to be generated in some other way, possibly by holophrastic insertion like the one-word utterances. However, there is nothing to suggest that the combinations *Melissa eye, Kimmy BM, Mommy oops, Melissa car* in Kendall I are really different in character from other combinations in table 17. The evidence from Kendall I and II and Seppo indicates that the occurrence of such forms in a corpus depends only on the presence of a productive actor-action pattern; it does not also depend, as I think Bloom and Bowerman assume, on a productive verb-object pattern (or verb-locative, or other pattern for composing

81

action phrases). It seems most implausible to assume that such forms are generated in one way (reduction) when there is a productive verb-object pattern and in another way (holophrastic insertion, presumably) when there is not.

7. It might be objected against the holophrastic-insertion hypothesis that one-word holophrastic action phrases sometimes coexist with action phrases containing both verb and noun: if the child is able to realize the action constituent with both verb and noun, why does he not always do so? The answer is that it seems never to happen in development that more developed forms replace primitive forms instantaneously; there always appears to be a period during which the more mature and the less mature forms coexist before the primitive form disappears. The period of coexistence is easily explained if learning is a matter of degree. Thus, there may be two degrees of mastery of a new linguistic structure: "initial" mastery when the new structure first becomes productive, and "final" mastery when it is used on essentially every occasion that its use is called for. Forms like *Daddy tower* and *Daddy make tower* (or *more book* and *more read book* in table 17) will coexist when some verb-object structure has become productive, but final mastery has not yet been reached.

THE CASE-GRAMMAR HYPOTHESIS

According to the case-grammar hypothesis, the children are acquiring a grammar of the kind described by Fillmore (1968). A case grammar contains expansion rules and transformational rules, like an orthodox transformational grammar. The expansion rules develop the underlying structures of sentences and are just like phrase-structure rules in form except that the constituents are not ordered. The principal constituent of every sentence is a proposition. A case grammar assumes that the logical structure of a proposition is that of a predicate (verb) and its arguments, and it makes the special claim that all arguments can be classified into one or other of a universal set of categories ("cases"), according to the nature of the semantic relation of the argument to the predicate. Thus, a proposition consists of a verb and a string of cases. In Fillmore (1968), an argument can be in an agent, instrument, dative, objective, factitive, or locative relation to the verb; there also may be other cases (e.g., benefactive, essive, comitative); the set of possible cases is left open.

Case grammar has proved attractive because it seems to provide a semantic basis for the early syntactic structures, and because there has appeared to be a good match between some of the cases and children's early semantic

categories (Kernan 1969, 1970). Bowerman (1973a) finds case grammar superior to orthodox transformational grammar, though she is also critical of some aspects of it. Brown reports that "all six case concepts posited as universal are to be found in Adam I" (1973, p. 139). Moreover, despite its formal similarity to an orthodox grammar, case grammar escapes most of the criticisms of transformational grammar formulated earlier. Thus, there is no generalized subject-predicate distinction and therefore no VP category to be criticized, nor is there any modifier category. While the existence of the part-of-speech categories verb, NP, and noun are assumed by the case-grammar notation, the categories verb and NP are explicitly identified with the logical categories "predicate" and "argument" and thus escape the previous criticism of these categories. On the other hand, a case grammar does assume the noun category without providing a semantic basis for it, and thus is subject to the same criticism as the orthodox grammar that it reads this category into children's heads without adequate supporting data.

The main issue in evaluating case grammar as a theory of the linguistic structures the children are acquiring is whether the case categories do indeed have a point-by-point correspondence with the semantic relations that are apparent in the children's productive positional formulae. It seems to me that the goodness of fit is more apparent than real. There seem to be three main ways in which the fit is poor:

1. The children's semantic categories seem much more concrete than Fillmore's cases. As Bowerman (1973a) points out, some of Fillmore's case categories, especially the dative and objective, are far broader than the categories the children seem to be using. Fillmore's dative refers to an animate object affected by the state or action of the verb; it is exemplified by the indirect object of verbs like *show* or *give*, the direct object of verbs like *murder* or *order*, the subject of verbs like *see* or *want*, and by possessives. Only the possessive among these is common in the corpora, and there is nothing that remotely suggests that the relation acquired is "person affected" or anything broader than possession or custody. In children who also know the verbs *see* or *want*, there is no evidence that a person seeing or wanting and a possessor fall into a common conceptual category. Fillmore uses the objective case as the residual category to which inanimate objects are assigned that do not fall into other cases. It includes many objects of verbs, many inanimate subjects of intransitive verbs, nouns of which adjectives are predicated, and nouns for items possessed or items whose location is indicated. This is a very heterogenous collection of semantic roles, and there is no reason to imagine that the children assign them to a common category. Case grammar would require, for example, that *shell* in *Daddy shell* ("Daddy's shell"), *lion* in *big*

