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STRUCTURE AND VARIATION IN CHILD LANGUAGE

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ABSTRACT

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Patterns of structure and variation are described in the language development of four children in the period in which mean length of utterance progressed from 1.0 to approximately 2.5 morphemes. Verb relations were of central importance in the children's language learning, and there was a similar developmental sequence among the children in the emergence of several semantic-syntactic categories of verb relations. Possible linguistic and cognitive explanations for the obtained developmental sequence are discussed. There was variation among the children in the lexical representation in utterances: although all four children presented the same semantics in their utterances—they talked about the same kinds of things and in the same sequence in the course of development—they did not use the same linguistic means for representing the same information. Two of the children learned a system of pronominal reference to persons and objects in verb relations, whereas the other two children learned categories of nominal forms relative to verbs. The developments within each system were orderly and predictable across time as each child proceeded to learn the other system and thereby acquired the capacity for alternative pronominal and nominal reference.

I. INTRODUCTION

Research in child language to date has resulted in a consensus about the semantics of early two- and three-word sentences. Studies of children learning English and certain other languages (Bloom 1970, 1973; Bowerman 1973a; Brown 1973; Schlesinger 1971; Slobin 1971) have revealed that the semantics of early sentences have to do with ideas about objects that originate in the development of sensorimotor intelligence in the child's first 2 years. During this period children learn that objects exist, cease to exist, and recur; that objects can be acted upon and located in space; that people do things to objects or are otherwise associated with objects. It should not be surprising that these are the kinds of things that children first learn to talk about. However, the linguistic means that children learn for the representation of such notions, the sequence of development in child grammar, and the relation of systems of child language to the adult model remain to be determined.

DESCRIPTIONS OF CHILD LANGUAGE

Certain claims that have been made thus far for what children learn in order to say sentences have been based upon observed evidence—for example, that children learn relative word position (Braine 1963) and that children learn semantic distinctions for reference to objects and events (Bloom 1970; Bowerman 1973a; Brown 1973; Schlesinger 1971). Other claims for the origin of the child's early linguistic system have been derived from such linguistic theories as generative transformational grammar (e.g., Chomsky 1965; McNeill 1966, 1970) and case grammar (e.g., Greenfield, Smith, & Laufer, in press; Ingram 1971). There has been an impressive consistency among subjects in different investigations in the use of word order and in the semantics of early sentences. It has also been possible to use one or another linguistic theory to describe something of both aspects of early child speech. However, it has become increasingly apparent that there is

variation in child language as well—variation in the speech of the same child across time as a function of development, as one would expect, but also variation in the speech of different children learning the same language, when average utterance length is held constant (Bloom 1970). The variation among different children is such that in the several longitudinal studies of small numbers of children (usually less than five) in the 1960s, investigators were cautious about pooling the speech data from different children, and results were usually reported for subjects individually.

Two descriptions of early child speech came out of the research in the early 1960s: "pivot grammar" (Braine 1963), and "telegraphic speech" (Brown & Fraser 1963). Pivotal utterances were those in which a constant function form such as "more" or "there" was juxtaposed with many different substantive forms, such as "cookie," "read," and "airplane." Telegraphic utterances contained two or more substantive forms and omitted the linking morphemes (e.g., "Mommy chair"). The two descriptions of early child speech appeared to be contradictory in that function forms were of central importance for defining pivot speech, whereas telegraphic speech was described as consisting only of substantive forms. However, it now appears that these superficial descriptions of early child speech may reflect both the structure of child language and the variation that exists within and among child speakers.

STRUCTURE IN CHILD LANGUAGE

In the present study, speech data from four children were examined in order to discover (1) categories of semantic-syntactic relations between words in the earliest multiword utterances and (2) the lexical representation of sentences in different categories—without attempting to tie the data to one or another theoretical framework. The results that are presented here suggest that the ability to say sentences depends upon the child's learning something of an abstract system of semantic-syntactic structure, a grammar, for representing linguistically what he already knows about events in the world.

The term "structure" can be defined on three levels for child language according to the results of this study. At the level of the sentence, two or more constituents can be combined so that the meaning of each of the constituents is somehow augmented by their combination, and structure is inferred when that meaning relation is repeated with different constituents and in different situations. Further, structure in the development of a particular child is demonstrated by the predictability of one part of the linguistic system given knowledge of another part—at any one time, and in the course of development. Finally, on the most general level, structure in child language is defined by the regularities and consistencies among dif-

ferent children, both at the same time with mean length of utterance held constant, and in sequential development.

The conclusion that children learn grammatical structure in order to combine two or more words was based upon two kinds of evidence. First, verb relations were of central importance in the children's learning, and the sequence of development of different verb categories was similar for all the children. There were regularities in the ways in which verbs were related to other constituents in sentences, and groups of verbs functioned similarly to one another in their relation to other sentence constituents. For example, one group of verbs (intransitive) was related to animate nouns that specified *movers* in an action that changed their spatial location (e.g., "go," "sit," etc.), and another group of verbs (transitive) was related to animate nouns that specified *agents* in an action that affected another object by changing *its* location (e.g., "put"). The regularity and consistency among utterances with such different verbs as "go," "sit," "stand up," etc., in contrast with other utterances with different verb relations, indicated that the children had made inductions about the possibilities for combining words with similar and different meaning relations between them. Moreover, the fact that the same words (e.g., animate nouns) could function differently in relation to different kinds of verbs (e.g., as agents and movers) was taken as evidence that the children had made higher-order linguistic inductions about superordinate grammatical categories.

Second, there was a systematic variation among the children in the kind of lexical representation in their utterances. Although the speech of all four children was semantically similar—they talked about the same kinds of things and in similar sequence in the course of development—they used either of two alternative strategies for learning syntax in order to represent the same information. The internal consistency in the system used by each child and the predictable development that followed was taken as further evidence that the children's multiword utterances were derived from underlying rules of grammar.

The description of the emergence of grammar that is presented here is consistent with the view put forth elsewhere (Bloom 1970, 1973) that children learn language as a means of representing or coding information that they have already acquired about objects, events, and relations in the world. Language development, in this view, follows from and depends upon conceptual development in a logical way—as traditionally argued by Piaget (1954) and Werner and Kaplan (1963), and affirmed more recently by Brown (1973), Schlesinger (1971), and Slobin (1971). An extensive argument against the counterclaim that children's linguistic knowledge consists of a set of innate grammatical relations that are there somehow from the beginning to guide and determine linguistic development (as per McNeill 1970) is presented in Bloom (1973).

THE VARIATION PARADIGM

The study of linguistic variation typically has been concerned with describing the effects of linguistic context or extralinguistic factors that are sociologically or geographically determined on different aspects of language use (e.g., Bailey 1973; Labov 1963, 1969; Sankoff & Cedergren 1971, and Sankoff & Laberge 1971). The source of linguistic variation in the child-speech data that have been described so far in the literature (from children of middle-class and generally college-educated parents) is neither cultural nor social. Although it may be environmentally conditioned to the extent that it reflects differences in parent interaction styles (Nelson 1973), it is more likely that variation in child speech is a function of individual cognitive development in interaction with different aspects of the linguistic code.

Although both the kind of variation to be described here and its conditioning factors are different from those described in studies of sociolinguistic variation (see Sankoff 1972), the problems are very nearly the same. In both instances it is necessary to observe a large number of behaviors so as to be able to make inferences and to generalize. However, in sociolinguistic studies one generalizes about a particular linguistic community, whereas in child language one makes inferences about the linguistic knowledge of an individual child. Given a large enough sample of observations, it is possible to discover patterns and relationships at one time that can then be compared with observations of the same child at a later time, and with observations of other children.

In order to demonstrate the patterns of variability as well as the regularities and consistencies in child speech, it is necessary to collect and process sufficient data to assure that the evidence will be accountable for the resulting descriptions. A single instance of behavior, although interesting in its own right, can assume importance only if it shares certain properties with a large enough portion of all the data. Accordingly, one needs clear evidence, and in sufficient quantity, to allow for meaningful comparisons among behaviors so that similarities and differences can be revealed, both within the language of an individual child and across different children. In presenting the evidence from this study, frequency and proportion measures will be used to demonstrate the relevant interactions.[1]

[1] The issue of *formalization* has not been addressed in the present study. Eventually, as data from more children are available, the taxonomic account presented here will need to be formalized with a scheme of semantic-syntactic rules, or grammar, that will represent both the regularities and the systematic variation in child language.

II. SUBJECTS AND PROCEDURES

The subjects of the study—Eric, Gia, Kathryn, and Peter—are firstborn children of college-educated parents. They were each visited in their homes at periodic intervals, and their speech was recorded along with descriptions of relevant nonlinguistic context and behavior using the procedures described in Bloom (1970, pp. 234–239). Eric, Gia, and Kathryn were each visited every 6 weeks over several days by Bloom. Peter was visited every 3 weeks by Lightbown and Hood. Figure 1 presents a description of the children in terms of mean length of utterance (MLU) (in morphemes); in the time period represented in the present study the children progressed from the period of single-word utterances to mean length of utterance of 2.5 morphemes,[2] and from age 19 months to 26 months. Table 1 describes the data base in terms of the numbers of utterances that were processed for each child.

RELIABILITY OF LINGUISTIC INTERPRETATION

The recorded observation sessions were transcribed, preserving as much of the information from the original behavioral events as possible. In the analysis to be presented here, a tentative description was made of a portion of the recorded data, and then successively larger and larger portions of the data were examined in order to test the consistency and regularity of the

[2] The MLU was used as an index of linguistic maturity so that the children could be compared with one another in the course of the longitudinal study and with other children who have been described in the literature (see, in particular, Brown 1973). All separable morphemes were counted in the first 100 utterances of each sample. Immediate self-repetitions, wholly or partially unintelligible utterances, and fragments of songs and rhymes were not counted. Imitative utterances, where the child repeated an adult utterance with five or fewer intervening child or adult utterances without changing the model except to reduce it by leaving something out, were not counted or processed in this study but are described in Bloom, Hood, and Lightbown (1974).

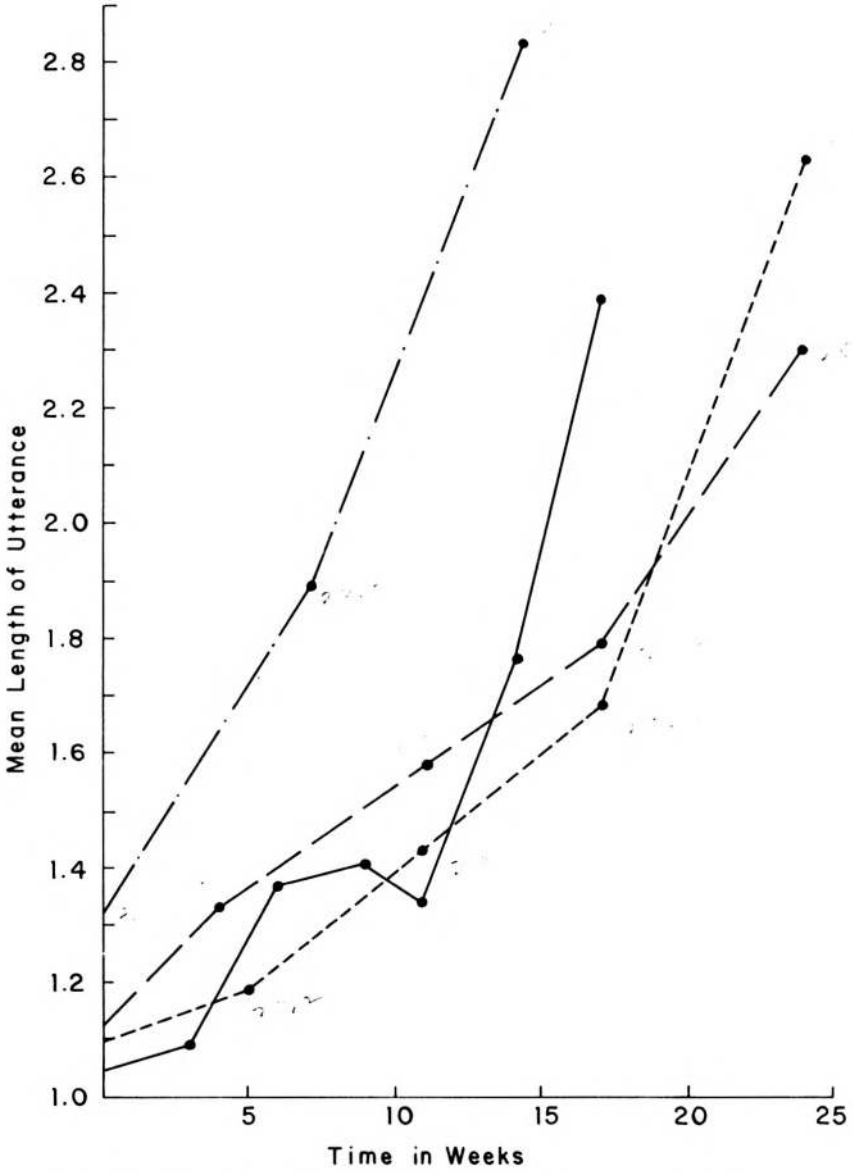

FIGURE 1.—Progression of mean length of utterance: -------- = Eric, ——— = Peter, ——·—— = Kathryn, — — — = Gia.

original description. Repeated passes through the recorded data, then, consisted of successive hypothesis testings: as questions were generated, the data were examined in order to answer the questions, the questions were revised, the data reexamined in order to answer the revised questions, and so on. Bloom (1974) has discussed the rationale that underlies an analysis in which categories of description are derived from a set of data in this way,

TABLE 1

SUMMARY DESCRIPTION OF SPEECH SAMPLES[a]

Child and Time	Hours	Age (Months, Weeks)	MLU	Syntactic Utterance Types	Syntactic Utterance Tokens
Eric:					
I....	4	19,1	1.10	10	16
II....	6.7	20,2	1.19	37	48
III....	7	22,0	1.42	108	165
IV....	8	23,2	1.69	401	504
V.....	8	25,1	2.63	902	1,056
Gia:					
I....	7	19,2	1.12	55	100
II....	6.7	20,2	1.34	226	341
III....	8	22,1	1.58	288	451
IV....	8	23,3	1.79	457	671
V.....	7.5	25,2	2.30	842	1,071
Kathryn:[b]					
I....	5.5	21,0	1.32	226	284
II....	5.5	22,3	1.89	767	896
III....	6.7	24,2	2.83	1,443	1,777
Peter:					
I....	3	21,1	1.04	7	7
II....	3.5	21,3.5	1.09	5	7
III....	4.5	22,2	1.37	70	150
IV....	4.5	23,1	1.41	80	149
V....	3	23,2.5	1.33	81	258
VI....	4.5	24,1	1.75	243	420
VII....	4.5	25,0	2.39	458	643

[a] The total data base consisted of 24,711 spontaneous utterances—both single-word and multiword tokens. Only spontaneous tokens were counted for the present study. See Bloom et al. (1974) for comparison of spontaneous and imitative utterances.

[b] The data processed for Kathryn represent only part of the total corpus collected for the longitudinal study and reported in Bloom (1970).

in contrast with an analysis that imposes a preconceived scheme for description on data. She pointed out that analysis based on a priori categories of description will necessarily fail to capture important distinctions in the data if distinctions that are present in the data do not correspond to the categories in the preconceived scheme.

Each multiword utterance was examined and the semantic-syntactic relations among words were identified by observing the relationship between the utterance and aspects of the child's behavior and the situational context

in which the utterance occurred. Obviously, one cannot be confident that the semantic interpretation given to an utterance by an adult does indeed equal the child's semantic intent. At the least, it is necessary to establish that (1) any utterance can be identified as a separate behavior (from the other linguistic behaviors that occur) by other observers, and (2) given the same information about the utterance and nonlinguistic context and behavior, different observers can assign the same interpretation to it.

Identifying the utterances occurred at the level of transcription. All of the transcription was done immediately after the recordings were made. The linguistic record was transcribed in traditional orthography, with phonetic notation used in cases where speech could not be discriminated. Nonlinguistic information about the context of each utterance was included in the transcription, and a standardized notation convention was used for recording the interaction between utterances and situations (Bloom, Lightbown, & Hood 1973). The following procedures were used to establish confidence in the transcriptions. All of the Peter data were transcribed by one investigator (either Lightbown or Hood) and subsequently checked by the other until agreement between them was established in the transcript. In the few cases where agreement could not be reached, the utterance was considered unintelligible. All of the Kathryn, Eric, and Gia data were transcribed by Bloom. Samples of 100 utterances from the data of Kathryn at Time III, Eric at Time V, and Gia at Time V were retranscribed by Hood and then compared with Bloom's original transcription of the same utterances. The proportion of agreement between the two transcriptions (each utterance scored as same or different) was .97 for Kathryn III, .95 for Eric V, and .98 for Gia V.

Interpretation of each speech event was made by at least two of the three investigators for all of the data. A comparison was made of the categorization of 100 utterances from Kathryn at Time II by two investigators, with an independent categorization of the same utterances by the third investigator. In the 100 utterances, 110 semantic-syntactic relations were identified, and the proportion of agreement on the categorization of these relations was .89.

III. RESULTS

THE SEMANTIC-SYNTACTIC CATEGORIES

The semantic-syntactic relations between two or more constituents could be identified for .88 of all the multiword utterances in the data. Categories of relations emerged with the regular and increasing occurrence of utterances encoding these relations in the speech of all the children; the categories were not a superimposed a priori system of analysis. By examining each speech event (which included the utterance, and behaviors by the child and others relative to the utterance) and considering its relation to other speech events in terms of similarities and differences, it was possible to identify categories of utterances that presumably derived from an individual child's own rule system and were, therefore, functional for the child. Judging the psychological reality of the categorization scheme for each child depended upon the extent to which the individual categories were productive in the linguistic behavior of the child. Accordingly, a criterion of productivity was established to support the assumption that the categories which were derived from the children's behavior did indeed represent their underlying linguistic knowledge: a semantic-syntactic category was considered productive (i.e., derived according to an underlying rule system) if five or more utterance types were observed in the category in the data from a particular child in a particular sample.[3]

Among the categories that emerged from the data were seven categories of verb relations and the category of possession which formed the basis for the present discussion of structure and variation in child language. These were the categories in which reference could be made to relationships

[3] The criterion of productivity (five or more utterances) was a more stringent requirement in the Peter data than in the data from the other children inasmuch as the total number of hours at each time was always smaller for Peter than for the other children.

between persons and objects, and in which a developmental interaction between form and meaning was revealed. In possession, the children made reference to objects that were within the domains of particular persons by virtue of habitual use or association. The criterial features that identified speech events in categories of verb relations were as follows: verb categories were distinguished (whether or not an actual verb form appeared in the utterance) according to whether or not relevant movement accompanied the utterance (action vs. state events), and whether or not place was relevant to either action or state (locative vs. nonlocative events). The distinction between action and locative verb relations is similar to the semantic distinction among verbs of motion that do and do not involve change of location for adults described by Miller (1972).

The categories are defined and illustrated below. Further examples from each child at each time are presented in the Appendix.

Action

Utterances in this category referred to two kinds of movement where the goal of the movement was not a change in the location of an object or person (see Locative Action).

1. Utterances referred to action that affected an object with movement by an agent. At least two of the three components of an action relation (agent-action-object) had to be represented in the utterance in order for the utterance to be included within the category. For example:[4]

	Agent	Action	Affected Object
P VII (Peter trying to open box)	my	open	that
K III (Kathryn opening drawer)	...	open	drawer
G III (Gia going to her bike, and then getting on)	[Gia [Gia	... ride	bike][5] bike]
E IV (Eric has just reassembled train)	I	made	...

[4] Examples of speech events are identified according to the sample in which they occurred; Roman numerals identify successive samples from each of the children, and the children are identified by first initial. Thus, P VII is the sample of speech from Peter at Time VII. Information in parentheses on the left identifies the context; the child's utterance is on the right, here arrayed according to constituents.

[5] Note that "Gia bike" might have alternative interpretations. In such cases, preceding and succeeding utterances were examined in an effort to determine the semantic-syntactic category to which the utterance would be assigned. If another utterance in the immediate context appeared to be a completion of the utterance in question or to otherwise disambiguate it, as in this case, the utterance could be assigned to a semantic-syntactic category. If not, it was classed as equivocal.

2. Other action utterances referred to movements by actors (persons or objects) in events where no object other than the actor was affected. For example:

	ACTOR	ACTION
K II (Kathryn has just jumped)	Kathryn	jumps
P VI (Peter watching reels of tape recorder)	tape	go round

Locative Action

Utterances in this category referred to movement where the goal of movement was a change in the location of a person or object.

1. Most locative actions entailed an agent, an affected object or person, and place or the goal of the movement. At least two of the four components (agent-action-object-place) had to be represented in the utterance in order for it to be included in the locative action category. For example:

	AGENT	LOC. ACTION	OBJECT	PLACE
K II (Kathryn throwing car and truck in box)	...	put	...	in box
P VI (Peter putting masking tape on toy car)	...	...	tape	on there
E V (Eric holds out hand to have Lois put puppet on it)	you	put	...	ə finger
G V (Gia had put polo shirts on Mommy's bed)	I'm	put	polo shirt	on there

2. Where the agent and affected object or person were the same, the single constituent was designated as mover. For example:

	MOVER	LOC. ACTION	PLACE
G IV (Gia wants Mommy to get balloon from ceiling)	Mommy	stand up	ə chair
P VI (Peter has been playing piano; he stops and turns around on bench)	I	get down	...

Locative State

Utterances in this category referred to the relationship between a person or object and its location, where no movement established the locative relation within the context of the speech event, that is, before, during, or after the child's utterance. Locative states entailed a person or object located, and place. At least two of the three components (object-state-place) had to be represented in the utterance in order for the utterance to be included in the locative-state category. For example:

	OBJECT	LOC. STATE	PLACE
P VI (Peter pointing to overhead light in hallway)	light	...	ə hall
G V (Gia looking for toy bag)	the bag	go	...
K III (Kathryn looking at picture of dog on chair)	...	sitting	on chair
E V (Eric on Mommy's chair)	I	sitting	...

Notice

Utterances in this category referred to attention to a person, object, or event, and necessarily included a verb of notice (such as "see" or "hear"), since such events as seeing or hearing could not be identified by aspects of context and behavior. For example:

	NOTICER	NOTICE	NOTICED
G IV (Lois talking to Gia's Mommy)	Lois	watch	Gia
E V (Eric looking out window)	I	see	two bus come there
K III (Children shouting in hallway)	I	hear	children
P VI (Peter looking in mirror box)	...	look at	that!

State

Utterances in this category made reference to transitory states of affairs involving persons or other animate beings: either (1) an internal state, usually with a verb form such as "like," "need," or "want":

P VI (Peter standing next to cabinet where pretzels are kept)	I want pretzel
E III (Lois has said she was going to take Eric's book home)	ə need book
G IV (Lois asked, "Did Caroline come to your party?")	Caroline sick

or (2) a temporary state of ownership or possession:

K III (Kathryn taking train from Lois)	I have it
E V (Eric giving toy to another child)	you have it

Utterances which made reference to external states of affairs included:

G V (Gia looking out window with sunglasses on)	it's dark outside

Intention

Two verb categories, intention and causality, emerged in the later samples and were distinguished from the others in that each involved two verb forms: a constituent verb in one of the categories already described, and a matrix verb that expressed either intention or causality relative to the constituent. Verbs of notice also functioned as matrix verbs in the later data, for example, "I see two bus come there" (E V). The expression of causal relations, for example, "make əm sit down" (K II), did not become productive for any of the children during the period studied.

Utterances in the intention category included variants of such verbs as "want," "going to," "have to," "let's" in combination with an action, locative action, or—occasionally—a state verb. The utterances most often made reference to action or locative-action events which in fact occurred immediately following the utterance or which the child appeared to intend or desire. Almost without exception, the child was the agent of the subsequent event. For example,

K III (Kathryn picked up lavaliere microphone)	I want ə wear this
G V (Gia's nose is running; Lois gets a tissue and Gia is reaching for it)	I want ə blow nose
K III (Kathryn and Lois having a tea party) (then Kathryn pretends to cut cake)	I gon' cut əs some more

The Remaining Categories

The categories of existence (simply pointing out or naming an object), negation (e.g., nonexistence, disappearance or rejection of objects or events), recurrence (reference to "more" or another instance of an object or event), and attribution (counting, specifying or otherwise qualifying objects) included utterances that made reference to objects primarily, and are discussed in Bloom et al. (1974). Other categories that emerged in the later data were wh-question, and relations that were subordinate to action verb relations: dative (specifying the recipient of an action that also involved an affected object), instrument (specifying the inanimate object that was used in an action to affect another object), and place. The category place included utterances that specified where an action event occurred, for example, "baby swim bath" (E V) and "buy more grocery store" (K II), in contrast with locative action where the goal of the movement was a change in location, for example, "put man block" (K II). The categories that were either not productive or did not manifest systematic developmental change were stereotype, routine, greeting, vocative, manner, time, affirmation, and conjunction. Finally, utterances that could not be assigned to any one category were judged equivocal (when more than one categorization was possible), anomalous (when the relation between utterance and context was contradictory), or otherwise undetermined. The absolute and proportional frequencies of utterance types in each of these categories that resulted from the linguistic analysis are presented in the section that follows.

The results of the linguistic analysis consist of (1) the sequence in which the above semantic-syntactic categories appeared in the developmental data, and (2) the development of pronominal and nominal lexical representation in multiword utterances. After presenting the results of the sequence of development and the pronominal-nominal variation in development, the findings will be discussed in terms of (*a*) explanations of sequential development, (*b*) semantic-syntactic structure in child language, and (*c*) variation in child language.

SEQUENCE OF DEVELOPMENT

More than 20 categories of semantic-syntactic relationships in multiword utterances were identified in the data from the four children in the period from single words to MLU of approximately 2.5 morphemes. Table 2 presents the absolute and proportional frequencies of utterance types in each of the categories. An utterance with one relation was counted only one time in table 2 regardless of how many times it occurred in a speech sample, if the semantic interpretation of the utterance was the same each time it occurred. If the interpretation was different, the homonymous utterances were counted in different categories. Thus, the frequencies of semantic-syntactic relations in utterance types, not tokens, are represented in the categories in table 2. When two relations occurred in the same utterance (e.g., "eat Mommy cookie"; action-affected object plus possession), both relations were counted, and the utterance was represented two times in table 2. The proportion of different utterance types with more than one semantic-syntactic relation increased developmentally from none in the earliest samples, to .19 at Eric V, .11 at Gia V, .12 at Kathryn III, and .07 at Peter VII.

The verb categories in combination with the categories of possession, attribution, existence, negation, and recurrence accounted for an average of .77 of the semantic-syntactic relations in the utterances from all of the children. In addition, an average of .04 of the relations were in the categories wh-question, instrument, dative, and action-plus-place; and an average of .07 were in those categories that showed no developmental change (stereotype, vocative, etc.).

Generally, the absolute frequencies of utterance types increased in all categories for each child across time (see table 2). For the combined verb categories proportional frequency tended to increase as well, but for the combined categories existence, recurrence, and negation, proportional frequency tended to decrease. Thus, although there were always larger numbers of different utterances as the children matured, utterances that made reference to the interactions between persons and objects or between objects increased proportionally, while there was a proportional decrease in utterances that made reference to an object with respect to itself or its class (except for attributives). Given these proportional interactions, it was concluded that the categories of existence, nonexistence, and recurrence were an earlier development, and the verb categories were a later development for all of the children.

The category of possession accounted for .10 or less of the relations in each child's speech at each time, and an average of .04 for all of the children in all of the data. However, this category tended to be less important in the early data and to increase developmentally with all of the children. The attribution category was different for different children; although absolute

TABLE 2

PROPORTION AND NUMBER OF DIFFERENT SEMANTIC-SYNTACTIC RELATIONS IN EACH SAMPLE[a]

	ERIC					GIA					KATHRYN			PETER						
CATEGORY	I	II	III	IV	V	I	II	III	IV	V	I	II	III	I	II	III	IV	V	VI	VII
Action	.10 (1)	.18 (7)	.20 (22)	.16 (68)	.20 (219)	.06 (3)	.11 (23)	.35 (101)	.35 (173)	.32 (307)	.24 (56)	.21 (174)	.24 (393)	.43 (3)	.40 (2)	.10 (7)	.23 (23)	.35 (28)	.14 (39)	.17 (81)
Locative action	...	.03 (1)	.06 (7)	.09 (32)	.09 (96)	.06 (3)	.06 (12)	.12 (36)	.13 (67)	.09 (87)	.06 (15)	.13 (108)	.12 (192)	.14 (1)	...	.06 (4)	.05 (4)	.17 (14)	.12 (33)	.15 (71)
Locative state	...	.03 (1)	...	.05 (21)	.02 (24)	...	.00 (1)	.04 (12)	.02 (10)	.03 (30)	.02 (4)	.05 (38)	.04 (67)	...	...	.03 (2)	.01 (1)	...	.05 (13)	.06 (30)
State	...	.05 (2)	.09 (10)	.05 (20)	.07 (81)	.02 (1)	...	.03 (9)	.01 (4)	.03 (26)	.04 (9)	.05 (38)	.06 (106)	...	...	...	.01 (1)	.01 (1)	.01 (4)	.04 (18)
Notice	.10 (1)	.03 (1)	.03 (3)	.01 (5)	.06 (69)	...	.01 (3)	...	.00 (2)	.01 (13)	.01 (3)	.01 (12)	.01 (20)	...	...	.03 (2)	.01 (1)	...	.02 (6)	.01 (3)
Intention	...	...	...	...	.01 (16)	...	...	.01 (4)	.01 (4)	.14 (135)	.02 (5)	.01 (11)	.07 (115)	...	...	...	...	...	...	.01 (7)
Existence	.30 (3)	.15 (6)	.15 (16)	.07 (31)	.06 (64)	.23 (12)	.13 (26)	.06 (17)	.03 (13)	.03 (30)	.04 (9)	.08 (68)	.07 (109)	...	.20 (1)	.07 (5)	.03 (2)	.05 (4)	.04 (10)	.07 (34)
Negation	.10 (1)	.15 (6)	.17 (18)	.05 (24)	.05 (56)	.02 (1)	.02 (4)	.01 (2)	.01 (7)	.04 (42)	.06 (14)	.05 (41)	.03 (54)	...	...	.04 (3)	.05 (4)	.02 (2)	.04 (10)	.02 (9)
Recurrence	...	.05 (2)	.07 (8)	.15 (65)	.03 (31)	.09 (5)	.20 (40)	.06 (18)	.02 (10)	.03 (24)	.08 (19)	.03 (26)	.03 (44)	.14 (1)	.40 (2)	.24 (17)	.16 (13)	.12 (10)	.04 (12)	.06 (31)
Possession	...	...	.03 (3)	.00 (2)	.02 (18)	.02 (1)	.03 (7)	.07 (19)	.08 (40)	.10 (91)	.06 (15)	.06 (51)	.09 (141)	...	...	.07 (5)	.05 (4)	.01 (1)	.04 (12)	.06 (27)
Attribution	...	.03 (1)	.05 (5)	.11 (46)	.10 (113)	...	.03 (6)	.05 (15)	.13 (67)	.10 (95)	.18 (41)	.09 (78)	.07 (116)	.29 (2)	...	.10 (7)	.18 (14)	.12 (10)	.16 (45)	.06 (31)
Wh-question	...	...	.02 (2)	.00 (1)	.05 (54)	...	...	...	.01 (3)	.02 (19)	...	.03 (23)	.07 (116)	...	...	...	...	...	.04 (12)	.03 (16)
Place[b]	...	.05 (2)	...	.02 (9)	.02 (20)	.02 (1)	.01 (2)	.01 (2)	.01 (6)	.01 (8)	...	.02 (14)	.00 (3)	...	...	.10 (7)	.05 (4)	.05 (4)	.02 (6)	.04 (19)
Action and place	...	...	.01 (1)	.01 (3)	.01 (7)	...	.03 (6)	.01 (2)	.02 (12)	.02 (15)	...	.00 (3)	.00 (8)	...	...	...	...	...	...	.01 (6)
Dative	...	...	...	.02 (9)	.01 (14)	...	...	...	.01 (4)	.01 (5)	.01 (2)	.01 (6)	.01 (10)	...	...	...	...	...	...	.01 (3)
Instrument	...	...	...	...	...	...	...	...	...	.01 (5)	...	.00 (2)	...	...	...	.01 (1)	...	...	...	...
Other[c]	.10 (1)	.10 (4)	.02 (2)	.05 (22)	.08 (93)	.30 (16)	.13 (26)	.04 (11)	.06 (31)	.00 (4)	.07 (26)	.06 (50)	.03 (58)	...	...	.03 (2)	...	...	.18 (51)	.11 (56)
Equivocal	...	...	...	...	.00 (4)	.04 (2)	.02 (5)	.04 (11)	.02 (11)	.00 (2)	.01 (2)	.01 (11)	.00 (7)	...	...	.01 (1)	...	...	...	...
Anomalous/ undetermined	.30 (3)	.15 (6)	.10 (11)	.16 (66)	.12 (131)	.15 (8)	.20 (40)	.11 (33)	.07 (35)	.01 (12)	.09 (22)	.09 (79)	.05 (83)	...	...	.10 (7)	.11 (9)	.09 (7)	.10 (28)	.10 (48)
Total *N* of Relations	10	39	108	424	1110	53	201	292	499	950	232	833	1642	7	5	70	80	81	281	490

[a] Proportions are rounded to nearest hundredth. Those less than .005 are given as .00.
[b] Multiword utterances that specified only place.
[c] Stereotype, routine, greeting, vocative, conjunction, affirmation, manner, and time.

frequency tended to increase for all the children, no clear trend emerged for proportional frequencies.

Utterances in the categories instrument and dative emerged only in the later data, as can be seen in table 2. Even though children are no doubt aware that (1) persons can be affected by certain actions that also involve other objects (e.g., as receivers), and (2) there are particular instruments for specific actions (e.g., pencils, crayons, spoons, keys), the children in this study simply did not talk about these kinds of relations in their early syntactic utterances. For the present study, wh-questions were identified only by their form; further semantic-syntactic analysis of the development of questions in child language is in progress.

In the category action-plus-place, place was not a complement constituent in an action relation as it was in locative relations, since the complement of an action verb does not depend on specifying place to complete the meaning of the verb (e.g., "write" and "play") as is the case with locative-action verbs (e.g., "go" and "put"). The category action-plus-place did not become productive until after the locative-action category was productive. The children did not produce such utterances as "those children doing there" (K III) or "orange chair read ə book" (G V) until after such utterances as "put man ə block" (K II) and "wrench go there" (E IV) were fully productive. This result is consistent with a report of similar development in Italian by Parisi (1974).

Sequence of the Development of Verb Relations

The development of verbs was central to the elaboration of structure after the emergence of two-word utterances, and the verb relations developed sequentially and similarly among the children. All of the other semantic-syntactic relationships between constituents were eventually subordinated to the verb relations: possessive, attributive, and recurrence relations were eventually embedded in predicate constituents; place, dative, instrumental, and negation relations were all constituents in verb matrices. The category existence was coded only when no other constituent relations occurred in an utterance.

Given the criterion of productivity, five or more utterance types in a category, the following sequence emerged: *encoding of action events preceded encoding of stative events; and nonlocative relations were generally encoded before locative relations.* As can be seen in table 2, the sequential development of verb categories for Eric and Peter was that action verb relations preceded locative-action verb relations and locative action preceded locative-state relations. The sequence of verb relations was somewhat different for Kathryn and Gia: they also learned to encode action events before nonaction (stative) events, but they developed reference to action and lo-

cative-action events at the same time. For all of the children, there was no developmental difference between the two kinds of action events with transitive (taking an agent) and intransitive (taking an actor) verbs; the number of intransitives was quite small in all instances. There were differences between locative-action transitive and intransitive verbs (with agents and movers, respectively) in grammatical complexity (described in Bloom, Miller, & Hood, in press), but not in the sequence or relative frequency of occurrence. Accordingly, the two subcategories of action and of locative action were combined here.

The children also differed in their use of the verb "want" for expression of state or intention. Kathryn and Gia used "want" overwhelmingly with a constituent verb (and often affected-object) immediately previous to an action to express intention to act. The category intention was more frequent for Kathryn and Gia than for Eric and Peter both proportionately and in absolute numbers of utterance types (see table 2). For Peter and Eric "want" was rarely used in combination with a constituent verb to express intention to act. In fact, intention was not a productive category until Eric V and Peter VII, and even in these later samples it comprised only .01 of all the data for each of them (see table 2). Rather, "want" was used by Peter and Eric the way "need" was—with a noun—to express an internal state, such as "I want pretzel."

Kathryn and Gia also used verbs other than "want" as matrix verbs in expressing intention (e.g., "gonna," "hafta"), and utterances in the category intention marked the beginning of two kinds of verb complexity. First, they were the first embedded sentences used by the children, and they were primitive in that the child was most often the agent of both the constituent and matrix verbs. Utterances such as "I want Lois button it" (K III) were rare, and utterances such as "I want comb hair" when the child wanted another to be the agent did not occur. The matrix verbs were used most often in situations where the child wanted to or was about to perform the action. Second, it appears that the matrix verbs ("want," "gonna," "hafta," "let's") in utterances in the category intention were used to express mood (intention to act) and were thus the beginning of the modal system. The only other modals were forms of negation, for example, "can't"; modals such as "will" and "can" did not occur. Notice verbs also began to appear as matrix verbs at the end of this period, for example, "ə see Mommy busy" (K III).

In sum, the sequence of development observed in the present study was as follows: the functional-relations existence, nonexistence, and recurrence preceded development of verb relations. Within verb relations, action events (action and locative action) preceded state events (locative state, state, and notice), and action preceded locative action for two of the chil-

dren. The categories possession and attribution were variable among the children and appeared to be later developments for Eric and Peter. Other categories developed after the basic verb relations and included specification of instrument, the dative, wh-questions, and, for Kathryn and Gia, matrix verbs.

PRONOMINAL-NOMINAL VARIATION

Certain relational meanings in early sentences were defined in Bloom (1973) as *functional* relations: a constant form with specific meaning was combined with a number of different words, and the meaning of the constant form determined the meaning of the relation between the two words in combination. Brown (1973) has pointed out that such relations have the form $f(x)$ with a fixed value, f, combined with a variable (x) that can assume many values. Such relational forms make reference across classes of objects and events—that is, many different kinds of things exist, disappear, and recur. Children can talk about such behaviors with respect to many objects and events (such as cookies, airplanes, and tickling) that are themselves otherwise quite different from one another.

These functional relations were observed in the speech of all the children: for example, "no," "gone," or "no more" signaled negation (most often nonexistence), and "more" or "nother" signaled recurrence. As observed in table 2, although the absolute frequencies in each of these categories tended to increase developmentally, their proportional frequencies decreased, leading to the conclusion that they were an earlier development than the verb categories for all of the children. Indeed, the functional relations were the most frequent in the earlier samples when syntax first emerged.

When mean length of utterance was less than 2.0, Eric and Peter continued the same kind of functional relations to encode particular functions in action, location, and possession relations: the pro-forms "I" or "my" as agent or mover, "it," "this one," or "that" as affected-object, "my" as possessor, and "here" or "there" as place. The structure that Peter and Eric learned, constant forms with constant functions, could be compared to a system of inflectional affixing or case marking which might be schematized as $Ax = X$, $Bx = X$, or $Ay = Y$, $By = Y$, where x and y are each constant relational forms that always mean the same thing relative to the different forms (A or B) with which they combine to create the relational meaning (X or Y). In this way, Peter and Eric were able to talk about a great many objects in action and locative relations, and syntax did not depend on lexical learning for making particular reference to different objects. However, Peter and Eric knew the names of many objects and persons. They used these nominal forms in single-word utterances and in functional relations with such words as "no" and "more." There was also a certain amount of variation with the

pronominal forms they learned to specify affected-object and place relationships (e.g., "this one" and "it," and "here," "right here," "over there," "there," etc.), as can be seen in the examples in the Appendix. Thus, it was not the case that the pronominal forms with verbs were unanalyzed phrases learned by rote. Reference to place and affected-object occurred independently of verbs, and verbs also occurred independently as well as occasionally with noun forms.

The grammatical system that Peter and Eric learned consisted of relations between different verb forms and a number of constant functional forms such as "it," "there," and "my." Successive verb relations were learned by fitting new categories (such as locative action and then locative state) into the existing system of reference or grammar. However, whereas reference to affected-object (with "it," "this one," etc.) and place (with "here" or "there") included many different things and places, Eric and Peter referred only to themselves as agents and possessors (with "I" or "my") and did not also talk about other people as agents and possessors when MLU was less than 2.0 morphemes.

Within the same MLU period, Kathryn and Gia used the same kind of functional relations—constant forms in combination with many different forms—to represent the notions existence, nonexistence, and recurrence. However, Kathryn and Gia encoded other grammatical relations with categories of nominal forms as *agent, affected object, place,* and *possessor* instead of a constant pronominal form for each grammatical relation. Thus, "Mommy," "Daddy," "Baby," "Kathryn," etc., formed a grammatical category *agent.* Such forms as "book," "cookie," "ball," "toy," "bag," etc., formed a grammatical category *affected-object;* such forms as "table," "floor," "outside," "bag" formed a grammatical category *place; affected-object* and *place* were not mutually exclusive. The fact that Kathryn and Gia developed action, locative-action, and possession relations at the same time was interpreted as evidence that they had learned the superordinate grammatical categories sentence-subject (including agents, actors, movers, and possessors), predicate-object (including objects of actions, locative actions, and possession), and predicate-complement (place), so that a number of semantic distinctions could be encoded within the same grammatical system that specified the relations among categories of nominal forms.