lion, block in *bite block, sand* in *sand eye* ("sand in the eye"), and *coffee* in *boom-boom coffee* all have the same semantic status for Jonathan. The data indicate that such forms belong to independent positional patterns in the corpora. The most straightforward assumption for each pattern is that the semantic role is defined by the semantic relation expressed by the pattern. There is no evidence for broader categories.

2. Fillmore's agent is by no means identical to the actor of the children's actor-action positional pattern. The prototype of Fillmore's agent is the animate subject of a causative verb (since it is only with respect to causative verbs that all the contrasts can be drawn among agent, dative, objective, and instrumental). In the corpora reviewed, the actions that are represented in the actor-action patterns are not those represented by causative verbs; they are mostly simple actions like sitting, running, eating, making a bowel movement, and the like. Within Fillmore's system, the distinction between agent and dative is hard to make for this kind of action and often seems quite arbitrary. Thus, Fillmore would presumably classify the subjects of *walk* and *run* as agents, the subjects of *sleep* and *cry* ("weep") would be datives; it is not clear to me how he would classify the subjects of *sit* or *lie.* Yet such actions as these are characteristic of the actor-action patterns of the corpora reviewed. For each action there is an obvious sense in which the preverbal noun performs the action indicated by the verb, and it seems to be this naive sense of an actor performing an action that the child has caught on to and that defines the semantics of the pattern. Fillmore's agent-dative distinction is simply too sophisticated to be appropriate to these corpora. The children's early actor category is thus not equivalent to either Fillmore's agent or his dative.[17] Since the apparent correspondence of agent and actor has been one of the main attractions of case grammar to students of child language the noncorrespondence is important to note.

3. There are some common productive patterns in the corpora to which the case categories seem irrelevant. For example, it is hard to know what case X should be assigned in *more* + X. In the adult language *more* would be a modifier, and the case of X would be determined by its relation to some verb. Yet in the children the purpose of the pattern is to express recurrence, so the focal relationship for the child seems to be between *more* and whatever is expressed by X. Also, one cannot adopt the adult treatment for the children without committing oneself to the reduction transformation criticized in the previous section, because a verb (moreover, a specific verb) would have

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[17] There is evidence in adult speech also for an actor category without an agent-nonagent contrast (Bucci 1975).

to be introduced into the underlying structure to determine the case of X, and the verb would then have to be deleted. Bowerman (1973a, p. 124) describes some other difficulties in handling patterns where one of the elements is a modifier in the adult language.

In summary, Fillmore's agentive, objective, and dative cases do not fit the child data. Possible examples of the comitative, instrumental, and factitive cases are rare in the early corpora. There are semantic categories in the corpora to which nothing corresponds in case grammar. This leaves the locative as the only example of a clear fit between a Fillmorean case and a semantic category in the corpora.

Chafe (1970) has proposed a set of cases that are somewhat different from Fillmore's, and Fillmore (1971) has revised his original proposals. However, the same or similar criticisms apply to the modifications. In general, the most straightforward assumption about the children's semantic categories is that they are precisely the relations expressed in their productive patterns. Case categories from adult linguistics are almost certainly wrong insofar as they imply more abstract or otherwise different categories.

What Case Categories are Present Early in Language Development?

So far we have discussed "case grammar" as a particular kind of linguistic system that might be generating the early word combinations. However, "case" is also used as a general term for types of semantic relations that the arguments of a predicate can have to the predicate (or, in the adult language, that the nouns in a sentence can have to the main verb). The latter usage need not imply any commitment to "case grammar" as a linguistic theory, nor to any particular set of case categories that have yet been proposed. Within this neutral framework, one can inquire what case categories there is evidence for early in development. There are only two cases for which there is good supporting data in these corpora: "actor" and "locative." A third case, "patient" (= "object moved or manipulated by the act indicated by the verb," approximately), is indicated by other literature on somewhat older children (Gvozdev 1961) and is glimpsed here in the corpus of Tofi. However, there is no evidence yet that this category ever applies to nouns that are subjects of sentences in the adult language. As noted earlier, "patient" would logically seem to imply a contrasting "agent," which could well emerge as a subcategory of "actor," as causative movement verbs are mastered. It seems to the writer that studies of later language development might provide an avenue for empirical determination of the case categories of the adult language.