The relations between nominal categories in Kathryn's and Gia's speech could be schematized as $A + B = C/D$, where A and B were grammatical categories, and the relations between them, C or D, were superordinate category relationships with specific meaning, such as possession, action, or location. Kathryn and Gia learned an abstract grammatical structure here schematized as $A + B$, which could be used to represent several semantic distinctions, here schematized as C, D. The structure learned by Eric and

Peter was different but equally abstract in that it was used to represent a number of semantic distinctions with each distinction dependent upon a linguistic operator or marker. The two systems of pronominal and nominal encoding are aspects of the adult model and, indeed, of language in general. All the children then were quite similar in their semantic knowledge, but there was variation among them in their knowledge of syntax—they were learning two different systems of semantic-syntactic structure that were virtually mutually exclusive in the beginning. There was an impressive consistency within each child and between Eric and Peter on the one hand and Kathryn and Gia on the other when MLU was less than 2.0.

The major development when MLU passed 2.0 was a shift in encoding and the integration of the two alternative systems of pronominal and nominal reference as presented in table 3 and figures 2 through 4. The figures represent proportional frequencies of *pronominal* encoding for agent and affected-object in action verb relations (figs. 2 and 3) for the four children, and possessor (fig. 4) for Kathryn and Gia.[6] The graphic representation of nominal encoding would, of course, be the mirror image of figures 2 through 4. As can be seen, even though the children started out (when mean length of utterance was approximately 1.3) with either one or the other linguistic system, there was a significant shift with development as both systems of reference were gradually integrated for all of the children. The occurrence of redundant coding (e.g., "fix it choo-choo train") occurred infrequently and only appeared in the data when MLU passed 2.0. Brown (1973) interpreted such utterances as a failure to analyze and segment the "it" from the verb form. However, in the present study, such utterances seemed to represent the children's attempt to learn the alternative forms of pronominal and nominal encoding in making the transition from one form of reference to the other. Also, Gia often said one form and then the other, especially for agents, for example, "Gia lie down/I lie down." Such redundancy, although generally infrequent, occurred equally often in the speech of all of the children.

The same developmental trends were apparent in the pronominal-nominal interactions among constituents in locative-action relations. The data in table 3 confirm the distinction between action and locative-action verb relations for Peter and Eric: action relations took pronominal forms as affected-object, but in locative-action relations Peter and Eric used nominal forms as affected-object (with pronominal place). Further, agents (with affected-object) and actors (which were also in a sense the objects affected by the action) were productive in action relations (P IV and E III) before refer-

[6] Peter and Eric did not make the same transition for possession in this time period because possession was a later development for both (see table 2).

TABLE 3

PRONOMINAL AND NOMINAL ENCODING OF SENTENCE CONSTITUENTS

CHILD SAMPLE	MLU	ACTION						LOCATIVE ACTION							
		POSSESSION-POSSESSOR		AGENT ACTOR		AFFECTED-OBJECT		AGENT		MOVER		AFFECTED-OBJECT		PLACE	
		Pro	Nom	Pro	Nom	Pro	Nom	Pro	Nom	Pro	Nom	Pro	Nom	Pro	Nom
Eric:															
II	1.19	...	...	...	1	4	2	...	...	...	...	...	...	...	...
III	1.42	2	1	7	1	14	4	...	...	2	2	...	2	1	3
IV	1.69	1	1	12	4	32[a]	33[a]	...	...	2	7	7	11	10	4
V	2.63	16	2	93	28	70[a]	111[a]	20	...	8	25	12	19	42	13
Gia:															
II	1.34	1	6	...	8	1	19	...	1	...	6	1	3	...	2
III	1.58	1	18	4	66	14	67	...	7	...	12	...	15	2	11
IV	1.79	7	33	7	106	17	120	...	5	1	31	1	16	15	27
V	2.30	61	30	163	48	79	193	8	4	22	22	8	18	24	44
Kathryn:															
I	1.32	2	13	4	19	4	44	...	1	4	1	2	2	...	9
II	1.89	32[a]	34[a]	9	99	41	81	2	12	6	28	22	25	35	37
III	2.83	104	38	123	92	128	212	21	17	15	28	55	49	56	58
Peter:															
III	1.37	2	3	...	...	5	2	...	...	...	...	1	3	3	1
IV	1.41	4	...	6	1	17	6	1	...	...	...	1	...	4	...
V	1.33	1	...	3	1	24	3	1	...	...	...	3	5	11	1
VI	1.75	12	...	8	...	23	13	...	...	2	1	7	10	18	4
VII	2.39	23	4	22	7	31[a]	38[a]	8	1	9	5	22[a]	9[a]	36[a]	7[a]

[a] Included here are utterances with redundant coding, for example, "my Kathryn house" and "I fix it choochoo train."

ence to agents (that moved another object) or movers (that were also the objects that moved) became productive in locative-action relations (P VII and E IV), apparently because action relations developed first.

Just before the pronominal-nominal shift there was a decrease in the proportional frequencies of utterances in the combined verb categories (see table 2). This exception to the developmental increase in the propor-

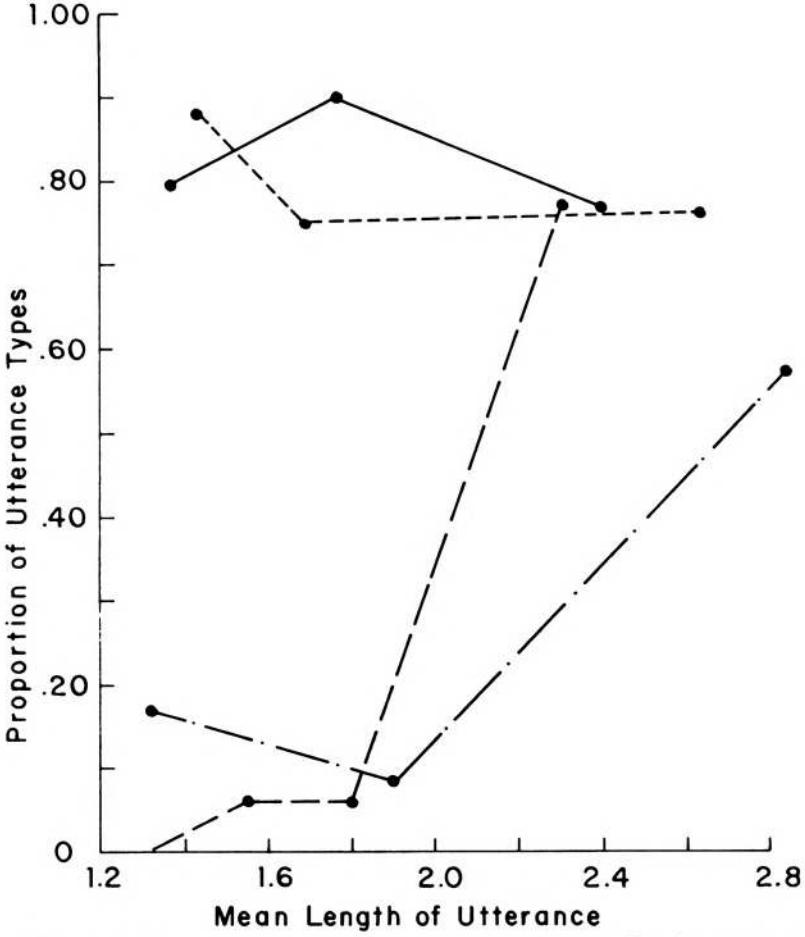

FIGURE 2.—Pronominal encoding of agent and actor. The first data point for Peter represents the averaged data from Peter III, IV, and V, when MLU was virtually identical: -------- = Eric, ——— = Peter, ——·—— = Kathryn, — — — = Gia.

tional frequencies in the verb categories might have been the effect of the transition from one means of encoding to another.

By the time MLU approached 2.5 morphemes, the variation among the children was greatly reduced. Kathryn and Gia had learned a primitive system of pronominal substitution for nominal categories, while Eric and Peter were learning categories of nominal forms to encode action, location,

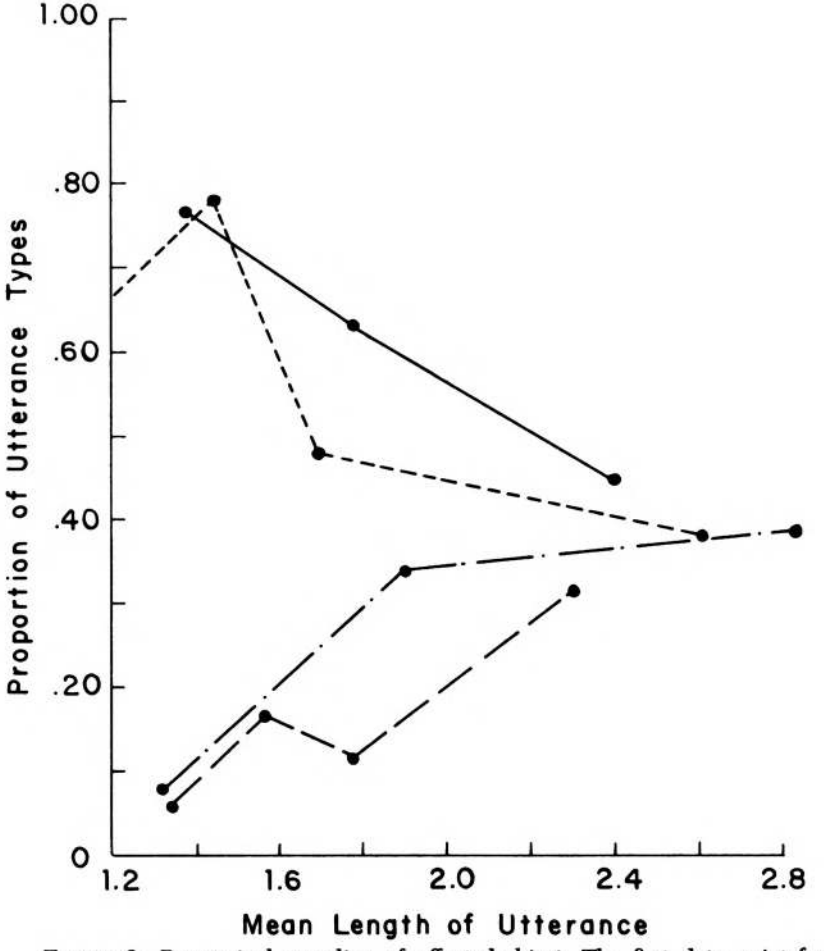

FIGURE 3.—Pronominal encoding of affected-object. The first data point for Peter represents the averaged data from Peter III, IV, and V, when MLU was virtually identical: - - - - - - - - = Eric, ———— = Peter, ——·—— = Kathryn, ———— = Gia.

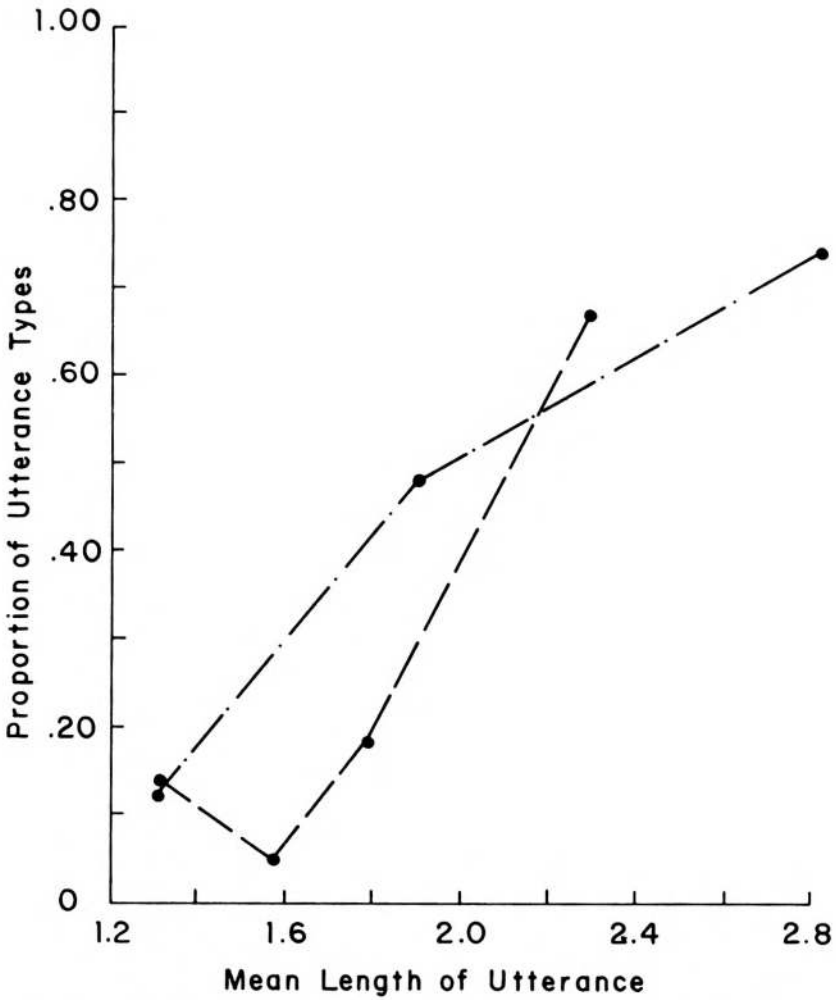

FIGURE 4.—Pronominal encoding of possessor: ——·—— = Kathryn, ———— = Gia.

and possession. In terms of nominal and pronominal reference, the children were quite similar to one another when MLU approached 2.5 morphemes. *No matter how they started out, affected-object was most often nominal and agent was most often pronominal for all four children.* There was a crossover from predominantly pronominal to predominantly nominal encoding of affected object for Eric and Peter, and a crossover from predominantly nominal to predominantly pronominal encoding of agent for Kathryn and Gia.

IV. DISCUSSION

The children in this study learned more than word order and something about the meaning relations between words. The facts of child language appear to translate to case grammar terms in the meanings of word relations, and generative transformational grammar terms in the nature of the grammatical relations between categories. However, it seems to be more profitable to describe such facts of child language on their own terms, by identifying and interpreting speech events according to shared features of situational context and linguistic form rather than in terms of goodness of fit with one or another preconceived system of analysis or linguistic theory.

The findings in the present study will be discussed here in terms of (*a*) explaining sequential development, (*b*) semantic-syntactic structure in child language, and (*c*) variation in child language.

EXPLAINING SEQUENTIAL DEVELOPMENT

There are several possible factors to explore in attempting to account for the sequence of development that was obtained, including relative frequency of exposure, syntactic complexity, semantic complexity, and cognitive complexity.

Frequency of Exposure

One possible explanation for the sequence of development in the children's speech was the relative frequency of utterances in the same categories in the adult speech that the children heard in the course of development. A comparison of the adult- and child-relative frequencies in the verb categories in the present data revealed that they were indeed the same: action was more frequent than locative action, locative state, and notice, in that order. However, attributive and wh-questions were even more frequent than action relations in the adult speech, and these two categories were proportionally far less frequent in the child-speech data. Although

these interactions were more often between investigator and child than between parent and child,[7] one has the intuitive impression that attributives, wh-questions, and the dative are generally frequent in adult speech to children. Parents typically point out different books, toys, articles of clothing, foods, etc., on the basis of relative size, color, amount, etc. Parents and other adults also ask children many questions (Broen 1972; Snow 1972) and give such directions as "give me the ball" or "show it to Daddy."

The parent-child data that have been reported in the literature indicate that the interaction between frequency of exposure and the sequence of development is quite complicated and that children do not learn different structures simply according to how often they hear them. If sufficient parent-speech data had been available in the present study, it might have been instructive to compare frequencies in the parent-speech data with the respective children's order of acquisition, as Brown (1973) did for the acquisition of grammatical morphemes. Brown reported that the sequence of development of morphological inflections in his data could not be accounted for by the relative frequency of the same forms in the mothers' speech. Rather than there being a simple causal relation between frequency in adult speech and order of acquisition, it is more likely that children actively search for linguistic forms that can represent what they want to talk about. Once the child has realized that certain aspects of his environment are relatively constant with respect to his behavior and the behavior of others, he can learn to represent linguistically the conceptualizations he has formed of recurring events. No matter how frequently a structure occurs in the speech a child hears, he can ignore it if it is not relevant for the kinds of things he needs to say (see Bloom et al. [1974] for discussion of how children actively process linguistic messages for their language learning).

Syntactic Complexity

Brown (1973) has invoked a "law of cumulative complexity" (p. 185) to explain the sequence of development in child language: "A construction x + y may be regarded as more complex than either x or y because it involves everything involved in either of the constructions alone plus something more" (p. 407). According to Brown, the order in which grammatical morphemes emerge in child speech can be accounted for in this way. It is also true for progressive syntactic complexity: three-term strings (subject-

[7] The use of investigator-child interaction was a deliberate feature of the research plan and was designed to reduce the variability in the data. It was reasoned that the greatest consistency would be attained in the data if all four children interacted with an investigator (rather than mother) primarily. For this reason, the intersubject variability in the data is all the more striking. As a result, however, the mother-child data that were recorded were insufficient for extended analysis.

verb-object) do not appear until after two-term strings (subject-verb, verb-object, subject-object), and recurrence, possession, and attribution do not occur in verb relations until after they are productive separately. The other structures described in the present study were not explicitly accounted for by Brown according to an index of cumulative complexity in what he called Stage I, when MLU was less than 2.0. However, it does appear that syntactic complexity can explain the late emergence of matrix verbs which entail sentence embedding, the dative which entails two different kinds of relations between persons and an object, and the instrumental which entails two kinds of agency. Indeed, these syntactic relations which children in the present study acquired later than the basic verb relations are perfect examples of Brown's "something more"—a new element which must be added to syntactic configurations acquired earlier.

However, there were other aspects of sequential development in the present study that did not fit the cumulative complexity explanation. The theory of cumulative syntactic complexity could neither describe nor explain the sequence of development of the early Stage I semantic-syntactic relations observed in the present study. The "something more" criterion does not appear to explain the fact that verb relations developed after functional relations. Verb relations are quite similar to functional relations in that a particular action such as "eat" can apply across several different objects such as "cookies," "meat," "pretzels," etc., just as "more" or "gone" can refer to different objects and events. One might argue that verb relations entail an agent constituent as "something more," but although agents were productive for Gia and Kathryn from the beginning, they were not productive with the earliest verb relations in the Stage I speech of Eric and Peter. For Eric and Peter, then, verb relations, although a later development, were not cumulatively more complex than functional relations. Locative relations involve "something more" (place) than action relations, but action and locative action appeared at the same time in Kathryn's and Gia's speech. The most obvious case in which cumulative complexity did not appear to be a factor was in the sequential development of encoding locative-action and locative-state events. If anything, locative state would seem to entail "something less" in that no agent was involved in affecting the spatial relation between object and place.

Brown did not report a sequence of development of semantic-syntactic relations in Stage I speech. The data he presented were cross-sectional within that period to demonstrate the existence of the "major meanings" of Stage I speech. Although cumulative complexity is descriptive of certain transitions from Stage I to later speech—in particular, those structures that involve conjoining and embedding—there were other syntactic developments in the present study which could not be explained by cumulative syntactic complexity.

Semantic Complexity

Bowerman (1973a) and Schlesinger (1971) have suggested that children have learned semantic relationships and have not learned grammatical relations when they put two and three words together—that early language learning is semantic rather than syntactic. Bowerman argued that there is insufficient evidence available to conclude that the subject-predicate grammatical relationship exists in early child language and that the distinction involves more abstract linguistic inductions that are probably made later in development. The claim that children are learning only semantic structures, like the similar claim for syntax in early sentences in the 1960s, is only part of the story (see Bloom 1970). It has become increasingly clear in linguistic theory that semantics and syntax are mutually dependent and inseparable in any theory of grammar, and the two aspects of structure could not be separated in describing the child language observed in this study. Indeed, according to Bowerman (1973b), "The linguistic knowledge which underlies the earliest two- and three-word constructions may be no more complex than simple rules to order words which are understood as performing various semantic functions" (p. 210). Bowerman appears to confuse the claim that children are learning only the semantics of sentences when she fails to consider word-order rules as manifesting knowledge of syntax.