SCHLESINGER'S REALIZATION RULES AND PIVOT GRAMMAR

The interpretation of the corpora proposed here, the limited-scope formula hypothesis, has much in common both with the proposals of Schlesinger (1971a, 1971b, 1975), and with my earlier pivot-construction proposals (Braine 1963). It joins together the viable parts of both of these, while at the same time rejecting parts that can now be seen to have been misconceived.

Schlesinger's Proposal

The essence of Schlesinger's proposal was that children acquire "position rules" which map semantic-conceptual categories into positions in utterances. This notion is the governing idea of the present proposal. Unfortunately, owing to the paucity of data available to him, Schlesinger was not in a position to base his proposed semantic categories on a comparative analysis of corpora, and it now seems that the mapping rules that he suggested to flesh out his proposal contain serious errors. The most important problem is that the categories he proposed tend to be modeled too closely on adult syntactic categories.

Schlesinger (1971a) proposed eight position rules, which will be discussed in turn. His first three rules are, respectively: agent + action, action + direct object (for which he provides the examples *see more, want more,* and *pick glove* "pick glove up"), and agent + direct object (for which the examples offered are *Eve lunch, Mommy sandwich,* and *Betty cinnamon toast,* the sense being that Eve, Mommy, and Betty are consuming or are to consume the named food). There are two main problems. (1) For reasons given in the discussion of the reduction transformation, the third rule is inappropriate (as table 17 shows, nouns under the action node are not adequately characterized as direct objects, since they can have several other kinds of relation to the apparently missing verb); moreover, a separate rule for such nouns is not necessary. Thus, Schlesinger's third rule can be dropped, and its purposes achieved by the first rule, which then becomes equivalent to what I have called "actor + action." (For reasons given in the critique of case grammar, the term "actor" is preferable to avoid the connotations of "agent.")[18] (2) The second rule is not acceptable. As Brown (1973) notes, the term "direct object" is purely a syntactic category and as such it should not appear in a rule that calls for conceptual categories: in adult English, direct objects play several quite distinct semantic roles. The English verb-object pairs that occur in the corpora are also semantically heterogenous and belong to several different positional patterns, as indeed the three ex-

[18] Actually, Schlesinger's (1971b) idea that agent might function as a "generalized pivot" essentially amounts to merging his first and third rules into an actor-action schema.

amples cited by Schlesinger demonstrate. Thus, *see sock* is part of a pattern for drawing attention to something (like *here* + X) (Schlesinger himself later classifies the very similar *see boy* this way, when he assigns it to the rule introducer + X); *want more* is from a request pattern; *pick glove* is probably from act + patient, or movement + object moved, or some semantically similar pattern.

Schlesinger's fourth rule is modifier + head, and his examples are *pretty boat, big boat, more nut, my stool, baby book,* and *baby car.* Like "direct object," "modifier" and "head" are syntactic categories and therefore not permissible in rules that demand conceptual categories. The semantic heterogeneity is evident from the examples. The evidence from the corpora indicates not one rule but a variety of separate formulae. Thus, where utterances like *pretty boat* and *big boat* are from productive patterns, the evidence from Jonathan suggests that they are independent patterns of the constant-plus-variable type (*pretty* + X, *big* + X), each remarking on a specific attribute. *More nut* is obviously from the pattern *more* + X, and there is no evidence for any conceptual relation to patterns not expressing recurrence. *My stool* and *baby book* are from the possessive formula.

There is good evidence for the fifth rule, negation + X. However, the sixth rule, X + dative, is subject to attack as being based on only one example. Also, it is not clear whether "dative" is to be construed syntactically, as equivalent to "indirect object," in which case it is an inadmissible category for the same reasons that direct object and modifier were inadmissible, or as equivalent to Fillmore's dative, in which case it is too broad. The seventh rule, introducer + X, covers the combinations that draw attention to things or identify them (e.g., *see* + X, *here/there* + X, *it/that* + X). The rule is responsive to patterns in the corpora, but the corpora suggest a number of different, though semantically similar, constant-plus-variable formulae rather than the single formula introducer + X. There is good evidence for the eighth rule, X + locative, except that Schlesinger assumes that locatives with *here* and *there* are generated by the same rule as other kinds of locative, whereas the corpora suggest that they may not be.

In summary, the problems with Schlesinger's position rules are that they seem to allow syntactic categories to masquerade as conceptual ones; and that they are too few and broad: the corpora indicate more rules, much more limited in scope.

Schlesinger's article also presents a notation for realization rules that combines position rules and part-of-speech assignments. It is proposed as appropriate for later stages of development of the language and is therefore

not germane here. His view that early stages of development do not show mastery of grammatical categories is well in accord with the evidence.

The Pivot Concept

The present proposal echoes two important aspects of the original pivot-construction analysis: the notions that limited formulae (rather than broad grammatical generalizations) are learned one after another during the early development, and that the formulae are positional.

The pivot analysis had two faults which are now glaringly obvious. One was that it claimed that children always begin with formulae of constant-plus-variable structure, whereas it is now clear that this claim is false.[19]

The other fault is that, in line with the linguistics *Zeitgeist* of the time, it studiedly ignored the obvious fact that the patterns reflected semantic relationships. Both these defects are now remedied.

A POSSIBLE OBJECTION TO THE LIMITED-SCOPE-FORMULA HYPOTHESIS

Because its interpretations make few inductive leaps from the evidence of the corpora, it seems unlikely that the theory proposed will be falsified by further text gathering at early stages of development, though details will no doubt be subject to amendment. However, the very fact that it stays close to the child data lays it open to an apparent objection that has previously been raised against the pivot analysis and against Schlesinger's proposals. This is that, because its formulae are "expressly tailored to the facts of early child speech it is unclear how these rules would develop into a grammar adequate even to Stage II let alone adult speech" (Brown 1973, p. 217). Thus, the objection might continue, since the older child and adult do manifest broad grammatical rules and part-of-speech categories, the present theory must suppose some discontinuity in development, where a transition to a more adult type of linguistic system takes place.

If properly construed, this objection is not really an objection at all but rather a virtue of the present proposal. First, there is nothing in the proposal that requires any sharp discontinuity in development. The proposal indeed implies that the average child of around 24–27 months knows less about English structure than either the transformational-grammar or case-

[19] Nevertheless, it is clearly true that constant-plus-variable formulae are very frequent in early corpora and that Brown (1973) is wrong in saying that they are confined to the expression of what he calls "operations of reference," i.e., drawing attention to something, identifying it, noting or requesting recurrence, or noting disappearance. The corpora contain many examples of constant-plus-variable formulae expressing other meanings.

grammar hypotheses imply that he knows; it therefore allows for more gradual learning than the other theories, a possible virtue. Moreover, some of the breadth of the adult's rules and relational categories (e.g., subject, modifier, etc.) could be more apparent than real: the apparent breadth could be due to accumulation of detailed learning rather than to single rules of very broad scope acquired early in language development; or, of course, it could be due to learning of detail followed by building of broader categories. It is a virtue of the present proposal that it makes the choice between such possibilities an empirical issue to be settled by work on the nature of subsequent stages of development. Finally, it is a major virtue of the present proposal that it makes an issue of the acquisition of part-of-speech categories. Since it does not posit knowledge of parts of speech for the early corpora, the need for a theory of the development of part-of-speech categories is made clear. The fact is that the developmental origins of word classes are not understood at all; there is not even an accepted timetable of development. Parts of speech have been read into the earliest stages of development primarily because of the notational commitment of phrase-structure grammars, with the result that the absence of a good theory has been concealed from view without being remedied.

V. SUMMARY AND CONCLUSIONS

Sixteen corpora of word combinations from children at an early stage of language development were analyzed, and the analyses lead to the following conclusions:

1. Three kinds of formal patterning are found in early corpora of word combinations. First, there are positional productive patterns. These are sets of combinations in which the same semantic relation is expressed using the same order of constituents and in which some of the combinations are not copied directly from adult speech. Each productive pattern results from the child acquiring a rule, here called a "limited-scope formula," that maps meaning into form by specifying where in the surface structure the words expressing the components of the semantic representation should be placed. Some of these formulae are of the constant-plus-variable type, as in the "pivot construction" of the earlier literature; in other common formulae both components are variable (e.g., actor + action, possessor + possessed). A high proportion of the combinations of most early corpora fall into positional productive patterns.

Positional associative patterns constitute a second kind of pattern. These are sets of combinations, probably always of constant-plus-variable form, where there is positional consistency without productivity. The child has registered the frequent occurrence of the constant term in a particular position in phrases in adult speech and learned a fair-sized batch of phrases of the type, but without acquiring a formula for coining new phrases.