Both Bowerman and Schlesinger argued that evidence of word-order rules is not a sufficient condition for attributing knowledge of the subject-predicate distinction (which they seem to equate with grammar) to the child. In particular, Bowerman objected to the assumption of an underlying subject-predicate structure in child language as "too abstract." The kind of evidence that both Bowerman and Schlesinger might accept in order to attribute such knowledge of grammatical relations to the child would be the occurrence of superordinate categories whereby words in the same syntactic position took on different semantic functions relative to one another. Such superordinate grammatical categories were manifest in the system of semantic-syntactic structure that Gia and Kathryn learned. That is, the same words (e.g., "Mommy" or "Baby") could have different grammatical meanings, such as Agent (in an action event), Mover (in a locative event), or Possessor, and different words (e.g., "chair," "floor," "box") could have the same grammatical function (place), etc. Indeed, the same kind of evidence seems also to appear among Bowerman's own data (1973a, pp. 237–292). Further, the alternative system learned by Peter and Eric, in this same period of time, was no less grammatical. Even though superordinate grammatical categories were not represented in their speech, the patterns of regularity in their speech provided evidence of an abstract linguistic structure that was no less coherent and consistent.

Bowerman pointed out that the syntactic tests of the reality of a sub-

ject-predicate distinction in the adult model (e.g., transformations such as the passive that operate the same way on constituents with different semantic functions) are not met in the evidence from child speech. However, the existence of a structure in child language needs to be justified by a test of the child-language data and not by tests that apply to adult-speech data. The critical issue is whether there is a syntactic structure—a system of rules for combining words—in the children's speech, and not whether one can identify adult syntax in child sentences.

An important distinction seems to have been blurred in the emphasis on semantic learning by Bowerman, Schlesinger, and others as well—the distinction between semantic development and conceptual development. Children's early language learning is semantic, to be sure, which simply means that they have learned something about the meanings of words and the meaning relations between words. But how they have learned to think about the objects, events, and relations in their experience is something apart from how they have learned to represent such information in linguistic messages. Semantic learning has to do with learning a coding system for representing meaning in natural languages. Meaning derives from an individual's mental representation of experience. Semantic complexity cannot be separated from syntactic complexity—both represent the linguistic complexity that influences the course of development. On the other hand, one can look at cognitive complexity apart from linguistic complexity and attempt to specify the conceptual constraints that influence development.

Cognitive Complexity

According to Schlesinger (1971) and Slobin (1971) later linguistic developments are semantically more complicated because they are cognitively more complex. To a certain extent, that is obviously true. Cognitive complexity can be defined in terms of the mental operations that result in the mental representation of events (one's experience), and the extent of discrepancy between an original event in reality and the conceptual coding of that event (see the papers in Melton & Martin [1972] for various accounts of coding systems in human memory). For example, encoding action events occurred before encoding attribution in the present study, and it is reasonable that action on objects was cognitively simpler (involving sensorimotor schemas and patterns) than discriminating among similar objects according to relative size, color, or amount (which involves higher-level cognitive processes of categorization and seriation). On the other hand, the fact that encoding locative-state relations did not occur until after encoding locative-action relations would appear to be evidence that relative cognitive complexity was not the only factor operating to determine developmental sequence. Placing an object relative to another point in the context (locative action) would entail the transformation of object *A* from place *B* to place *C*. Quite simply, in order to know to change the location of an object the child would

have to be aware that it is already located at *B* and it potentially can be located at *C*. Viewed in this way, a locative state might appear to be less cognitively complex than a locative action.

Knowing about something does not simply translate to being able to talk about it or to understand when others talk about it. Children give every indication that they know the instrumental functions of crayons, keys, spoons, etc., and are aware of the function of persons as receivers in such events as giving, showing, kissing, etc., before these relations are represented in their syntactic speech. Even earlier, before the first sentences appear, children's linguistic behavior presents evidence that they are aware of relations among persons and objects and that objects can be located in space or otherwise acted upon (Bloom 1973; Greenfield et al., in press). While such awareness is a necessary condition for learning grammar, linguistic development is neither isomorphic with nor a necessary result of cognitive development.

The distinction between cognitive categories or conceptual schemata, and linguistic categories, can be easily obscured. As the child acts on his environment and observes others acting on his environment in similar and different ways, he begins to organize his experiences. He develops schemata to represent mentally such relations among objects as persons acting on objects, persons habitually associated with objects, the relative location of objects, persons changing the location of objects, etc. Such cognitive schemata are general and nonspecific to particular persons or objects, having been formed on the basis of many encounters with different persons and objects. With each schema, the child has induced a regularity in the interactions among persons and objects so that future encounters with events can be recognized and incorporated in cognitive memory. Such cognitive categories represent the entire relationship among, for example, agent, action and object, or possessor and possessed.

The child does not need to know anything about words and word meanings in order to form such cognitive schemata. Children learn such abstract object relationships and then need to learn how the words that they hear and perhaps already know in a lexical sense can take on meanings in relation to one another for more extended messages about particular events. A linguistic category is formed by those words that come together in the language because they can mean the same thing relative to other words, for example, "Mommy," "Daddy," and "Baby" as *agent* in the relation to "table," "chair," "floor" as *place;* or "eat," "turn," "push" as *action* in relation to "it" as *affected-object.* Such differentiated semantic categories as agent, place, affected object, etc., are linguistic inductions that the child has made on the basis of his linguistic experience relative to existing relations in cognitive schemata; the meaning relationship between linguistic categories is determined by a semantic-syntactic structure. Although relative cognitive complexity is a factor in explaining linguistic development, it appears to function to determine linguistic development only in complex interaction

with the linguistic code that the child is learning. Slobin (1971) has discussed how cognitive development can interact with linguistic complexity to determine developmental differences and similarities among children learning different languages (see, also, Macnamara 1972).

The Cycle of Actions and States in Cognitive-Linguistic Development

The encoding of action and locative-action relations appeared to be sandwiched between the encoding of two kinds of stative events in the sequence of linguistic development. Existence, nonexistence, and recurrence were often stative and did not necessarily involve action by the child or others; locative state, state, and notice were the stative events that were encoded after action events. However, what appears at first glance to be a discontinuity in linguistic development may result from the primacy of actions over states in the interaction between cognitive and linguistic development. The sequence of linguistic development of semantic-syntactic relations appears to recapitulate the cycle of deriving knowledge of states from knowledge gained through action or the perception of movement.

In early infancy, the child's movements in space result in the beginning mental representation of his spatial context in which objects do not have independent status from the context or from one another. Such static spatial maps provide a background for the more salient objects that move, and moving objects come to be increasingly discriminated from their contexts and from one another. Children might begin to build up the awareness that objects can exist independently from their spatial contexts through a process of recording the location of very familiar particular objects that move or are otherwise involved in actions. Children can be aware of particular objects and their habitual locations from a very early age—perhaps before they begin to know any language at all—through movements that (1) bring such objects into and out of view and (2) serve to emphasize or highlight an object in relation to a static background (see, e.g., Bower 1974; and Tronick 1972). Specific objects and then objects in general increase in salience in relation to their spatial contexts as the child develops the capabilities for acting on objects in particular ways.

With respect to linguistic development, Huttenlocher (1974) reported that names of a family pet or animal words such as "dog" were among the earliest words that children whose understanding she tested were able to recognize. Other words that the children recognized were similarly objects that moved or objects that were acted on, such as cookies. Clark (1973a) reviewed the diary literature and described movement (and four-leggedness which also involves movement) as among the most common perceptual features that characterize objects that were frequently named by children's early words. Nelson (1973) reported that, for many children, the first words they say make reference to objects that move. The most frequent words in four Czech-speaking children's early vocabularies compiled by Janota

(1972) after "Mummy" and "Daddy" were "bow-wow," "beep beep," "car," "moo moo," and "bye bye" (English glosses given here).

In the sensorimotor period before grammar emerges, children learn about the permanence of objects through their actions on objects and their observations of actions on objects—that is, the child learns that objects exist by acting in ways that make them disappear and recur (Piaget 1954; Sinclair 1973). Thus, the notions of existence, nonexistence, and recurrence are action dependent in the single-word utterance period (Bloom 1973). The child comes to an awareness of such object states through his own actions, his observations of the actions of others, and the movements of objects. By the time existence, nonexistence, and recurrence are encoded syntactically, they represent stative events as well as action events.

Subsquently, children encode relations between persons and objects, and encoding most often precedes or accompanies action by the child to effect those relations. Thus, in the present study, encoding relations between objects and persons or between objects appeared to depend upon an ongoing or intended action by the child or by another at the child's direction. Only after a child learned to encode person-object relations with the support of relevant action was he able to encode static relations among objects in which neither he himself nor his actions were necessarily relevant to the state of affairs represented in his message.

The ability to talk and understand depends upon the complexity of the linguistic code in interaction with the child's strategies for learning it. The variations in sequence of development (Gia and Kathryn learned action, locative action, and possession at the same time, whereas Peter and Eric learned them sequentially) appeared to be determined by the underlying structural systems that the children were learning, as revealed in the two different patterns of grammatical regularity that were represented in the speech of the different children.

SEMANTIC-SYNTACTIC STRUCTURE IN CHILD LANGUAGE

The claim that children are learning grammar does not require that children learn the adult system of grammar or that rules of adult grammar account for child sentences. The children's semantic-syntactic systems were not the same as the adult system, and adult grammar could not have accounted for such systems or their development in any adequate way. Nevertheless, the results of this study strongly support the position that children are learning grammatical structure when they combine two and three words at the end of the second year.

The data presented here provided evidence for the three levels of structure that were defined earlier for child language: with respect to sentences, sequence of development, and for child language in general. At the level of the sentence, it was possible to identify semantic-syntactic relationships be-

tween constituents for .88 of all the multiword utterances in the speech of the four children. With few exceptions, word order was consistent within each category, and the speech of each child was consistent with one of two alternative grammatical systems. Second, the longitudinal development of each child manifested antecedents and consequences in (1) the sequence in which different categories of semantic-syntactic relationship emerged and developed and (2) the shift from pronominal to nominal or nominal to pronominal encoding, as the children enlarged their original linguistic systems to include both grammatical alternatives. The semantic-syntactic relationships that the children learned did not occur or exist in isolation from one another. There was coherence in each child's development: learning the later verb categories appeared to depend on the structure already learned for encoding earlier verb relations, and it was apparently necessary to learn one system of reference (either nominal or pronominal) before learning the other. Given information about the language of a particular child at a particular time, one could predict other aspects of his language at the same time, whether pronominal or nominal reference would predominate, and, at a subsequent time, which categories would appear, and the nominal-pronominal shift. Finally, when the children were compared with one another, there was consistency among them in the semantics of their sentences, in the sequence of development, and in the pronominal-nominal shift. One could observe regularities among all four children that were consistent with reports from comparable studies (e.g., Brown 1973) and conclude that there is a coherent structure in child language.

In judging the grammaticality of child speech, it is necessary to distinguish between the dynamic process of the child's acquisition of grammar—that is, the psychological reality of his developing knowledge of grammatical structure—and the linguistic description of that knowledge at any point in time. Judgments of grammaticality cannot be obtained from the child and necessarily depend upon observations of the regularities in the child's speech data. The way in which a linguistic description can represent such regularities in children's speech is the issue of formalization that is open to debate at the present time. In Bloom (1970), linguistic descriptions were presented in the form of generative transformational grammars. Since that time, progress in the study of linguistics and linguistic theory has been such that there is no longer a unified theory of generative grammar and no consensus about the kinds of information to be represented by rules of grammar. The taxonomy of linguistic structures that has been presented here is a linguistic description of speech data that can represent the child's knowledge and changes in the child's knowledge in only a very gross way. There is no way of knowing, at the present time, the form in which such knowledge about linguistic structure is represented in the child's mental grammar.

However, it is possible to speak of the emergence of grammar in the child's knowledge when such knowledge is manifested in the child's behav-

ior—as he uses multiword utterances with regular and recurring relationship between constituents. That is, if structural features occur often enough and are shared by a large enough number of different multiword utterances, then it is possible to attribute the recurrence of such regular features to the productivity of an underlying rule system (see, e.g., Brown 1973), and attempt a linguistic description of what the child's system might consist. What such features would be might very well be different for different children speaking the same language (as in the present study), and they most certainly would be different for children speaking different languages.

VARIATION IN CHILD LANGUAGE

The two different systems of semantic-syntactic structure when MLU was less than 2.0 morphemes could be compared with the traditional classification of language systems as synthetic-agglutinative or analytic-isolating. The system of pronominal reference that Peter and Eric learned for their early sentences could be described as "agglutinative," with a small number of constant morphemes (pronominal "it," "there," "my," etc.) added on to other morphemes to signal certain semantic distinctions (affected-object, location, possessor, etc.). In contrast, Gia and Kathryn learned a system whereby many different morphemes were combined with one another to signal the same semantic distinctions, and such morphemes were more isolatable and less dependent on one another. It is possible to conclude that the capacities for both pronominal and nominal encoding (or, put another way, for both agglutinative and isolating linguistic processes) exist among children, from the beginning of the use of syntax.

Other studies of child language may be interpreted as confirming the intersubject nominal-pronominal variation observed among the four children in this study. A fifth child, Allison, whose development was reported in Bloom (1973, pp. 233–257), used exclusively nominal forms in her early syntax, as can be seen in the data presented there. In other data from English-speaking children, reported by Huxley (1970) and Nelson (1973), there were children who appeared to use predominantly pronominal forms and other children who used nominal forms in their earliest syntactic utterances. In two unpublished studies by Lightbown (1973) and Vosniadou (1974), the speech of French- and Greek-speaking children was described, respectively, and the almost exclusive occurrence of either nominal or pronominal forms was observed in the early syntactic utterances of the different children. It appears that an individual child's first sentences are either nominal or pronominal, and the two systems of reference are not mutually substitutable in the beginning.

The variation among the children in the pronominal and nominal encoding of verb relations and possession can be attributed to the two strate-

gies for syntactic encoding described in Bloom (1973). The first strategy is the linear combination of one word, having the same form and same meaning, with various other words, for example, "fix it," "eat it," "read it," etc., where "it" operates much like a formal marker. The second strategy is the hierarchical combination of categories of words, with a structural meaning that is essentially independent of the lexical meaning of each word separately. It seems that children can break into the adult linguistic code in one of (at least) two ways: with a system of formal markers, or with a system of rules for deriving grammatical categories. Both strategies would provide the child with a means for representing the same semantic information in his speech, with greater or lesser lexical specification, and both are aspects of the adult code. The choice of strategy (if there is a choice) as children begin to use syntax would appear to be the result of complex interactions between cognitive development and linguistic experience. Once a child has recognized the relations among objects and events that recur with different objects in different situations, he can begin to learn a system of syntactic coding that represents such information about events, in the speech that he hears and in his own speech. The aspects of the system that he learns will be determined at least in part by the kind of linguistic reference that he hears.

Parents may differ from one another in the relative extent to which they use pronominal or nominal forms in their speech to their children. Nominal forms may well predominate generally in speech to children for increased specificity or redundancy, for the sake of gaining attention, adding emphasis, or increasing clarity. The interaction in the present study was between investigator and child primarily, but in the mother-to-child speech that was recorded the four mothers did not differ from one another in the extent of pronominal reference.

The use of proforms in adult-to-adult speech is governed by a fairly explicit system of deictic reference (see, e.g., Fillmore 1971). Adults use proforms according to the information that speaker and listener share about events. If an object has already been named or otherwise pointed out in the situation, then the use of pronoun reference occurs with no loss of information because both speaker and listener know, for example, the particular object to which "it" refers, or the place to which "there" refers. Adults use proforms gesturally, when they also point out or otherwise indicate the object, action, or person of reference, and anaphorically, when the object, action, or person of reference has already been named by either speaker or listener in the situation. Whether one says "eat the spinach" or "eat it," or whether one says "the book is on the table" or "it's over there" depends upon what both the speaker and the hearer already know about the situation and about one another.

Children are exposed to systems of deictic reference, with shifting between nominal and pronominal forms, in both the adult-to-child speech that they hear and the adult-to-adult speech that they overhear. This intraspeaker

variation that forms a part of adult competence and interacts with information about situational and interpersonal contingencies can be compared with the interspeaker variation among the children in their early use of pronominal or nominal reference. However, the use of proforms and substantive forms in the children's speech was not a system of shifting deictic reference; the children used either one or the other form of reference. The use of proforms by Peter and Eric was neither gesturally nor anaphorically conditioned, and when the pronominal-nominal shift for each of the children occurred it was not conditioned by such deictic constraints from the situation or awareness of the information shared with a listener.

Other kinds of evidence indicate that children who are less than 3 years old would not know such communication conventions for speaking and understanding that take into account the information that is shared between speaker and listener and that contributes to determining message form (e.g., Brown 1973; Flavell 1968; Glucksberg, Krauss, & Higgins 1975; Maratsos 1971). It appears then that children learn usage constraints on nominal and pronominal encoding *after* they acquire the formal linguistic means for shifting reference, which the children in this study began to acquire when MLU was approximately 2.5 morphemes and they were approximately 2 years old. How they proceeded to learn to take account of social, cognitive, and linguistic variables as the factors for shifting pronominal or nominal encoding, in their later development, remains to be determined.

Strategies for Language Acquisition

The children's early development of syntax can be attributed to two alternative strategies. For Peter and Eric, the early development of syntax can be attributed to a *pronominal* strategy because early sentences used pronominal forms that functioned to represent a variety of objects or persons in event relationships. In contrast, for Gia and Kathryn, the early development of syntax can be attributed to a *categorization* strategy, because their use of sentences was characterized by the use of categories of nominal forms with particular grammatical functions.

Different investigators have attempted to explain variability in child language behavior in terms of children's strategies for language acquisition.[8] In one context, Bever (1970), Clark (1973b), and Slobin (1971), among others, have proposed successive strategies of acquisition to explain variability or change in linguistic behavior as a function of development. They each proposed sequences of strategies that children use in the process of learning how to obtain meaning from the words and structure of adult sentences. The strategies proposed by Bever were hierarchically ordered accord-

[8] See, also, Bowerman (1974) for discussion of strategies for language acquisition.

ing to the relative complexity or the syntactic constraints of English sentences. The strategies proposed by Slobin and Clark consisted of processing directives that retrospectively accounted for several of the findings in studies of child language and development. Such successive strategies are the steps or rules that children follow for proceeding from one level of development to another, and such strategies, in effect, represent stages in development.

The context in which strategies have been proposed in the present study is the variation observed among different children at the same level of development. Rather than hierarchical, according to complexity of the adult-model language, or sequential, to account for developmental change (as were the successive strategies proposed by Bever [1970], Clark [1973b], and Slobin [1971]), the two strategies offered here are attempts to explain the two different approaches taken by different children in the course of development. While both strategies have to do with learning aspects of the model language, one or the other predominated in the development of different children in the same period of time. The use of strategies in this second context is meant to imply an organizational scheme, for representing information and taking in new information, based upon the inferences the child has made about the linguistic system. His use of this organization of linguistic information represents his map, or plan—that is, his strategy for linguistic behavior and language learning. Sequential strategies for developmental change would operate within the more general organizational strategy such as the pronominal strategy or the categorization strategy proposed in the present study, and one could propose, for example, a set of operating instructions for shifting from nominal to pronominal or from pronominal to nominal representation.

Substantive intersubject variation has also been described in phonological development by Ferguson. In Ferguson, Peizer, and Weeks (1973), two organizational strategies were described as accounting for different rules used by different children in their early phonological acquisition: one, the choice of consonant-vowel-consonant-vowel models with "assimilation to full reduplication" (p. 61), and an alternative strategy of reducing polysyllabic items to monosyllables. Ferguson (personal communication) has described two different organizational strategies for the acquisition of Spanish liquids: one strategy was first represented by "some kind of lateral" for *l*, *r*, *rr*, and intervocalic *d* (ð), while the other strategy had "r-quality sounds fairly early." It appears then that in phonological development as in grammatical development, different children can travel different paths to the same end.

There well may be important variation in the duration of different children's use of either an initial pronominal or nominal strategy for encoding grammatical relations. In the present study, the four children progressed from their earliest productive syntax (when MLU was approximately 1.3) to the pronominal-nominal or nominal-pronominal shift (when MLU was approximately 2.5) in a period of from 12 to 20 weeks. A child might

possibly stay with one or another strategy for only a few weeks (or less) or for a much longer period of time. Indeed, it well may be the case that the strategy shift presents problems for some children, and they may make the shift with difficulty if they make it at all. In a study by Morehead and Ingram (1973), the speech of children whose language was diagnosed as disordered appeared to be quite limited in lexical representation, so that one could conceivably explain their language disorder as an inability to shift from relations with constant (pronominal) forms to a system of grammatical categories.

V. CONCLUSIONS

In the present analysis, the regularities and consistencies in the data provided evidence of child-language structure that is more like adult grammar than it is different and, furthermore, contains both the analytic and synthetic features of languages in general. The analytic aspects of languages such as English were manifest in the early combinations of categories of nominal forms in the speech of Gia and Kathryn, while the early use of pronominal forms by Peter and Eric was interpreted as similar to processes of affixing as observed in synthetic languages such as Russian and Finnish. The variation observed in the present study helps to explain the apparently contradictory "pivot grammar" and "telegraphic speech" descriptions of child language that were reported in the 1960s. It also helps to explain the fact that some investigators in cross-linguistic research (e.g., Burling 1959; Park 1970; Pavlovitch 1920) have reported exceptions to what has been viewed as a universal in child language, namely, that children use content words in rigid order before they learn to use synthetic features of language (inflections and other functors). McNeill (1970) has suggested that, since some languages require rigid word order and few inflections while others use variable word order and obligatory inflections, children can be expected to be influenced by one or the other of these two approaches in their early language learning. (See also Brown [1973] and Traugott [1973] for further discussion of this issue.) Further, however, the observed variation can be viewed as the genesis of the capacity for shifting pronominal-nominal reference that is required before the child can learn systems of usage constraints that depend on situational and interpersonal contingencies.