The third kind of pattern was called a "groping" pattern. A groping pattern is a set of combinations—usually not a large set—in which the child is attempting to express a particular kind of meaning before he has acquired a rule that specifies the positions of the words. The word order is variable in the set because no order has yet been learned. A groping pattern is an early and temporary phenomenon and is always followed by a positional produc-

tive pattern expressing the same meaning, once the child has acquired a formula that determines the order of the constituents.

There are other cases of free word order in the corpora that are not groping patterns. In all such cases where sufficient longitudinal data were available to trace the sequence of development, it was clear that the variable word order was due to the child having acquired separate positional formulae for each order. The two formulae were acquired at different times, or there was a difference in semantic content expressed by each order. In general, variable word order is likely to arise for a pair of constituents whenever the adult language has both orders. The data suggest the following typical developmental sequence leading to the adult pattern. The first rule-governed stage is a positional pattern in which the child's word order is usually the order that is dominant in the adult language and reflects his learning of this order. This stage may or may not be preceded by a groping pattern. The positional pattern is followed by a stage where there is a sharp increase in the frequency of the nondominant order in the child's speech, to the point that this order becomes more common in the child's speech than in the adult's. This increase is due to the child learning the nondominant constituent order of the adult language; the child now has two rules, one generating each order. The final stage is one during which the relative frequencies of the two orders in the child's speech converge on those of the adult language. Presumably, this convergence is due to the child learning whatever the factors are, semantic or pragmatic, that determine the relative frequency in adult speech.

2. The corpora contain a few utterances with more than two terms which appear to have an hierarchical organization of constituents (e.g., Andrew's *other cover down there; that Kimmy ball* and *Ben swim pool* in Kendall II). The possibility of hierarchical organization is implicit in the semantic basis of the positional patterns. Thus, Andrew's formula *X down there* locates an object as being "down there"; since *other cover* identifies an object (as being other than one at hand), it can substitute for the X term of *X down there*. Thus, no special acquisition theory is required to account for hierarchical organization. The idea that children are acquiring positional formulae that map meaning into form predicts that hierarchical organization may appear whenever the semantic basis of the formulae permit one formula to be embedded in another, and there is a context where the result would make sense. Hierarchical organization is infrequent in early corpora for two reasons. One is that the small number of formulae provide few places where there is a semantic basis for embedding one in another. The other reason is that in early corpora, where there are many one-word utterances, the probability

of a child using any given formula is small, and the probability of two formulae being used in the same utterance is therefore very small (Braine 1974b). (Thus, given a full corpus that includes all the one-word utterances, if the probability of *X down there* is p, and the probability of *other X* is q, then the probability of *other X down there* might be expected to be pq and will be minute if p and q are both small.)

3. The range of semantic content found in the corpora agree well with the conclusions of other investigators (e.g., Bloom 1971; Brown 1973). The children talk to draw attention to things or identify them; or they note plurality or iteration, or recurrence and disappearance of things; or they note possession of things; or they talk about actor-action relations, or the location of objects and actions; or they remark on specific properties or class membership of objects; or they negate; and they request. The formulae that underlie the positional productive patterns are rules that map these sorts of meanings into surface structure.

4. The possibilities for variation among children are limited, on the one hand, by the range of semantic content talked about, and, on the other hand, by the kind of positional structure used to express it. Within these limits, children are about as different from each other as they could be. Each formula expresses a particular, often rather narrow, range of semantic content. Hence the formulae are referred to as formulae of "limited scope." There is no common order of emergence of formulae; indeed, there appear to be essentially no interdependencies among the formulae, indicating that each formula is an independent entity, independently acquirable. Each child's corpus is a sample from the rather wide range of possibilities open. Development at this stage consists in acquiring more and more formulae. As children develop by acquiring more formulae, children learning the same language will become more similar to each other and appear to converge on a common simplified grammar of that language.

5. The corpora provide much evidence that the children are not acquiring a simplified form of an orthodox transformational grammar of the type proposed by Chomsky and assumed in many studies of the linguistic structure of the language of adults. The evidence indicates that the children's linguistic categories are semantic, not grammatical. The broad phrase-structure rules of a transformational grammar ($S \rightarrow NP + VP$, $VP \rightarrow V + NP$, etc.) predict interdependencies among the children's productive patterns which are not compatible with the data. Moreover, there is no evidence that the children have mastered grammatical classes like noun and verb: all the distributional data that might appear to support the presence of these categories can be easily accounted for on other grounds, as a joint

function of the semantic bases of the limited-scope formulae and of the properties of the child's world.

6. Although the categories for which there is evidence are semantic categories, they are not the broad semantic categories posited in case grammars. They are simpler, more concrete, and usually much narrower in scope than the usual case categories. The rules proposed by Schlesinger also assume categories that are much too broad and fail by the same token. On the other hand, the kind of rule proposed by Schlesinger, that is, position rules that map components of a semantic representation into positions in the surface structure, is confirmed by the data.

7. In general, the evidence indicates that the literature has overestimated the syntactic competence manifest in early corpora. The widespread use of the transformational model has encouraged the assumption that children have mastered grammatical classes like noun and verb, and broad categories like subject and VP. Moreover, there are a number of instances where investigators have assumed that a rule was productive for a child when there were only one or two combinations in the corpus that could exemplify the rule. This has been particularly likely when the rule was one of the standard phrase-structure rules. The result is that the literature as a whole contains an analytic bias toward attributing considerably more grammatical structure to young children than is warranted by the corpora.

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COMMENTARY BY MELISSA BOWERMAN

What kind of knowledge underlies a child's first word combinations? Despite over a decade of intensive theorizing on the problem and recent advances in our knowledge of the semantic characteristics of children's utterances, a precise understanding of the nature of the early rules for sentence construction has yet to be reached. Braine's *Monograph* is directly addressed to this continuing gap in our knowledge. The author focuses with powerful analytical tools upon important questions concerning the nature, breadth, and order of emergence of the categories that constitute the structural components of children's first rules for combining words. The conclusions he arrives at are supported by carefully drawn and persuasive arguments. Some of them challenge existing hypotheses about the nature of the child's linguistic rule system. These proposals are valuable both in themselves as explicit alternate views of the relevant data and also because they clearly define some interpretive problems, the resolution of which will require further investigation and debate.

Three aspects of the *Monograph* are considered below under the headings "Methodological Considerations," "Some Theoretical Issues," and "Some Different Kinds of Rules."

Methodological Considerations

The last few years have seen intensive work on the semantic properties of children's early utterances. The semantic analysis of children's utterances has led to fruitful cross-linguistic comparisons and to new information on the course of development at the two- and three-word stage (Bowerman 1973a, Brown 1973). It is possible, suggests Brown (1973), that "in addition to summariz[ing] data and reveal[ing] uniformities," the description of children's utterances according to a set of semantic relationships may "repre-

sent a psychological *functional* level in sentence comprehension and production" (p. 173). But he reminds us that different investigators have used somewhat different systems of classifying utterances according to the semantic functions they perform, and he warns that we do not yet really know "how finely the [semantic] abstractions should be sliced . . . no proof exists that the semantic levels hit on by any theorist, whether Bloom, Schlesinger, Fillmore, or whomever, are psychologically functional. Nor is this a nonsense question. It is an empirical question awaiting a technique of investigation" (p. 146).

In the present study, Braine refines a set of techniques that answer to this need. Rather than classifying child utterances according to a preconceived set of semantic relations, he uses these techniques in analyzing 16 corpora of child speech in order to determine what kinds of abstractions are actually operating in children's own rule systems.

The methodological heart of the study is the section entitled Evidence on the Scope and Independence of Positional Patterns (Intrachild Evidence and Evidence from Individual Differences). Many of the types of evidence Braine works with to establish the scope of the rules—for example, simultaneity of emergence (or lack of it) of potentially related constructions—have been suggested or used by other investigators (e.g., Bloom, Lightbown, & Hood 1975; Bowerman 1973b, pp. 208–210, and in press; Brown 1973, p. 142; Greenfield, Smith, & Laufer, in press; Schlesinger 1974, p. 136). Nevertheless, they have never been so explicitly stated as in this study nor all applied in concert toward a common goal.

Braine's theoretical discussion of sources of evidence is fleshed out by his detailed considerations of the particulars of each corpus and of the problems encountered in analyzing it. This in depth "working through" of the data according to a set of procedures provides valuable guidelines on how to extract, from even a single corpus, a great deal of information on the child's probable rule system.