Until the emergence of the capacity for alternative pronominal and nominal reference, it was possible to conclude that form followed function in the children's language development. When the children first began to use grammar, it was clear that what they were learning to talk about was determined by what they knew about objects and events in the world. Interpretation of their utterances was straightforward because the mapping relation between underlying semantic intent and surface form was quite direct. How-

ever, the capacity for alternative pronominal and nominal reference provided the first evidence of function following form in language development. The children had learned that they could refer in sentences to a car as "it" and "car," they could refer to a place as "there" and "floor," and they could refer to possessions as "Kathryn('s)" and "my." However, they had not begun to learn the social and linguistic conventions that govern the use of one or another kind of reference for communication.

The developmental distinctions between action and state events in general, and locative-action and locative-state events in particular, correspond to the grammatical distinctions of "dynamic" and "static" aspectual opposition, of which the opposition "directional" (locative action) versus "locative" (locative state) is a particular manifestation (see Leech 1970, pp. 198–201; and Lyons 1968, pp. 298, 397). Traugott (in press) has discussed the dynamic-static opposition for locative terms in pidgin and creole languages and concluded that the dynamic aspect appears to dominate in the evolution of such languages. The sequence of linguistic development reported here may be a reflection of the more basic dynamic-static distinction in languages in general.

The conclusions offered here are necessarily tentative, awaiting confirmation from studies of more children. The patterns of regularity and variation that have been described here emerged from the data as the result of quantitative comparisons. Just as anecdotal evidence or the description of isolated behaviors is never adequate for justifying an assumption about underlying knowledge, it is also true that the conclusions presented here were based upon performance values that were relative. Indeed, it seems safe to say that there are no absolutes in child language. However, when large interactions in the linguistic data occur they can be interpreted as important evidence of regularities and patterns of developmental variation in the language of a particular child and, eventually, in the language of larger numbers of children. Other, smaller effects are no doubt a function of other variable factors which will also need to be spelled out eventually.

APPENDIX

The Appendix consists of utterances from each speech sample, from each child, that are examples of the semantic-syntactic categories. Only productive categories are illustrated. The utterances were selected for presentation here in the following way: two utterances were chosen as examples for every five utterance types in each category, up to a maximum of 10 examples from any one category, regardless of how many utterance types actually were in the category. The examples were taken from the transcript in the order they occurred, with the following limitations: (1) If several utterances in the same category occurred in one speech event, then only one of them was chosen. For example, if the child had finished drinking milk and was asking for more, and said, "I want milk Mommy/want milk/want more milk/" only the first of these child utterances was included here as an example. (2) Utterances which represented more than one semantic-syntactic category, such as "I read my book" (Action and Possession), are presented here as examples for only one category.

Different verb tenses are used in describing the situation and context: progressive for simultaneous action, simple present for actions or events which precede or follow an utterance, utterances are spaced on lines before or after the description according to whether they are preceded or followed by the action. An arrow at the end of an utterance indicates rising intonation; a slash indicates utterance boundary.

The categories are presented for each child in alphabetical order.

Action	
Eric I (not productive)	. . .
Eric II:	
(Eric picks up his pail)	ə find it
(Eric picks up his drum)	play it
Eric III:	
(Eric reaching for cup of juice)	ə eat juice
(Eric looking for block; Lois is holding it)	ə find it
(Eric and Lois have been looking for driver of toy truck; Eric gets up and goes to look for it in vacuum cleaner)	hə look for it
(Eric assembles tank car)	I fix it
(Eric assembling train)	ə fix it
(Eric going under bed after a bead)	ə got it
(Eric throws disk)	I do
(Eric retrieves disk; giving it to Lois)	I find it
Eric IV:	
(Eric takes ball from his stroller and gives it to Lois)	I'll give you ə ball
(Eric breaking cereal)	ə broke it
(Eric picks up piece of slide that Lois brought)	ə bring slides
(Lois rolls disk; Eric going after it)	I got ət blue
(Eric closes tape recorder; turns to light which is off)	turn light off
(Eric looking on floor for blocks)	ə look for ət
(then Eric kicks slide over)	ə break it ə break it
(Eric starting to put slide together)	ə fix it
(Eric stacking blocks)	I do it
(Eric nesting blocks)	ə make house
Eric V:	
(Eric pushing his cup of cocoa away)	I finish
Mommy: What did you drink with a straw?	I drink ə cocoa
(Eric runs from bathroom to living room where Lois is sitting)	I do pipi
(Eric telling Lois about trip to fire house with Daddy)	ə fire engine make noise
(Mommy had spanked Eric's hand)	sometimes you hit
(Eric pointing to tape recorder)	you turn that ↑
(Eric giving Lois a disk to roll down slide)	take one
(Lois hadn't brought choo-choo train)	ə bring ə choo-choo train tomorrow ↑
(Eric moving Lois's hands so she'll put two pieces of toy slide together)	ə put it
(Lois had just closed lid of tape recorder; Eric trying to open it)	open it
Action and Place	
Eric I–IV (not productive)	. . .
Eric V:	
(Eric and Lois looking out window at man walking)	walking street
(Eric's baby sister had just had a bath; Mommy lifts her out)	ə baby swim bath ↑
(Eric catches his finger in nesting blocks as he stacks them)	my finger got stuck in there
Attribution	
Eric I–II (not productive)	. . .

Attribution (*Continued*)

Eric III:	
(Eric taking truck from toy bag)	red car
(Eric points to lamp which is off)	light hot
Eric IV:	
(Eric talking about the last time he went to the beach)	e pool cold
(Eric looks at picture of two buffalo on cereal box) Mommy: How many buffalo are there?	three buffalo
(Eric holding sheep)	little that
(Eric picks up green disk)	green one/ə big one
(Eric watching tape-recorder reels)	two wheels
(Eric pointing to tape recorder control buttons)	ə wheel button
(Eric gives Lois two disks)	two wheel
(Eric holding yellow disk)	that's yellow one
(Eric pointing to shelf with bear and duck on it)	funny duck
(Eric and Lois in living room, hear noise of vacuum cleaner in Eric's room)	other room
Eric V:	
Mommy: Sometimes I hit you when you're a bad boy.	də bad boy/a naught/you ə naughty boy ↑/
(Lois points to missing part of clown's hat)	e broken clown
(Eric picks up yellow disk and brings it to Lois)	here's ə yellow one
(Eric puts green and yellow disks on bed)	that green/that yellow
(Eric looking out window at people walking)	that's ə nice man
(Eric picks up clown; picking up second clown)	ə clown two clowns
(Mommy asks Eric how many hands his baby sister has)	two hands
(Eric looking out window at police car)	big noise
(Mommy asks Eric what color tootsie lollipop he wants)	ə green one tootsie lop
(Eric trying to stand man on block)	man ə good boy

Dative

Eric I–III (not productive)	. . .
Eric IV:	
(Eric points to car out of window)	ə green/green/
Lois: What's green? Where? (Eric pointing out window)	I'll show you
(Eric hears vacuum cleaner noise; runs to door)	show me
(Mommy asks Eric where Iris is)	show you
(then Eric runs into hallway and points toward parents' bedroom)	. . .
(Lois is putting her toys away; Eric has train car)	show Mommy that
Eric V:	
(Mommy is giving Eric's baby sister a bath; Eric watching) Mommy: When does Eric get a bath?	Daddy give Eric bath
(Eric had put lambs into stacked blocks; called them houses; he knocks blocks down; starting to stack them again)	I make the nother house lambs
(Lois arrives at front door: Eric runs to open it)	open door Mrs. Bloom
(Eric and Lois reading *Anybody Home;* Eric turns to picture of snail)	tell me what's at
(Lois gives Eric a puppet; Eric puts it in box)	ə give it to you
(Eric tries to trade books with Lois, but she doesn't want to) Lois: This is the book I want to read. (Eric taking Lois's book)	OK/ə back to you/ I want it

Existence	
Eric I (not productive)	. . .
Eric II:	
(Eric turns to opened toy box)	ə toy
(Eric points to doll)	ə baby
Eric III:	
(Eric fitting lamb piece in puzzle)	ə lamb
(Eric picking up clown)	ə clown
(Eric takes rattle and whistle from toy box)	ə whistle
(Eric picking up bird)	there ə birdie
(Eric climbs on chair and reaches toward lamp)	ə light
(Eric pointing to bunny)	e bunny
Eric IV:	
(Eric holding hair brush)	e brush
(Eric points to telephone on wall)	e telephone
(Eric pointing to train)	that choo-choo train
(Eric pointing to tape-recorder buttons)	ə button
(Eric points to vacuum cleaner)	ə cleaner
(Eric pointing to dump car)	e dump car
(Eric picks up book; looking at picture of birds)	e picture/e birdie there
(Lois opens closet door; vacuum cleaner is inside)	there cleaner
(Eric pulls out Daddy form)	that Daddy
(Eric pointing to tape recorder)	that chine
Eric V:	
(Eric brings yellow disk to Lois)	here's ə yellow
(Eric picks up clown; shaking it)	ə clown
(Eric showing Mommy lamb and block)	lamb/ən that's ə toy
(Eric pointing to truck)	that fire engine
(Lois and Eric looking at animal book; book is opened to picture of horse)	ə horsie
(Mommy gives Eric his pacifier)	this pacifier
(Eric taking train from toy bag)	this ə choo-choo train
(Eric showing Mommy tank car)	this is ə tank
(Eric pointing to last coupling on train)	this ə end
(Lois has engine) Lois: Is this a tank?	no/this ə engine

Intention	
Eric I–IV (not productive)	. . .
Eric V:	
(Eric had been reading *Mrs. Tittlemouse* with Mommy, Lois, and two children; the children are preparing to leave)	ə want see Tittlemouse
(Eric climbing on Mommy's chair)	ə want sit there
(Eric walks over to his toy chest; the tape recorder is on the toy chest)	ə wanta sit down
(Lois makes man of clay; head falls off; Lois puts it back on)	want look ə man
(Mommy is giving Eric's baby sister a bath) Mommy: Let's give baby Nancy a shampoo shall we? (Eric reaching for shampoo bottle)	ə want hold it
(Eric trying to reach his baby sister in her crib)	I want kiss it/I want kiss

Locative Action	
Eric I–II (not productive)	. . .

Locative Action (*Continued*)	
Eric III:	
(Eric putting man on blocks)	man sit blocks
(Eric getting up)	I get down
Eric IV:	
(Eric putting toys away in toy bag)	all away
(Eric putting clown on top of blocks)	another clown up here
(Eric fitting disk into block)	ə fits here
(Eric fitting disk in hole)	nother fit
(tower of blocks crashes down)	it fall down
(Eric positioning large block; but doesn't sit on it)	I'll sit here
(Eric pushing toy train)	train ə bye bye
(part of train falls over)	choo-choo fall down/choo-choo train fall
(Eric putting man on train)	ə man sit train
(Eric putting plane piece into puzzle; he had called it a wrench instead of a plane)	wrench go there
Eric V:	
	we go ə toilet
(then Eric and Lois go into bathroom)	
(Eric pointing to toy man; then Eric puts man in car	that goes there
(Eric puts bendable figure in block)	ə put it
(Eric carrying disks to his bed)	I put it down
(Eric looking out window; shouting to man who has walked away)	you come here
(Eric looks out window at bird; bird walks out of sight)	birdie away
(Eric trying to balance toy car on top of block pile)	I took car on this
(Mommy preparing to leave house)	you go out little bit
(Eric holding up piece of toy engine)	ə piece go
(Eric had stood toy man on blocks; man falls off)	man fall off

Locative State	
Eric I–III (not productive)	. . .
Eric IV:	
(Eric hears noise of people in the street)	people ən street
(Eric reaches toward lamp which is off)	no more light]
Lois: No more light? Where is the light?	ə light up here]
(Eric points to toys on shelf)	ə dolly up here
(Eric drinks juice)	any soda in there ↑
(Eric pointing to spindle of tape-recorder reels)	pin in it
(Eric looks at wheels on train; then picks up car; pointing to wheels on car)	wheels car too
(Eric pointing to Daddy figure in dump car)	Daddy up here
Eric V:	
(Eric pointing to pigeon walking on street)	there's ə birdie in there
(Mommy is sitting on stool)	Mommy sit
(Toy man had fallen off train a few minutes before; Eric pointing to it)	man sit
(Eric looking into crib)	ə baby there ↑
(Eric picks up *Animals*, a book)	bumblebee in there
(Eric looking at car parked on the street)	ə car going there
(Eric had climbed on chair; after minute's pause)	I sitting Mommy
(Eric looking out window at several pigeons)	ə pigeon there
(Eric pointing to book on shelf of his chest)	this up in air
(Eric asks where toy man is; looks for it; finding it)	oh here's ə man

Negation	
Eric I–II (not productive)	. . .
Eric III:	
(Eric rolls beads; looking for more; can't find any)	no more
(Eric brings disks to Lois; looking around but no disks are left)	no one
(Eric trying to nest blocks)	no go in
(Eric twists wheels on axle; stopping it)	no more noise
(Eric putting toy car in bag)	no more car
(Eric heard an airplane outside a few minutes previous)	no more airplane
Eric IV:	
(Eric eats last piece of cereal)	ə no more
(Eric trying to fit disk in very small hole)	it doesn't fit
(Eric pointing to space for fourth train car)	missing there
(Eric pushes switch to turn lamp on, but it doesn't go on)	no more light
(Eric pressing on-off button of vacuum cleaner)	no more cleaner
(vacuum cleaner stops)	no more chine
(Eric finishes putting all pieces on form board)	no more pieces
(Eric pointing to empty space on form board)	missing here
(noise from vacuum cleaner stops; Lois tells Eric that Iris turned it off)	ə no more cleaner/off
Eric V:	
(Eric had been looking out window at pigeon; it flew away)	no more birdie
(Lois and Eric had been putting lambs in blocks; Eric pointing to empty block)	ə missing there
Lois: We could put this black one in there, Eric. (Eric taking block away)	no in there
(water from hose drips into a bucket; stops)	no more water
(Eric knocks over blocks with lambs in them; lambs fall out)	no more lamb
(Eric holds parts of slide out to Lois)	you put ə on
Lois: Can you put that on? (Eric holding it out to Lois)	I can't/you put ə on
(Eric pushes car under bridge and bridge collapses)	no more bridge
(Mommy tries to put bib on Eric; he squirms away)	no bib
(Eric had been on a roller coaster recently) Mommy: Would you like to go again on the roller coaster?	no I didn't go back roller coaster
(Eric tries to sit on pile of stacked blocks that is too high for him)	and ə no sit down
(Eric tries to fit one block into another; can't do it)	doesn't fit

Notice	
Eric I–III (not productive)	. . .
Eric IV:	
(Eric sees piece of tinker toy)	I see/I see train
(Eric and Lois are looking out window)	I see another man
Eric V:	
(Eric points to yellow disk)	I see yellow
(a disc rolled under chest; Eric pointing to chest)	see under there ↑
(Eric pointing to disks he had put on bed)	see wheel ↑
(Lois opened tape recorder; Eric watching reels)	see chines ↑
(Eric pointing to man out window)	look ə man
(Eric pointing to top block on block pile)	look up in air
(Eric looks around for disk; sees it and goes after it)	I saw it

Notice (*Continued*)	
Eric V (*Continued*):	
(referring to picture in book)	I see monkeys there
(Eric pointing to disc on floor near crib)	look ə wheels
(Lois opens refrigerator; there is juice inside)	see juice
Place	
Eric I–III (not productive)	. . .
Eric IV:	
(Eric pointing to his dresser)	ə up there
(Eric pointing to top of closet)	up there
(Eric pointing into block)	right here
(Eric picking up disks; then fits a disk into a block)	ə this/up here/over here
Eric V:	
(Eric pointing out window to man walking on the street)	way up there
(Eric telling Lois about his ride on a roller coaster)	the roller coaster nice/
Lois: Was the roller coaster nice?	yes/up in the air
(Lois asked Eric if he'd like to go on the roller coaster again; Eric said no; Mommy repeats question) Mommy: Would you like to?	no on the train
(Eric trying to make bendable figure sit on train)	ə in dump car
(Eric had been pushing vehicles under bridge; bridge collapses; Lois sets bridge up again)	under bridge/again/under bridge
(Eric puts bear on pillow) Lois: What did you do?	on pillow
(Lois presses piece of clay on Eric's nose; Eric holding his knee up)	on ə knee
(Eric lines pieces of clay along crossbar of crib; going to get more clay)	on ə bed
Possession	
Eric I–IV (not productive)	. . .
Eric V:	
(Lois and Eric eating lollipops)	this ə mine lollipop
(Eric sees bottle of his baby sister's shampoo; then picks it up)	baby shampoo
(Eric and Lois are looking out the window; a car similar to Eric's family car stops outside)	and this ə my car
(Eric sees a man walking on the street who looks like a man he knows, Jimmy)	his name ə Jimmy
(Lois pushes toy truck back and forth)	gimme]
Lois: What? What do you want?	my truck]
(Lois reaches for clay Eric has been playing with)	it's mine clay
Recurrence	
Eric I–II (not productive)	. . .
Eric III:	
(Eric twists wheels; stops; twisting wheels again)	no more noise/ more noise
(Eric slides disk; sliding another one)	nother one
Eric IV:	
(Eric eats piece of pineapple; Mommy gives him another piece; Eric eating it)	another one
(Eric breaks pieces of cereal; picking up broken pieces and eating them)	another broke

Recurrence (*Continued*)

Eric IV (*Continued*):	
(Eric and Mommy are looking out window; many people are walking by in the street)	people
Mommy: Yes? What else do you see?	another people
(Eric nests one block into another; nesting another one)	another fit/more fit
(Eric taking second clown from toy bag)	another clown
(Lois has book; Eric picking up other book)	another book
(Eric rolls disk down slide: picks disk up; but doesn't roll it)	ready/ready/go another ready go
(Eric picks up dump car; pointing to engine)	this ə dump car too
(Eric turns button on tape-recorder handle; turning button on other side of handle)	another turn button too
Eric V:	
(Eric putting second figure on block)	another one
(Eric looking out window at people walking)	oh another man
(Eric pointing to lamb; pointing to second lamb)	that's ə lamb/ that's ə lamb/nother lamb
(Eric pushes bridge down; laughs) Lois: What happened to the bridge?	ə more bridge/more bridge/ more bridge please
(Lois had made a man out of clay) Lois: Shall we put the clay away?	no clay/make another man
(Lois and Eric are looking out the window; there are two trees)	I see tree/I see another tree
(Eric and Lois each have a clump of clay; Eric reaching for Lois's clay)	more clays
(Lois puts piece of clay on Eric's knee; Eric hands Lois another piece)	another piece ə clay/knee
(Lois had put cat finger puppet on Eric's finger; it falls off)	more pussycat
(Eric gives some blocks to Lois; giving her another one)	nother block

State

Eric I–II (not productive)	. . .
Eric III:	
(Eric eats apple; finishes it, whining)	want more apple
(Lois teases Eric that she's going to take his book home)	ə need book
(Eric and Mommy are looking for Eric's shoes)	ə need shoes
(Eric taking slide from Lois)	I need that
Eric IV:	
(Eric holding lamb)	ə got it/I got it
(Eric pointing to disks Lois is holding)	need that
(Eric tries to take book from Lois; whines)	I want book
(Eric looks at picture of raccoon holding an apple; closing book)	ə want apple too
(Eric pointing to photograph of himself sleeping)	baby sleep
(Eric puts Mommy form flat on board)	Mommy sleeping
(Eric goes to closet where vacuum cleaner is)	ə want cleaner
(Eric looks for train; can't find it)	ə want choo-choo train
Eric V:	
(Eric's baby sister is crying)	baby Nancy want ə bottle