Some Theoretical Issues

Braine's major conclusion is that the structural knowledge children draw upon in constructing their earliest sentences can be represented as a small set of formulae, each one of which specifies how to combine words, usually in a particular order, so as to express a relatively restricted range of semantic content. Several aspects of this position are in clear conflict with other existing or in-press interpretations of child language data. The issues have to do with the degree of abstractness, completeness, and consistency in order of emergence of children's early linguistic knowledge.

1. *Early understanding of syntactic relationships?*—There has been much re-

cent debate over the issue of whether children base their initial rules for com-
bining and ordering words purely on semantic notions like "agent" and
"possessor," or acquire instead an early understanding of nonsemantic (syn-
tactic) relationships such as those holding between subject and predicate
(see Bloom et al. 1975; Bowerman 1973a, 1973b, 1974, 1975; Schlesinger
1971, 1974). Earlier arguments against crediting children with knowledge
of syntactic relationships were primarily negative, based on the observation
that there is no real evidence for such knowledge (e.g., Bowerman 1973a,
1973b). Braine's present arguments are much stronger. He suggests that
there is, in fact, clear-cut evidence that such knowledge is lacking.

In a recent *Monograph*, Bloom et al. (1975) take a position that contrasts
strikingly with Braine's. Reaffirming Bloom's (1970) original proposal that
children acquire an early understanding of abstract syntactic notions, these
investigators argue that the child's ability to use the same words in the same
sentence position in a variety of different semantic roles (e.g., "Mommy"
as possessor, as agent, as mover) indicates that the child has "made higher
order linguistic inductions about superordinate grammatical categories"
such as "subject." The existence of continuing debate over this question (see,
e.g., Bowerman [1975] for a critique of Bloom et al.'s argument) testifies to
the complexity of the problem. Braine's proposals add important additional
grist for the mill. The ultimate resolution of the issue (assuming one is
achieved) will contribute considerably to our understanding of the level of
abstraction at which children's initial strategies for processing language
operate.

2. *Richer deep than surface structure?*—A second way in which Braine's con-
clusions are potentially controversial involves the question of whether a
child's utterances provide a direct and complete view of his knowledge of
sentence structure. Several investigators have presented variations on the
argument that children may have a more complex and integrated grasp of
sentence structure than their limited sentence-programming span will allow
them to demonstrate within the boundaries of individual utterances (e.g.,
Antinucci & Parisi 1973; Bloom 1970). (My own suggestions [Bowerman
1973a] for a verb-deletion transformation are related, but I do not regard
them as belonging to quite the same genre, since [a] they were occasioned
primarily by the requirements of the frameworks for grammar-writing I
was testing, and [b] there was no indication in my own data that the failure
to include the postulated deep-structure elements in actual utterances was
due to limited programming span.) When the child's semantic intentions
are regarded as more complex than the sentences he actually produces, the

discrepancy must be accounted for. Bloom does this with a reduction transformation that deletes underlying elements, while Antinucci and Parisi do it by postulating a gradually increasing "lexicalization span" that allows the child to verbalize more and more of the structure that was implicitly there all along.

Braine's position in the present *Monograph* contrasts sharply with this "deep structure richer than surface structure" hypothesis. In his view, the relationship between children's actual utterances and their knowledge of sentence structure is very direct. For example, two-word utterances reflect simple formulae for relating two semantic notions, each of which is given lexical realization. While there are abstractions (e.g., the notion of "possessor" or "activities involving oral consumption"), there is no major discrepancy between what is produced and the "semantic intent" that underlies it.

The phenomena that led Bloom and Bowerman to propose erasure rules are accounted for by Braine without recourse to a distinction between a rich deep structure and an impoverished surface structure by a process he terms "holophrastic insertion." It is not clear how Braine would handle the characteristics of sentences upon which Antinucci and Parisi base their proposals; possibly "holophrastic insertion" could apply here too. (Phenomena similar to the ones they describe for the Italian child, Claudia, do not seem to occur in the samples Braine analyzes.) Braine's account of how holophrastic insertion can account for sentences like "Mommy sock" (agent-object) is intriguing and deserves further study.

3. *A regular sequence of acquisition?*—A third way in which Braine's proposals contrast with others in the literature involves the question of whether the ability to produce sentences of different semantic types emerges in a regular order. According to Braine, children differ greatly not only with respect to the specific semantic contents of their early productive formulae for sentence production but also with regard to the order in which they acquire the same or related patterns. Bloom et al. (1975), on the other hand, argue that the four children they studied acquired the ability to produce utterances of different types in a strikingly similar order: for example, constructions expressing the existence, nonexistence, or recurrence of objects preceded those involving verb relations; among verb relations, action events preceded state events, and so on.

Part of the discrepancy between the studies by Braine and by Bloom et al. is due to methodological differences involving the way in which utterances were classified (see Bowerman, in press). However, some real differences remain. For example, Bloom et al. found that constructions expressing

locative actions (X goes to Z, X moves Y to Z) consistently preceded those expressing locative states (X is located at Y), and they account for this by reference to the relative salience of dynamic over static events in the young child's experience. Yet Braine's analyses do not reveal this sequence. Some of the children in his study developed productive formulae for expressing locative actions prior to ones for locative states, but others began to produce utterances of both kinds at about the same time. Further empirical studies, including ones that classify the same set of utterances both as Braine did and as Bloom et al. did, are clearly needed to resolve the questions that arise from these discrepancies.

Some Different Kinds of Rules

Braine's study supports a proposal first made by Bloom (1970) to the effect that there are qualitatively different kinds of rules for sentence production. In one variety (which Bloom calls "pivotal") there is a function-like word which exerts a constant semantic and syntactic effect on the word with which it is combined. Another type of rule ("categorical," in Bloom's terminology) is more abstract, involving conceptual notions such as "possessor" or "location" that are independent of particular words.

There has been much attention paid to rules of the former type that involve words expressing notions of *existence* or *nomination* ("this," "that," etc.), *nonexistence* ("allgone," "no more," etc.), and *recurrence* ("more," " 'nother") (e.g. Bloom 1970; Brown 1970, 1973). Although utterances with these words do turn up frequently in child speech, Braine's analyses strongly support his claim that the formulation of rules based on how to combine particular lexical items with other words is by no means limited to words expressing nomination, nonexistence, and recurrence.

The detection of rules specifying how to combine particular words with other words often may be very difficult. In order to identify such a rule, a speech sample must contain a number of utterances for which it is responsible. Utterances with "this," "that," "more," "allgone," etc., occur frequently because, as Brown (1973) points out, nomination, recurrence, and nonexistence have "the widest possible range of application. Any thing, person, quality, or process can be named, can recur, and can disappear" (p. 170). (The semantic concept of "desire" or "demand," as expressed by "want," although not discussed by Brown, appears to have the same wide range of application.) But the relative infrequency of utterances containing other words such as "big," "green," or "walk" does not necessarily mean that when such utterances do occur they are generated by a different kind of rule— one that is more abstract in that it governs combinations with many other

lexical items as well. It might simply mean that there are relatively fewer occasions to produce utterances with these words because the concepts they represent have more restricted domains of application.

Let us look now at the other kind of rule for which Braine finds evidence: formulae based on semantic concepts that are more abstract than those expressed by individual words. Although Braine does not do so, I think it may be profitable to distinguish between two varieties of these. Concepts such as "actor" or "agent," "possessor," "possessed," "located," and "location" are essentially independent of the lexical meanings of the words performing these relational functions. For example, there is nothing inherent in the meaning of "Mommy" or "Kendall" that calls for these words to fulfill the roles of actor or possessor. But consider, in contrast, some of the other semantic notions that Braine suggests may be operating in one or another child's sample: for example, SIZE ("big," "little"), activities involving ORAL CONSUMPTION ("eat," "bite," etc.). Here, the concept that apparently serves as a structural component of the formula is closely tied to the lexical meanings of the words that may function in that role. Rules involving this kind of notion are abstract in the sense that they are not tied to particular words, as recurrence is tied to "more," but they differ from formulae of this very concrete nature only in that they make reference to a semantic feature common to more than one word. Formulating rules of this kind requires a somewhat different induction about linguistic structure than is needed either for rules based on the semantics of particular lexical items or for those involving categories that—like "possessor"—do not necessitate recognition of similarities in word meaning. Some children may arrive at such rules easily, while others may rarely use them. The processes involved in formulating rules of these various kinds require further study.

Conclusions

A number of interesting aspects of Braine's *Monograph* have not even been mentioned. Two particularly important ones are (1) the proposal that many of children's hitherto unexplained departures from "normal" word order can be explained as resulting from "groping patterns" which temporally precede the acquisition of order-based formulae for expressing the semantic relations in question, and (2) the observations concerning the need to distinguish between the conceptual notions of *agent* and *actor*. These and other topics Braine touches upon, in addition to the matters already discussed above, make this work an extraordinarily rich and interesting source of both methodological tools and of hypotheses about development that merit the closest attention.

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