State (*Continued*)	
Eric V (*Continued*):	
(Eric standing in front of chest under which disks had rolled)	I need that blue
(Eric takes block from Lois)	I need that
(Eric stands man on block; it falls and is flat on floor)	man rest
(Eric holds empty dish out to Lois)	want some nuts
(Eric sees toy fire engine behind him)	I need ə fire engine
(Eric is about to eat lunch)	I want bagel
(Mommy opening container of cream cheese for Eric's lunch)	I like the cole slaw
(Eric has been crying; Mommy goes to get pacifier)	ə want ə pacifier
(Eric and Lois had been playing with the train; Eric now playing with dump car)	ə like ə choo-choo train
Wh-Question	
Eric I–IV (not productive)	. . .
Eric V:	
(Eric looking in toy bag)	where's it/where's ə/ where's ə choo-choo train/
(Lois slides red disk; Eric retrieves it; looking around)	where's ə yellow
(Lois knocks over blocks)	why you want ə do that
(Eric pointing to Lois's toy bag)	where ə choo-choo train in there
(Lois dumps puzzle out; Eric points to empty puzzle board)	where's ə goes there
(Eric holding out piece of puzzle to Lois)	what this
(Eric holding up engine piece of puzzle)	what engine go
(Eric takes out toy car that has space for driver)	where's ə man
(Eric pointing to end of train made up of adjoining cars)	ə what's there
(Eric and Lois are reading *Anybody Home;* book was opened to picture of bumblebee, but Eric loses the page)	where's ə bumblebee

Action	
Gia I (not productive)	. . .
Gia II:	
(Gia points to lamp which is off)	turned on light
(Gia and Lois looking at snapshots) Lois: What's Mommy doing? (picture of Mommy on carousel)	ride Dumbo
(Gia looking at picture of herself on small animal) Lois: Who's riding?	ride da fish
(Gia pushes snapshots away; picking up *Pat the Bunny*)	more/see book
(Gia opens book to picture of girl pushing carriage)	kə push ə carriage
(Gia riding tike bike)	ride dis
(Gia breaks off piece of cookie; putting it in her mouth)	eat piece
(Gia carrying book to Mommy)	read ə book
Gia III:	
(Gia taking *Anybody Home* from toy bag; then hands it to Lois)	ə read dat book
(Gia taking slide from toy bag; then gives it to Lois)	fix dat ↑
(Gia putting disk on slide; rolls disk)	Gia do it
(Gia trying to put man in truck)	ride truck
(Lois stacks blocks; Gia knocks them down, laughs; starts to stack them again)	Gia more
(Gia pulls her tricycle into center of room; then gets on it)	Gia ride bike
(Gia and Lois go into dark bedroom; Gia looking for lamp)	on light
(Gia trying to snap form board cover closed)	ə close button
(Gia sitting on tank car)	Gia ride tank car
(Gia holding book out to Mommy)	Mommy open that
Gia IV:	
(Gia tries to put slide together; can't; giving it to Lois)	Lois fix it
(Gia and Lois go into bedroom; Mommy is taking sheets off bed)	Mommy change sheets
(Gia scribbles on paper; it tears)	tear it
(Gia plays with slide; Mommy comes into room; Gia going to Mommy)	Gia play Lois
(Gia scribbling on paper)	Gia writing
(Gia pushes cart)	Gia push
(Gia having trouble nesting blocks)	Lois help
(Lois builds "house" of blocks; Gia knocks it down; starts to build it up)	build house
(Gia reaching for tape-recorder button; Lois stops her)	push ə button
(Gia pushes truck into bridge; bridge falls; Gia trying to build bridge again)	bridge/build ə bridge
Gia V:	
(Gia runs into living room with musical T.V. that her uncle had brought for her)	Uncle Paul ə record
(Gia takes book from toy bag and giving it to Lois; Gia taking another book from bag)	you read this book/ I read this book
(Gia points to piece of scotch tape on book) Mommy: What happened to the book?	ə tore it
(Mommy is ready to leave; Gia running to door; opens door)	I'm open door

Action (*Continued*)	
Gia V (*Continued*):	
(Gia putting man in car)	man ə ride this truck
(Gia opens up book which she and Lois use as a tunnel; puts opened book on end)	I make ə tunnel
(Gia tries to connect two train cars; can't)	Lois help Gia ↑
(Gia and Lois push train; it buckles and comes apart)	bump my train
(Gia going toward *Animal* book; picking up bendable man on the way)	read ə book/ə man ə read ə book ↑
(Gia running to bedroom; pulls her bike out and gets on it)	I ride my bike
Action and Place	
Gia I (not productive)	. . .
Gia II:	
(Gia scribbling on paper)	write ə paper
(Gia trying to scribble on picture of rabbit in book)	write ə rabbit
Gia III (not productive)	. . .
Gia IV:	
(Gia scribbling on paper)	draw paper
(Gia going to desk; Gia reaches for paper; Mommy gives it to her)	write ə paper Mommy
(Gia holding out her finger which has pen marks on it)	Gia write finger
(Gia climbs on orange chair holding book in her hand)	read orange chair
Gia V:	
Lois: Shall we sit on the sofa and read my book? (Gia going to orange chair)	orange chair ə read ə book
(Lois attaches paper to clipboard and puts it on table; Gia draws)	I'm draw clipboard
(Gia has tried on new jacket; Mommy starts to unbutton it; Gia pulls away)	I wanta wear outside
(Gia hears children shouting in hall)	I want play ə Kevin hall
(Gia scribbles on toy pan)	I write my pan
(Gia writes on her stomach)	I'm ə write belly
Attribution	
Gia I (not productive)	. . .
Gia II:	
(Gia looking at picture of hen and chicks) Lois: Who's that? (hen)	Mommy chicken
(Gia pointing to record player on which she plays children's records)	baby record
Gia III:	
(Gia pointing to picture of chick)	baby chicken
(Gia picking up Daddy's magazine)	Daddy new book
(Gia looking at picture of a bad baby)	bad bad boy baby
(Gia looking at picture of boy running after bus)	little boy school bus
(Gia puts form board cover on her head) Mommy: What a pretty hat.	new hat
(Gia and Lois are reading; Gia struggles to get up) Lois: What do you want?	bunny rabbit book
(Gia picks up *Animals*, which has rabbit on the cover)	
Gia IV:	
(Gia comes out of kitchen with box of birthday candles) Mommy: What's that?	cake candle

Attribution (*Continued*)	
Gia IV (*Continued*):	
(Lois pointing to picture of baby elephant)	baby elephant
(Gia carrying empty wine bottle to desk)	big bottle
(Gia points to her blankets at bottom of laundry cart)	one two blanket
(Gia giving smallest nesting block to Lois)	Lois little box
(Gia fitting boy figure on form board)	little boy
(Gia pointing to baby in picture of a family)	little baby
(Gia holds book; Lois holds another) Lois: Which one (shall we read)? (Gia hitting one Lois has)	this book
(Gia picks up *Toys* after looking through magazines)	this ə nice book
(Gia trying to snap tape-recorder cover closed)	push ə new button
Lois: That's right. You never pushed that one before.	
Gia V:	
(Lois is sitting on orange chair ready to read book to Gia; Gia pointing to tape recorder)	take dis orange chair
(Gia reassembles book "bridge")	I make ə new bridge
(Gia putting red disk on slide)	ə red one
Lois: (referring to disk) See if the green one's in the block. Look in the block. (Gia going to mirror block)	dis block
(Gia painting with black paint)	I draw red man/I draw black man
(Gia putting brush in blue paint)	this ə blue one
(Gia painting on big piece of paper on wall)	that too big
(Gia wipes her hands with washcloth; putting cloth back)	it's nice and clean
(Gia pointing to small ball in picture; pointing to big one)	there's ə little ball/ there's ə big ball
(Gia gives long pencil to Lois; takes Lois's shorter pencil)	you draw big pencil/I'm draw little pencil
Dative	
Gia I–IV (not productive)	. . .
Gia V:	
(Gia is pretending that she's going to Jeffrey's house; taking book from toy bag)	bring Jeffrey book
(Gia "feeds" lamb)	lamb ə cookie
Existence	
Gia I:	
(Lois holding up button)	ə button
(Gia looking at picture of teddy bear)	ə baby
(Gia holding out box of tape-recorder tape)	ə box
(Gia pointing to picture of rabbit)	ə rabbit
Gia II:	
(Gia pointing to phonograph cabinet)	ə record
(Gia looking at picture of dog)	da bow wow
(Gia opening book to picture of children playing peekaboo)	ə peekboo
(Gia holding lamb) Lois: What's that?	ə lamb
(Gia pointing to rabbit in book)	ə rabbit
(Gia reaching for coin bank)	da bank
(Gia pointing to her new stroller) Lois: Oh what's that?	ə stroller
(Gia pointing to records on top of record player)	ə record
(Gia pointing to cookies on top of refrigerator)	ə cookie
(Lois assembles train; Gia points to it)	ə train

Existence (*Continued*)	
Gia III:	
(Gia turning pages of book)	here ə page
(Gia points to picture of baby) Lois: Who's that?	
	da baby
(Gia picking shoe up)	ə shoe
(Gia pulls seesaw from box)	
(Lois: What's that?	
	ɛt ə seesaw
Gia IV:	
(Gia picking up Lois's keys)	here key
(Gia and Lois looking at picture of dog in book) Lois: What's that?	
	ə bow-wow
(Gia pointing to a record)	ə record
(Gia pointing to picture of a Daddy)	here Daddy
(Gia looking through magazine; stops at page with a map)	ə map
Gia V:	
(Gia takes slide from toy bag) Lois: That's a slide.	
(Gia taking bendable man from bag)	ə man
(Gia taking *Animals* book from toy bag)	ə book
(Gia holds up tank car)	dis tank car
(Gia pointing to book on record-player cabinet)	there's ə book
(Lois points to Gia's navel) Lois: What's that?	
	ə belly button
(Gia holding up jacket)	dis ə jacket
(Gia looking at picture of father waving goodbye to rest of family)	this ə bye-bye boy
(Gia holding lamb up to Lois)	dis is lamb
(Gia pointing to boy figure on form board)	dat boy ↑/dis boy ↑
(Gia holding up Mommy figure)	dis ə little girl
Intention	
Gia I–IV (not productive)	. . .
Gia V:	
(Lois just arrived; Gia running into bedroom)	I want go my toys
(Gia hears children in hallway; runs to door and kicks it)	I want see Kevin
(Gia pointing to book "bridge"; then picks it up)	I want take the bridge away
(Gia and Lois are painting; Lois reaches for brush; Gia pulls it back; Gia paints)	I'm draw balloon
(Gia is sitting on train; Lois pushes it; stops; Gia tries to move train herself)	I wanta push Gia
(Gia holding book; then opens it)	I wanta read it
(Lois had taken pencil from Gia because she had drawn on the counter)	I want draw paper
(Lois is sitting on bench; Gia tries to get on)	I want sit ə bench
(Gia picks up straw hat; tries to put it on)	I want wear it
(Gia hears a knock at the door; running to door)	I want go door see my Mommy
Instrument	
Gia I–IV (not productive)	. . .
Gia V:	
(Gia holding pencil up)	I write the pencil
(Gia holding pencil; Lois takes pencil from Gia, but Gia takes it back)	you Lois draw balloon pencil

Locative Action	
Gia I (not productive)	. . .
Gia II:	
(Gia giving Lois block to fit in larger block)	Mommy in
(Gia pointing to space on puzzle where baby belongs)	ə baby on
(Gia takes handful of snapshots to desk)	away picture
(Gia carrying wheels to toy bag)	away bag
Gia III:	
(Gia trying to take blocks out of toy bag)	out block
(Gia taking blocks to toy bag; puts them in bag)	away bag
(Gia picking toy man up; drops it into toy bag)	away man
(Gia holding block; then puts it in toy bag)	Gia bag
(Gia putting Mommy figure into place on form board)	Mommy go on
(Gia pulling train from under bridge)	out train
(Gia tries to put form board into its cover; can't; giving it to Lois)	Lois aways
(Gia picking up boy figure)	up boy
(Gia looking at picture of boy running after moving bus)	bus away
(Gia taking baby figure from form board)	baby out
Gia IV:	
(Gia putting lamb in toy car)	lamb ə go car
(Gia reaches for tape box Lois has; Gia closes box and puts it on table)	Gia away
(Gia sitting on orange chair; Lois standing up; then Lois sits on chair with Gia)	sit the chair/sit orange chair
(Mommy is getting ready to go out; Gia goes to closet)	me come
(Gia climbing off chair)	Gia get down
(Gia bringing lambs to toy bag; drops them into bag)	Gia away ə lamb
(Gia picks up keys; bringing them to bag; drops them into bag)	away key
(Gia holds block) Mommy: Where does that go? (Gia putting block in box)	here block ə go
(Gia putting boy figure on form board)	here ə man go in
(Mommy leaves the house)	Mommy go
Gia V:	
(Gia putting car driver in truck)	man go
(Mommy puts on her coat)	Mommy go bye-bye ↑
(Gia trying to fit train cars together)	dis go here
(Gia sets man on train; while attaching another car to train man falls; replacing man on train)	sit over dere/man sit over dere
(Gia taking man and car to bridge)	man go ən bridge
(Gia rides her bike; falls)	I fell down
(Gia stands on large toy dog)	stand ə wow-wow
(Gia straddles toy train; sitting on it)	I'm ə sit tank car
(Lois goes over to couch; Gia sits on couch with book)	Lois sit ə couch read ə book ↑
(Gia pointing out window)	I want go outside

Locative State	
Gia I–II (not productive)	. . .
Gia III:	
(Gia points to picture of baby in a basket)	baby basket
(Gia looking at picture of boy in a house)	boy in
(Gia looks in mirror box) Lois: Who's in that box? (Gia looking in box again)	Gia box
(Gia pointing to baby figure on form board)	baby in

Locative State (*Continued*)	
Gia IV:	
(referring to trip to the library) Mommy: What did we see on the wall?	
	picture the wall
Lois: Where's Mommy? (Mommy is in bathroom)	Mommy bathroom
(Gia pointing to piece of mending tape on page of book)	tape on
(While Gia looked in toy box, Lois sat on Gia's chair; Gia returns to Lois and chair)	Lois chair
Gia V:	
(Gia pushes car and driver under book "tunnel"; man falls under "tunnel") Lois: Where's the man?	
	man ə under tunnel
(Gia pushes car under bridge; it falls onto car) Lois: Where's the car? (Gia pointing to car)	here under bridge
(Gia looks for dump car; finding it)	here dump car
(Gia goes to get bottle which is on window ledge next to piece of cookie)	my cookies/my cookie down there
(Gia pointing out window)	ə somebody down there
(Gia and Lois are sitting on couch; Gia drinking her bottle)	sofa sit/you sit/you ə sit couch
(Gia looking out window at children on playground)	down there Doria
(Gia pointing to doll she put on couch)	here ə dolly
(Gia crumpling a plastic-wrapped shirt)	paper in there
(Gia tries to lift toy bag) Mommy: Is that heavy?	
	yes/is toys in there
Negation	
Gia I–III (not productive)	. . .
Gia IV (no productive subcategories)	. . .
Gia V:	
(Gia opens book to last page)	all gone ə page
(Gia pointing to last empty coupling on train) Lois: What's missing?	uh oh missing
	missing tank car
(Gia tying to wind up mechanical car)	don't break it
(Gia taking matches from box)	no play matches
(Gia runs into bedroom; returning with dry diaper)	dis ə not wet
(Gia reaching for dish of pretzels; whining)	can't reach it
(Gia tries to put lamb in block; can't)	can't do dit
(Gia puts all figures on form board) Lois: Now can I do it? (Gia taking figures off)	no now I do ə dit
(Gia trying to open bedroom door) Lois: What can't you do?	can't do dit
	can't open open door
(Gia pointing to empty space on form board)	oh oh/baby missing
Notice	
Gia I–IV (not productive)	. . .
Gia V:	
(Gia pointing to rabbit in a picture)	ooh look at the rabbit
(child shouts in the hall outside; Gia listens)	I hear Kevin!
(Gia's painting set falls on floor; Gia bends to retrieve it; sees her toy car and picks it up)	I see my car
(Gia looking into toy bag)	look in there
(Gia looking out window) Lois: What do you see? (Mommy is walking into building)	I see Mommy!

Place	
Gia I-III (not productive)	. . .
Gia IV:	
(Gia taking shoes into living room)	out here
(Gia nesting block)	in here ↑
Gia V:	
(Gia pushes car into book "bridge")	under tunnel/under bridge
Lois: Where are the cookies? (Gia going into kitchen)	in my kitchen
(Gia tries to attach engine to wrong end of train) Lois: I don't think so. Where's the engine go? (Gia taking it to opposite end)	down here
Possession	
Gia I (not productive)	. . .
Gia II:	
(Gia pointing to Mommy's face in a photograph)	Mommy face
(Gia pointing to hat on her doll)	dolly hat
Gia III:	
(Gia pulling her books from Lois's toy bag)	Gia book
(Gia goes to her doll carriage)	Gia doll carriage
(Gia taking Lois's scarf from her)	Lois scarf
(Gia walks into kitchen; sees Mommy's scarf on table; reaching for it)	Mommy scarf
(Gia reaches for her friend Kevin's Snoopy pull toy) Lois: Whose Snoopy is that?	Kevin Snoopy
Gia IV:	
(Gia pointing to her blankets on floor)	Gia blanket
(Gia picking up her toy telephone)	Gia telephone
(Gia runs into bedroom and lies down on her blanket)	my blanket
(Gia gets off her chair; gesturing toward bedroom; then goes to bedroom and returns with *Curious George*, a library book) Lois: Whose book is that?	my library book Gia library book
(Gia holding Lois's keys; looking around for Mommy's keys; (sees them and picks them up)	Mommy key
(Gia runs out of bedroom with Mommy's glasses)	Mommy glasses
(Gia tries to put Mommy's glasses on)	Gia on Mommy glasses
(Gia pointing to book shelves filled with her parents' books)	Mommy book
(Gia picking up Lois's keys)	play Lois keys ↑
Gia V:	
(Gia runs into living room carrying musical T.V.)	this ə mine toy
(Gia sitting on her bike)	dis ə my bike
(Gia pointing to computer printout "Happy Birthday" on wall that her uncle gave her)	dis ə mines
Lois: Would you like to come here and read the book? (Gia starts toward Lois)	play my toys/play Lois toys
(Gia climbing off couch; gets bottle)	I'm get my bottle
(Lois points to miniature straw hat of Gia's) Lois: Whose hat is that?	Gia hat
(Mommy takes Gia's spring coat from box)	dis ə mine/dis ə my coat
(Gia pulling toy bag toward door)	bye bye/I'm ə go Jeffrey house bring ə toys
(Gia picks up pencil Lois had left in Gia's house the previous day)	dis ə yours ↑
(Lois is sitting on Gia's chair)	dis ə my chair

	Recurrence
Gia I:	
(Gia scribbles on paper; scribbling some more)	more write
(Lois rocks clown; Gia tries to rock it and it falls)	more clown
(Gia and Lois had been looking at a book with a picture of a rabbit; Gia picks up book, looking for picture of rabbit)	more/more rabbit
Gia II:	
(Mommy turns off radio)	more record
(Gia takes out second clown)	more clown
(Gia had been looking at snapshots; pointing to snapshots she hasn't looked at yet)	more picture
(Lois pushes block tower over; Gia points to blocks)	more block
(Lois nests blocks; Gia picking up another block; then tries to fit it in)	more in
(Gia takes figures out of puzzle; handing them to Mommy)	more man
(Gia finishes eating a cookie)	more cookie
(Mommy puts baby figure on form board; holds up boy figure) Mommy: Who's this?	more/more girl
(Gia pointing to picture of butterfly) Lois: Butterfly. Yes. (Gia pointing to another butterfly) Lois: That's not a rabbit, silly. That's also a butterfly.	butterfly rabbit more butterfly
(Gia picks up book; turns pages by herself for awhile; then holding book out to Mommy)	more read
Gia III:	
(Gia had been playing with toys and reading *Toys* book; going to toy bag)	more/more toy
(Gia made tower; knocks it over; starting to stack blocks again)	do again
(Gia stacks blocks and puts car driver on top of stack; picking up truck driver; tries to put it on top)	more man
(Gia slides wheel down slide; running after it)	oh more wheel
(Gia connects two train cars; taking more cars out of bag)	more train
(Lois and Gia are playing catch; Gia holding her arms out for ball)	more ball
(Gia looking at picture of igloo) Lois: (referring to second igloo) What's that?	igloo more igloo
(Gia and Lois read book; Gia gets distracted; Gia turning back to Lois)	more read dat
(Gia picks up second lamb)	more lamb
(Gia puts blocks into box; going after another block)	more block
(Gia picks up boy figure and puts it on form board; picking up girl figure)	more boy
Gia IV:	
(Gia and Lois had been reading book a few minutes before; Gia holding book)	more read dat
(Gia picking up second block)	here another box
(Gia holding one lamb; picks up second one)	more lamb
(Gia fits blocks together; picking up another one)	Gia more block
Gia V:	
(Gia takes clown from toy bag; taking out second clown)	this another clown
(Gia riding her bike over toys)	crash/more crash!

Recurrence (*Continued*)	
Gia V (*Continued*):	
(Lois had drawn balloon; Gia scribbles; pointing to scribble)	balloon/nother balloon
(Gia starting to scribble again)	I'm draw nother balloon
(Lois winds beads around Gia's neck; beads become undone)	again more more bracelet ↑
(Lois bounces Gia on her knees, pretending to be washing machine; stops)	more go washing machine more ↑
(Lois and Gia had played with the slide earlier; Gia pulling slide from bag)	I'm ə the slide more
(Gia puts lamb into block because it's "cold"; picking up second lamb)	nother lamb cold
(Gia completes form board; Lois about to dump figures out; Gia pulls it back) Lois: Let's do it again.	
	I'm do it again
(Gia holds out arm for Lois to pinch it; Lois does; Gia giving Lois other arm)	nother arm
State	
Gia I–II (not productive)	. . .
Gia III:	
(Mommy is out of the house) Lois: Where's Mommy?	
	Mommy work
(Gia reaches for block)	I want it
(train cars become uncoupled)	happen train
(Gia reaching for Daddy figure)	Gia want Daddy
Gia IV (not productive)	. . .
Gia V:	
(Gia reaches into laundry cart for her overalls)	I want it
(Gia spills milk on floor)	I want paper
(Gia starts to draw on counter; Lois trying to take pencil from Gia)	I need it/I want need it
(Gia looking at picture of train in book)	Lois have train ə like dat
(Lois opens book; Gia reaching for it)	I want my book
(Mommy putting jacket on Gia)	I want ə raincoat
(Gia holding lamb)	lamb hungry ↑
(Gia and Lois in kitchen)	I want ə cookie
(Lois is in kitchen; Gia runs into kitchen; gets in her highchair)	I'm hungry
(Gia at crib; doll is inside)	I want my doll
Wh-Questions	
Gia I–IV (not productive)	. . .
Gia V:	
(Gia pointing to empty coupling on train)	what's ə missing dat
(Gia looking around for car driver)	where man go
(Gia and Lois are reading book; picture of baby sleeping)	what is the baby doing
(Gia looking around)	where bag go
(Lois takes hat off and hides it; Gia is surprised)	where hat go ↑
(Mommy returns from shopping with several packages; Gia pulls packages)	what's in ə bag
(Gia looking around)	where wheel go
(Gia pointing to scribble on book)	who write it ↑

Action	
Kathryn I:	
(Kathryn and Lois had been reading a book; Kathryn going after another book)	ə read book
(Kathryn sitting on Mommy's lap; Mommy has rubber band; Kathryn pushing her hair up toward Mommy)	Mommy pigtail
(Kathryn putting driver in toy car)	this rides
(Kathryn bringing bus with people in it to Lois)	man ride ə bus
(Kathryn touching window) Lois: Cold feet! Your feet are cold?	cold/cold feet put heater up
(Lois is about to leave; Kathryn going toward Lois; Kathryn kisses Lois)	Lois kiss
(Kathryn at table having lunch; touching glass of milk)	touch milk
(Mommy and Kathryn are putting animal forms in form board; Kathryn trying to fit one; can't)	Mommy push
(After playing with form board Kathryn goes over to rest of toys)	make ə house
(Kathryn is lying on bassinette; Mommy folding diaper for her)	Mommy diaper/fold up
Kathryn II:	
(Kathryn taking blocks out of toy bag)	build ə house
(Kathryn pointing to her hair that Mommy had just washed)	Mommy clean hair
(Kathryn takes train cars from toy bag)	make ə choo-choo train
(Kathryn has bear book in hand)	read bear book
(Kathryn takes *Anybody Home;* opening to first page)	Kathryn read this
(Kathryn taking train cars apart)	ə take off ə this
(Kathryn holds pieces of slide out for Lois to assemble it)	do it
(Kathryn taking disk to the slide)	Kathryn do it
(Kathryn touching lavaliere mike around her neck)	untie this
(Kathryn looking at picture in magazine of people eating)	eating dinner
Kathryn III:	
(Kathryn sees gifts for Daddy's birthday on table; then Kathryn takes gifts off table)	want go get it
(Kathryn picks up doll with long hair; pointing to side with pigtail Daddy had made)	Daddy make a pigtail
(Kathryn gets up and leaving room; Kathryn returns with book)	Kathryn go get a book
(slide comes apart; Kathryn trying to fix it)	ə do Lois try this
(Kathryn looking at picture of man baking bread)	man making muffins
(Mommy appears in hallway putting ironed shirt on hanger)	Mommy iron ə shirt
(Kathryn putting man in toy car)	that one take a ride
(Kathryn pushing car)	I take this one
(Kathryn and Lois have been putting lambs in nesting blocks; there's one block too few; Kathryn getting up)	ə want get a cup
(Kathryn returning with cup)	I got a cup

Action and Place	
Kathryn I–II (not productive)	. . .

Action and Place (*Continued*)	
Kathryn III:	
(Kathryn looking at picture of a doctor in a book)	ə doctor doing there ↑
(Kathryn and Lois looking out window at children playing)	those children doing there
(Kathryn looking at picture of boy jumping in tub)	boy jumping in ə bathtub
Attribution	
Kathryn I:	
(Kathryn pointing to tape recorder)	funny chine
(Kathryn takes doll sock out of toy box; sock isn't dirty)	ə dirty sock
(Kathryn picking up wooden peg man)	funny man
(Kathryn dumps dried peas out of jar)	tiny balls
Lois: Let's go find a book to read. (Kathryn picking up baby book)	this baby book
(Kathryn looking at doll)	black hair
(Kathryn eating marshmallow)	tiny marshmallow
(Mommy about to put freshly washed overalls on Kathryn; Kathryn had spilled something on them the day before)	dirty pants
(Kathryn putting socks on toy dog)	heavy sock
(Mommy folding diaper for Kathryn)	sharp pin
Kathryn II:	
(Lois rolls disk down slide; Kathryn picks up second disk; bringing it to slide)	this one
(Kathryn putting *Anybody Home* aside)	funny house
(Kathryn trying to put clown figure in block)	funny man in
(Kathryn shaking clown which makes noise)	tiny ball
(Kathryn hears Mommy in hall ready to take laundry downstairs)	ə dirty clothes
(train cars are unhooked)	broken train
(Kathryn pointing to her snowsuit on table)	snowsuit clean
(Kathryn pointing to picture in magazine)	that ə funny man
(Lois and Kathryn are putting toys away; two dolls are among toys)	two doll
(Kathryn holding lamb)	fuzzy lamb
Kathryn III:	
(Mommy steps into hallway and puts a freshly ironed shirt on hanger)	Mommy wearing ə clean shirt/ Mommy iron ə shirt
(Kathryn picking up two parts of slide)	this broke
(Kathryn and Lois get disks out of bag) Lois: I have the yellow wheel. (Kathryn has green disk)	Kathryn got ə this one
(Mommy gives Kathryn a metal cup)	ə big cup
(Lois pretends to fill cup with cereal; hands it to Kathryn)	ə get some milk
(Kathryn points to one magnet, then another)	that's two magnets
(Kathryn rolls disk down slide; retrieves it)	this one ə go some more ↑
(Kathryn picks up little balloon)	ə little one
(Lois enters house; Kathryn spreading the skirt of her dress)	striped skirt/my new striped skirt
(Kathryn pointing to picture of big fish)	there ə big fish

Dative	
Kathryn I (not productive)	. . .
Kathryn II:	
(Kathryn carrying magazines across room)	and there's one for Kathryn
(Kathryn and Lois pretending to feed lambs)	ə Mommy give them milk and sugar
Kathryn III:	
(Kathryn taking two disks from Lois)	those these for Kathryn
(Kathryn and Lois are setting table with play dishes; Kathryn handing Lois the only cup)	Lois cup
(Kathryn putting out tea set)	one for Kathryn/one for Lois
(Lois pretends to eat)	you get some Kathryn
Existence	
Kathryn I:	
(Lois just put lavaliere mike on Kathryn)	this necklace
(Kathryn looking at picture of puppy named Hunky Dory in story book)	Hunky Dory here
(Mommy, Lois, and Kathryn looking out window; girl passes by)	ə girl
(Kathryn bringing book to Lois)	this book
Kathryn II:	
(Kathryn taking car from toy bag)	that's car
(Kathryn pointing to lamb)	that ə lamb
(Kathryn pointing to man inside truck)	that ə man
(Lois is assembling train)	that's a train
(Kathryn looking at picture of dogs)	that dogs
(Kathryn pointing to tape recorder)	that chine
(Kathryn taking book from toy bag)	this ə book
(Kathryn picking up mirror)	that ə mirror
(Kathryn pointing to mike)	that ə chine
(Kathryn pointing to picture of woman cooking)	that's ə Mommy
Kathryn III:	
(Kathryn picks up her new book) Lois: It's a nice book. Is it a birthday present?	no/that's ə book
(Kathryn and Lois reading book; picture of tiger) Lois: You know what that is?	that's tiger
(Kathryn looking at picture of Mamma Bear)	there Mamma/that's Mamma Bear
(Kathryn opens book and starts naming pictures)	ducks/cats/cats there
(Kathryn holding log-puzzle piece)	this ə log
(Kathryn holding up bird-puzzle piece)	that bird ↑
(Lois takes pants off Kathryn's doll)	there's ə behind
(Kathryn picking up lavaliere microphone)	this ə necklace
(Kathryn points to hollow eggshell made of mirrored plastic)	there's ə mirror
(Kathryn touching Lois's ring)	that's ring
Intention	
Kathryn I:	
(Mommy opens refrigerator so Kathryn can see pudding) Mommy: You want some pudding?	pudding Kathryn want pudding]
(Kathryn had been eating raisins; finished them)	ə want more raisin

Intention (*Continued*)	
Kathryn II:	
	ə want slides
(then Kathryn picks up the two pieces of the slide)	
(Kathryn looking for mirror after she put lavaliere mike on neck)	I want ə mirror
(Kathryn looking for tank car to put clown in)	want Kathryn ə put in ə tank
(Kathryn and Lois are pretending toy man is going for ride to park)	I want go park
Kathryn III:	
(Lois and Mommy are sitting on sofa; Kathryn sits on sofa)	ə want sit down
(Kathryn at toy bag; takes out slide, then train cars from bag)	ə want play with choo-choo train
(Kathryn pointing to mirrored plastic egg; then Kathryn pretends to scramble egg)	ə wanta make ə egg
(Kathryn reaching for package for her father)	I want open
(Kathryn looking out window)	ə want go see children down there
(referring to her dress; Lois tries to help Kathryn take dress off)	I want take this off
(Kathryn takes figures off form board)	I want try again
(Kathryn holding tank over slide; tries but it falls off)	I wanta roll tank
(Kathryn takes nested blocks from Lois; dumps small ones)	I wanta dumped out
(Kathryn put blocks on truck; Kathryn pushes truck)	ə want take for ə ride
Locative Action	
Kathryn I:	
(Kathryn trying to climb on chair)	up Kathryn
(Kathryn picks up book and going toward Mommy) Mommy: You want to read a book? Come sit over here.	ə read book
(Kathryn sits on Mommy's lap)	down ə lap
(Kathryn putting sweater on a chair)	sweater chair
(Mommy dressing Kathryn)	ə go outside
(Kathryn puts sheep in nesting block, which she calls "window;" putting another sheep into block)	this window/two window
(Lois and Mommy are talking about visiting Kathryn's friend Jeremy)	ə go Jeremy
Kathryn II:	
(Kathryn struggling to put bendable figures on train)	ə go this one
(Kathryn putting a second man on train)	nother sit down
(Kathryn putting lambs into nesting block)	lamb ə goes/lambs ə go into
(Kathryn crouching behind T.V.)	Kathryn sit down
(Kathryn trying to sit on top of nesting blocks)	up Kathryn
(Kathryn taking bendable figure off train)	off ə this
(Kathryn trying to climb on piano bench)	sit on piano
(doorbell rings; Lois entering house)	Lois came back
(Kathryn pushing train under bridge)	Kathryn under bridge
(Kathryn pushing lamb through windows of doll house)	lamb go in there
Kathryn III:	
(Kathryn trying to reach gift on table)	get it off
(Kathryn holding disk in front of slide; then Kathryn slides disk)	ə put this in there
(Kathryn putting man in car)	I put this in there

Locative Action (*Continued*)	
Kathryn III (*Continued*):	
(Lois puts lambs in blocks; Kathryn putting another lamb in another block)	lamb go there this one
(Lois puts lamb into block)	here one fits
(Kathryn pushing truck under bridge Lois made with book)	comes ə bridge
(Kathryn holding puzzle piece)	do log goes in there ↑
Lois: Mm hm (then Kathryn tries to fit piece in puzzle)	
(Kathryn pointing to where foot-puzzle piece goes)	foot goes over here
(Kathryn taking puzzle pieces out)	ə take this off
(Kathryn rolling disk into block)	go in there
Locative State	
Kathryn I (not productive)	. . .
Kathryn II:	
(Kathryn pointing to blocks in Lois's toy bag that are the same as Kathryn's)	Kathryn in there!
(Kathryn shaking clown which makes noise)	tiny balls in there
(Kathryn takes rabbit book from toy bag)	rabbits ə book
(Lois and Kathryn have been looking for slide; Kathryn sees it)	there's slide
(Kathryn pointing to her apron on kitchen table)	that's ə on the table
(Kathryn pointing to bananas on the refrigerator)	that ə banana up here
(Kathryn has book with pictures of dragon) Lois: Where's the dragon?	where dragon/red dragon in book
(Kathryn looking at magazines stacked on shelf on T.V. stand)	magazine T.V.
(Kathryn looking at man in toy car)	that's ə man ə car
(Kathryn pointing to picture of horse on block)	horse block
Kathryn III:	
(Kathryn looking at wrapped gifts)	tie on it
(Kathryn turns pages of book looking for picture of bank; finding it)	there's ə one
(Lois pretends to fill cup with cereal; gives it to Kathryn)	cereal in there
(Lois putting doll's shoes on) Lois: Where's the other sock? (Kathryn's sitting on other sock)	where other sock see my sitting on it
(Kathryn looking at picture of bee hive)	bees in there
(Kathryn looking in toy box for another toy man)	more in there ↑
(Kathryn looking at picture of baby sitting in chair)	baby sitting down in ə chair
(Kathryn looking at picture of cat)	there's ə cat sitting there
(Kathryn pointing to books on top shelf of bookcase)	there's Humpty Dumpty up there
Negation	
Kathryn I:	
(Kathryn tries to put rubber band on her finger; can't)	no fit
(Kathryn searching for pocket in Mommy's slip; there is no pocket)	no pocket
(Kathryn trying to zip her boots up; can't)	no zip
(Kathryn picking up clean sock; then picking up dirty sock)	no dirty/ this dirty

Negation (*Continued*)	
Kathryn II:	
(Kathryn is wearing pants) Lois: Is Kathryn wearing a skirt?	no skirt
(Kathryn trying to fit pieces of slide together)	no fit
(toy car is stuck under bridge)	can't see
(Kathryn wants mirror to look at mike around her neck; mirror isn't in sight)	mirror all gone
(Kathryn looks for tank car; can't find it)	no find ə tank
(Kathryn is barefoot)	Kathryn wear shoes
(Lois and Kathryn are reading book; Kathryn looking up at Lois who hasn't a hat)	Lois no hat
(Kathryn has no socks on)	Kathryn have ə socks on
(Kathryn shaking head "no")	me like coffee/Lois ə no coffee
(Mommy offering car to Kathryn) Mommy: There's the truck.	no truck
Kathryn III:	
(Kathryn looking at picture of baker making bread)	not making muffins/making bread
(Lois hadn't brought her train)	didn't bring ə choo-choo train
(Kathryn takes arm-puzzle piece off board; pointing to empty space)	ə no hand there
(Kathryn pointing to block which has no label)	this one have no
(Lois puts train cars together; Kathryn looking in box for more cars)	no more choo-choo train
(Lois and Kathryn reading *Smalls*, not *Anybody Home*)	that not body home
(Lois and Kathryn are looking out window) Lois: A truck. What else do you see? (There is no boy)	no boy
(Kathryn is looking at "C" page of alphabet book; after pointing to cat, Kathryn points to chick)	that not cat
(Lois hadn't brought lambs)	no bring lambs
(Kathryn tries to climb behind playpen; can't; walking away from it)	Kathryn not go over here

Notice	
Kathryn I (not productive)	. . .
Kathryn II:	
(Kathryn trying to turn page of book)	look at more
(Kathryn looking in mirror)	I see Kathryn in mirror
(Kathryn reading *Smalls* book)	ə see houses
(Kathryn trying to twirl key ring on her finger)	watch it
Kathryn III:	
(Kathryn looking at picture of bear with scissors)	look what other bear have
(Kathryn had put man in car)	look ə put
(Kathryn looking at picture of animals in book)	ə see ducks!
(Kathryn looking at reflection in mirrored egg)	see Lois ən face
(Kathryn showing Lois picture of rabbit on page she just turned)	look ə found ə rabbit
(Kathryn looking at picture of bears in book)	I see ə bears
(Kathryn hears noise of children playing outside)	ə hear childrens!
(Kathryn sees train car in bottom of bag)	I see choo-choo train in there

Possession	
Kathryn I:	
(Kathryn and Lois are looking at picture of girl with dress on; Lois pointing to dress) Lois: See the girl. What's that?	girl dress
(Kathryn has letter from Grandma; there is a picture of a garden on the stationery)	Grandma flower
(Mommy gives Kathryn some of Mommy's apple)	Mommy apple
(Mommy makes Kathryn a pretend sock out of toilet tissue) Mommy: That's your sock. There.	Kathryn sock
(Kathryn pointing to toy sheep's ear)	sheep ear
(Kathryn has pair of Mommy's socks)	Mommy sock
Kathryn II:	
(Kathryn picks up book of Lois's which is similar to book Kathryn has)	Kathryn my book
(Kathryn getting Lois's book from toy bag)	get my book
(Kathryn pointing to tape recorder)	that Lois chine
(Kathryn pointing into kitchen to her apron on table)	that Kathryn apron
(Kathryn picking up Lois's keys)	that's ə Lois keys
(Kathryn pointing to newspaper)	that Daddy paper
(Kathryn pointing to books on piano)	Mommy library books
(Kathryn steps on her book)	step my Kathryn book
(Kathryn pointing to her box of toys)	thas my Kathryn toys
(Kathryn pointing to Lois's socks)	that Lois socks
Kathryn III:	
(Kathryn pointing to Daddy's gifts on table)	that's Daddy's birthday
(Kathryn pointing to her puzzle)	that's my puzzle/that's Kathryn puzzle
(Kathryn pointing to picture of nesting blocks similar to hers in book)	those Kathryn
(Kathryn pointing to her party hat)	there my hat
(Kathryn picking up her new book)	this my book/that my book
(Kathryn takes doll from Lois; trying to button doll's pants)	that's her button
(Kathryn getting her stuffed dog)	there my doggie
(Kathryn running into living room looking for her balloons)	I find my balloons
(Kathryn takes thermometer from doctor bag)	this my mometer
(Kathryn and Lois are reading book; referring to picture) Lois: Daddy's hanging up the clothes.	Mommy hangs my socks up
Place	
Kathryn I (not productive)	. . .
Kathryn II:	
(Kathryn looking at picture of airplane)	up in sky
(toy car is stuck under bridge; Kathryn reaching for it)	ə under bridge
(Lois and Kathryn looking for disk for slide) Lois: Do you see it?	behind ə chair
(Kathryn pushing car under chair)	under chair
(Lois pulling train under bridge)	under bridge
Kathryn III (not productive)	. . .
Recurrence	
Kathryn I:	
(Kathryn pulling toys from toy box)	toy/nother toy

Recurrence (*Continued*)	
Kathryn I (*Continued*):	
(Kathryn picking up second hair curler)	nother hair curl
(Kathryn pretending to feed toy cat)	cat more meat
(Kathryn finishes eating nuts)	more nuts
(Mommy is giving Kathryn a bath; finishes lathering her)	more soap
(Mommy pretends to pin a toilet tissue sock on Kathryn; Kathryn wants another "pin" for the other "sock")	nother pin
(Kathryn finishes eating raisins)	ə more raisin
Kathryn II:	
(Kathryn putting second man on train)	nother one
(Kathryn knocks block house down)	make ə house again
(Lois and Kathryn have been reading a magazine; Kathryn getting up; Kathryn gets stack of magazines and returns to Lois)	more magazine
(Lois pushes car through Kathryn's; legs Kathryn squeals and laughs)	do again
(Kathryn struggling to get last lamb out of bag)	get another one
(Kathryn pushes lamb under bridge; bridge collapses)	make ə more under more
(Kathryn knocks block house down) Lois: Shall I build another house?	Kathryn want build another house
(Kathryn pointing to picture of lady with apron on; pointing to picture of girl with apron on)	apron on apron too
(Kathryn drops toys and small blocks through hole in large block; getting up to pick toys and blocks up)	Kathryn ə make again
(Mommy rolls disk down slide)	again one
Kathryn III:	
(Kathryn points to gift; points to another)	this Daddy's birthday present/ there's another
(Kathryn pointing to ear-puzzle piece)	this another ear
(Kathryn puts puzzle piece on board; picking up another piece)	this ə other one ↑
(Kathryn points to picture of spider in book; looks through book to find another spider; finding one)	ugly spider there's another ugly
(Kathryn had completed puzzle; Lois takes it apart; Kathryn starts to put it together)	ə do again
(Kathryn knocks block tower down; stacks them again)	I make ə more
(Lois puts two train cars together; Kathryn looking in box for more)	get ə more
(Lois and Kathryn are pretending to have lunch)	I want some more egg
(Kathryn stacks blocks; they fall; Lois helps Kathryn stack blocks)	Lois put on more block ↑
(Mommy gives Kathryn piece of paper; Kathryn drops it on floor)	nother piece ə paper
State	
Kathryn I:	
(Kathryn looking at picture of baby asleep in crib)	baby tired
(Kathryn and Lois walk into kitchen; Mommy is there)	Mommy busy
(Kathryn eating lunch) Mommy: You'll take a nap in a little while.	əm busy now
(Kathryn and Lois looking out window)	outside cold

State (*Continued*)	
Kathryn II:	
(Kathryn looking at picture of cat sleeping in window box)	cat tire
(Kathryn bringing disks for slide to Lois)	Mommy busy
(Kathryn and Lois looking at picture of family eating)	girl hungry
(Kathryn looking at picture of boy lying down)	boy tire
(Kathryn and Lois using nesting blocks as houses) Lois: Lois has two houses. What does Kathryn have?	Kathryn one houses
(Kathryn looking at picture of woman sleeping)	lady tire
(Kathryn shaking head "no")	me like coffee
(Kathryn pointing to her overalls)	Kathryn have red pants
(Kathryn and Lois playing in living room; Mommy is in other room)	Mommy busy now
(Kathryn looking at picture of cat)	pussycat tire
Kathryn III:	
(Kathryn holding disks)	I have these
(Kathryn giving disk to Lois)	Lois have this
(Kathryn "feeding" lamb)	like ə cereal ↑
(Kathryn looking at picture of man hanging up clothes)	gets dry
(Kathryn pointing to book)	ə want that book
(Kathryn pointing to envelope with flash cards in it)	I need this
(Kathryn holding red disk)	Kathryn want ə red one
(Kathryn and Lois are pretending to have a tea party)	ə want some tea
Lois: Do you like nuts?	yes/Kathryn me like crackers
(Kathryn and Lois are pretending to have a tea party)	ə want some food

Wh-Questions	
Kathryn I (not productive)	. . .
Kathryn II:	
(Kathryn pointing to label on car)	what's that
(Kathryn takes train from toy bag)	what's this
(Kathryn picking up mike)	what's in this/what's in that
(car gets stuck under bridge)	ə what happens
(toy bridge collapses)	where's ə bridge
(Kathryn looking for mirror)	where's ə mirror
(Kathryn has toy driver of car; looking for car)	where the car
(toy clown falls over)	what happen
Kathryn III:	
(Kathryn pointing to Indian in picture book)	what's that
(Lois and Kathryn are looking at book; bank is not on this page)	where put your money in
(Kathryn looking at picture of bird taking bite of cake)	what's that down there
(Kathryn pointing to picture of Daddy Bear)	what's this
(Kathryn takes car with seat for driver from toy bag)	where's ə man
(Kathryn tries to put big puzzle piece in small spot) Lois: Too big.	where ə little one
(Kathryn puts puzzle piece on board; looking for another piece)	where's ə other one
(Kathryn pointing to magnet on puzzle)	what's that on there
(Kathryn puts dress-puzzle piece on puzzle; girl's legs are covered by the dress)	where's legs are
(Lois puts shoes on doll; one doll sock is in sight)	where other sock

Action	
Peter I–II (not productive)	. . .
Peter III:	
(Peter touching window-shade pull)	pull it
(Peter pointing to T.V.)	turn it
Peter IV:	
(string of pull toy is tangled around toy)	oh fix it
(Peter looking at tape-recorder reels)	turn it ↑
(Peter pushes buttons on tape recorder)	push the button
(Peter pointing to light button on tape recorder)	push one
(Peter's baby sister is crying loudly)	baby crying
(Peter putting train cars together)	fix that
(Peter had separated train cars)	I did it
(Peter and Lois had just made a house of blocks) Lois: You wanna make a house again?	tunnel/make tunnel
(Lois and Peter pushing cars through tunnel)	I get them
(Peter takes roof of tunnel off; reaching in to pull car through)	I get it
Peter V:	
(Peter holding toy screwdriver out to Patsy)	screw it
(Patsy's hand is on trunk of car)	close it ↑
(Peter holding screwdriver and windshield)	I gon fix it
(Peter pointing to microphone which is in his way on the floor)	push it
(Peter trying to close hood of car, but it's too full of toy people)	do it
(Peter holding toy lady that goes in car)	found it
(Peter picks up car by tires; looking at tires)	turn it
(Peter putting tire back on car)	fix it
(Peter pointing to steering wheel which also unscrews as do tires)	wheel off
(Lois puts bolts on her finger and Peter's finger as "rings"; Peter looking for more bolts)	get more
Peter VI:	
(Lois takes out car box from toy bag)	open it
(Peter pointing to car engine which unscrews)	screw it
(Peter pointing to side panel of car)	open that
(Peter touching light button on tape recorder)	I turn the light on
(Peter pointing to tape-recorder buttons that are partially hidden by leather case)	open the buttons
(Peter turning pull toy right side up)	turn it over ↑
(Peter using screwdriver on car)	I do it
(Peter holding two finger puppets out to Lois)	try this
(Peter at open tape recorder; then closes it)	close it
(Peter had just turned lamp on; going back to it; then turns it off)	turn it on
Peter VII:	
(Peter tries to fix toy telephone; can't; holding it out to Lois)	fix it
(Peter has recording tape which is unwinding; Lois tries to take it from him)	ə my wind up
(Peter reaching for box of bendable people)	open this
(Peter putting car on the slide)	car ride
(Peter running to other side of room to get magazine)	my get magazine
(Peter ready to write on paper) Patsy: What're you going to write?	make a car
(Patsy and Peter are drawing faces)	help me make a happy face

Action (*Continued*)	
Peter VII (*Continued*):	
(Peter pushes button that turns on tape-recorder light)	ə turn on ə light!
(Peter looking around for a second sheep)	get another one
(Peter bringing his paper to Lois)	you write
Action and Place	
Peter I–VI (not productive)	. . .
Peter VII:	
(Peter holding box of recording tape; pointing to tape recorder)	there's ə tape go round right there ↑
(Peter writing on paper)	on my paper write
(Peter spinning tires on truck)	ə wheels go round right there
(Peter comes over to Lois; pointing to her paper)	wanna write there
(Peter gives Mommy pencil and pulls car over to her; car has piece of masking tape on it where Lois had written "Peter" several weeks ago)[a]	write Patsy ə write truck
(Peter trying to put bendable boy in car)	boy take a ride in there
Attribution	
Peter I–II (not productive)	. . .
Peter III:	
(Peter playing with train cars)	three trucks
(Peter looking at tape-recorder buttons)	tape-recorder button
Peter IV:	
(Lois, Patsy, and Peter get off elevator; walk to Peter's apartment door; Peter touches door knob)	door shut
(Peter putting tape on his face, like a beard)	two piece
(Peter holding box for recording tape)	book box
(Peter pointing to two wheels)	two wheels
(Peter and Lois push cars through block tunnel which is too narrow)	big tunnel
(Peter finds big block; giving it to Lois)	more big one
Peter V:	
(Peter takes toy car and truck that he's never seen before from bag)	two cars
(Peter looking for new truck)	new one
Patsy: I think we should turn on a light. Which light light should we turn on? (Peter running to lamp near kitchen)	big one
(Peter reaching for car under table instead of one on table)	other one
Peter VI:	
(Peter pointing to one then another chimney out the window)	two buildings
(Peter standing next to hissing radiator)	that's hot there
(Peter playing with dirty piece of masking tape)	this is this is dirt
(Peter has two finger puppets: a dog, and a donkey)	two dogs
(Peter turning lights on)	two lights
(Patsy holds up pen and pencil for Peter to choose) Patsy: Which would you like?	two pens/big pens

[a] Peter frequently confused Patsy and Lois. In fact, he subsequently solved the problem by referring to each of them as "Patsy-Lois."

Attribution (*Continued*)	
Peter VI (*Continued*):	
(Peter pointing to tape-recorder reels)	all finished that ↑
(Peter flies his toy plane around the room; hears plane outside; then holding up five fingers)	two airplanes
(Peter picks up second giraffe)	two giraffes
(Peter goes to Mommy in kitchen; holding up two fingers)	pretzel please/two pretzels/one two pretzels
Peter VII:	
(Peter pulls two alligators from ark)	two alligators
(Peter looking at tape on tape recorder)	finished that one too
(Patsy and Peter draw "happy" faces; Peter pointing to his drawing)	happy face
(Peter puts a pen and pencil in Patsy's pocketbook)	that's two pens ↑
(Peter had previously used turned-over slide as a runway for his cars; taking slide apart)	wrong side
(Peter moves microphone; pats it)	that all right ↑
(Peter rolls wheels and small toys down slide; crashes them; laughs)	that fun
(Patsy putting corn chips on Peter's plate)	five chips
(Peter eating his lunch)	that's good!
(Peter tries to hook train cars together; can't; showing it to Patsy)	that broken right there
Existence	
Peter I–II (not productive)	. . .
Peter III:	
(Peter on his bike)	ə bike
(Peter pretending he sees friend in mirror box)	ə Butch
Peter IV–V (not productive)	. . .
Peter VI:	
(Peter showing screwdriver to Lois)	this is screw
(Peter pointing to sheep)	that there
(Peter pulling tiny truck from toy bag)	the truck
(Peter getting donkey finger puppet)	that's ə mouse ↑
Peter VII:	
(Peter taking bendable daddy from box)	ə daddy
(Peter showing bendable daddy to Lois)	this is daddy
(Peter pointing to microphone)	that ə microphone
(referring to bendable baby)	ə boy
(Lois draws a car; Peter pointing to it)	here's ə car
(Peter picking up wagon pull toy)	this is wagon
(Peter holding up book for Patsy and Lois to see)	ə book ↑
(Telephone rings; Mommy goes to answer it; Peter follows)	That's Daddy/Mommy/that Daddy
(Peter showing baby sister box of recording tape)	that's tape
(Peter giving unboxed recording tape to Lois)	here's ə tape recorder Patsy
Locative Action	
Peter I–IV (not productive)	. . .
Peter V:	
(Peter trying to put headlight on car)	ə put it

Locative Action (*Continued*)	
Peter V (*Continued*):	
(Peter pushes car but one tire is off so it won't roll smoothly)	wheel back ↑
(Patsy holds jack up; Peter pointing to its place in car)	put it here
(Peter putting screwdriver under hood)	I put back
(Peter putting tiny car under finger-puppet's skirt)	goes ən there
Peter VI:	
(Mommy picks up Peter's baby sister and walks out of living room)	baby go
(Peter putting tools back on car)	put it there
(Peter taking tools out of car and putting them back in)	it goes/screw out
(Peter putting piece of masking tape on his face)	tape here
(Peter putting screwdriver inside finger-puppet's skirt)	goes in there
(Peter putting bendable Mommy on top of wooden man)	put up here
(Mommy is holding Peter in arms; Peter reaching down to put pen and paper on counter)	put that
(Patsy had just put her hat on)	put on/hat on
(Peter looking at Patsy who is standing up next to dining-room table)	sit there
(Peter trying to put pencil on counter)	pencil down there
Peter VII:	
(Peter indicating place on toy telephone where detached wire belongs)	ə put in there
(Peter climbing up on his rocking horse in order to see fire engine out the window)	əm gonna get ə horsie see it
(Peter aligns the two parts of the slide)	goes right here!
(Peter holding recording tape)	put this down ↑
(Peter trying to fit large wooden man on seesaw)	goes in there
(Peter attaching pull toy to handlebars of his tricycle)	put on right there
(Peter holding Lois's barrette to his head, looking at Lois)	put in hair please
(Peter standing on couch; then gets down)	ə gotta get down
(Peter putting recording tape in its box)	tape recorder goes in there
Locative State	
Peter I–V (not productive)	. . .
Peter VI:	
(Peter looking at end of train car that has no hook)	no more there
(Peter pointing to lamp)	light there
(Peter showing animals in ark to Patsy and Lois)	giraffe there
(Peter pointing to chair Patsy is sitting in)	chair right there
Peter VII:	
(Peter showing his baby sister a box of recording tape)	there's ə tape in there
(Peter pointing to bus in street)	over there is ə bus
(Peter trying to open box of bendable people)	daddy in ə there
(Peter sees bendable mommy that he had been looking for)	there ə mommy right there
(Peter notices that tiny truck has a spare tire)	more wheel on ə truck
(Peter looking at tape recorder)	tape recorder right there
(Peter noticing piece of masking tape on car)	tape on truck
(Peter pointing to pens on the floor)	pens right there

Locative State (*Continued*)	
Peter VII (*Continued*):	
(Peter touching barrette in his hair)	my barrette's on
(Peter and Patsy are in kitchen getting Peter's lunch) Patsy: Show me where the chicken is. (Peter pointing to refrigerator)	chicken in there
Negation	
Peter I–V (not productive)	. . .
Peter VI:	
(Peter looks for monkey in ark; doesn't find one)	no monkey
(Peter closes trunk of car with spare tire in it)	bye-bye wheel
Peter VII (no productive subcategories)	. . .
Notice	
Peter I–V (not productive)	. . .
Peter VI:	
(Peter pointing to smoke out window)	look at that
(Peter has finger puppet)	look at this
(Peter looking at recording-tape box on floor)	look at down there
Peter VII (not productive)	. . .
Possession	
Peter I–II (not productive)	. . .
Peter III:	
(Peter looking at his pencil and Patsy's pencil)	my pencil/Patsy's pencil
Peter IV–V (not productive)	. . .
Peter VI:	
(Peter reaching for his pen and paper which are out of reach; whimpering)	my pen
(Peter reaching down for paper)	my paper
(Peter pointing to Patsy's pocketbook on floor where pen Peter was using is)	my pen down there
(Patsy and Peter watch airplane take off outside: then Peter picks up his toy airplane; flying it)	my airplane
Peter VII:	
(Peter gesturing with barrette to Lois's hair)	Patsy hair right there
(Peter eating lunch)	that my bologna
(Peter taking bendable girl from Patsy)	ə that mine
(Peter holding Lois's barrette to his head)	that's my
(Peter touching barrette in his hair)	my barrette's on
(Peter pointing to Patsy's paper)	that Patsy
(Peter holds recording tape; it starts to unwind) Lois: Why don't you put it back in the box and give it to me?	oh no/mine it/ə mine it
(Peter showing baby sister his pen)	my pen Jenny
(Mommy comes in to see what Peter's been doing; Peter points to his drawing paper; tapping it)	that mine/that mine
(Peter looking at Patsy's pen on floor)	that's ə Patsy's pen
Recurrence	
Peter I–II (not productive)	. . .

Recurrence (*Continued*)	
Peter III:	
(Peter playing with toy cars; one has seat; other doesn't; has peg person in hand)	more car
(Peter holding two toy cars; looking for another; finding another)	more cars/ more cars/ more cars
(Peter finding peg boy)	here more
(Peter holding disks for slide; then rolls them)	wheels ə more
(Peter pointing out window at street light; at another one)	light/ more light
(Peter reaching for more train cars)	more train
Peter IV:	
(Patsy had taped peg boys to train; Peter looking at it; Peter bringing roll of tape)	more train ↑ more tape ↑
(Patsy was talking about turning the recording tape over; Peter reaching for second box of tape in bag)	more one ↑
(Peter holding up another finger puppet)	more doggie
(Peter tries to put peg man in hole in truck; doesn't fit; putting boy in hole instead)	more man
(Peter reaching for Lois's barrette after staring at her hair)	hair more/hair more/hair more barrette
Peter V:	
(Peter holding another toy headlight out to Patsy)	here more
(Peter trying to take second bolt off car)	get more
(Peter picking up car and its box)	more put put back
(Peter had eaten cookie in kitchen; now he, Patsy, and Lois are in living room about to put the toys away)	more cookie ↑
Peter VI:	
(Peter searching for fourth flat car after finding three)	need ə more
(Peter had been putting masking tape on toys; holding roll of tape)	more tape ↑
(Peter adds block to circle of blocks he and Lois are building; then gets another block)	get ə more
Peter VII:	
(Peter picking up fourth train car)	this is more
(Lois had just drawn car; Peter gesturing that he wants Patsy to draw a car now)	me make ə car too
(Peter draws, then Patsy draws)	make it too
(Peter noticing one empty seat on seesaw)	need ə more
(Peter running to kitchen; he had a snack a while ago)	more chips please
(Peter hears tape-recorder feedback; gets box of recording tape; opening it)	more tape
(Peter looking at recording tape in box)	more tape goes around
(Peter has box of recording tape in hand; excitedly looking from tape in hand to tape recorder)	more tape recorder right there I bet/more tape recorder right there all finish
(Peter notices spare tire on tiny truck; picking up truck)	more wheel ə truck
(Peter looking in Patsy's pocketbook for another pen)	get some more nother one ↑
State	
Peter I–VI (not productive)	. . .

PETER (*Continued*)

State (*Continued*)	
Peter VII:	
(Mommy goes out of room with part of toy telephone; Peter running after her)	need it/my need it
(Mommy enters room)	ə want milk please
(Mommy gives Peter corn chip; he wants the bag)	need ə chip Mommy
(Peter tapping paper where Lois had drawn a house)	want ə house like that
(Peter touching barrette in his hair)	this hurt
(Patsy, Lois, and Peter in kitchen; Peter choosing what he wants for lunch)	want the bologna
Wh-Questions	
Peter I–V (not productive)	. . .
Peter VI:	
(radiator hisses)	s æt noise
(Peter dumps car out of box; looking at it)	what's in there
(Peter unscrewing tire)	what's that there
(Peter pointing to engine on car)	what's this
Peter VII:	
(Peter noticing new microphone)	what's that
(Peter noticing truck has a spare tire)	what's that there
(Peter gets toy airplane; all the peg people are missing)	where the people go
(Peter pointing out window at smoke coming from road)	what's that down there
(Peter looking out window at park; no dog has come into view)	where doggies go
(Peter noticing train car is missing a plastic disk)	where is it

REFERENCES

Bailey, C. J. Variation resulting from different rule orderings in English phonology. Unpublished manuscript, Georgetown University, 1973.

Bever, T. G. The cognitive basis of linguistic structure. In J. Hayes (Ed.), *Cognition and the development of language.* New York: Wiley, 1970.

Bloom, L. *Language development: form and function in emerging grammars.* Cambridge, Mass.: M.I.T. Press, 1970.

Bloom, L. *One word at a time: the use of single word utterances before syntax.* The Hague: Mouton, 1973.

Bloom, L. Comment. In F. F. Schachter et al., Everyday preschool interpersonal speech usage: methodological, developmental, and sociolinguistic studies. *Monographs of the Society for Research in Child Development,* 1974, **39**(3, Serial No. 156), 82–88.

Bloom, L.; Hood, L.; & Lightbown, P. Imitation in language development: if, when and why. *Cognitive Psychology,* 1974, **6,** 380–420.

Bloom, L.; Lightbown, P.; & Hood, L. Conventions for transcription of child language recordings. Unpublished manuscript, Teachers College, Columbia University, 1973.

Bloom, L.; Miller, P.; & Hood, L. Variation and reduction as aspects of competence in language development. In A. Pick (Ed.), *The 1974 Minnesota Symposium on Child Psychology.* Minneapolis: University of Minnesota Press, in press.

Bloom, L.; Rocissano, L.; & Hood, L. Adult-child discourse: developmental interaction between information processing and linguistic knowledge. In preparation.

Bower, T. G. *Development in infancy.* San Francisco: Freeman, 1974.

Bowerman, M. *Early syntactic development: a cross-linguistic study with special reference to Finnish.* Cambridge: Cambridge University Press, 1973. (a)

Bowerman, M. Structural relationships in children's utterances: syntactic or semantic? In T. Moore (Ed.), *Cognitive development and the acquisition of language.* New York: Academic Press, 1973. (b)

Bowerman, M. Discussion summary-development of concepts underlying language. In R. Schiefelbusch & L. L. Lloyd (Eds.), *Language perspectives—acquisition, retardation and intervention.* Baltimore: University Park Press, 1974.

Braine, M. D. S. The ontogeny of English phrase structure: the first phase. *Language,* 1963, **39,** 1–13.

Broen, P. The verbal environment of the language-learning child. *ASHA Monographs,* 1972, No. 17.

Brown, R. *A first language, the early stages.* Cambridge, Mass.: Harvard University Press, 1973.

Brown, R., & Fraser, C. The acquisition of syntax. In C. N. Cofer & B. Musgrave (Eds.), *Verbal behavior and verbal learning: problems and processes.* New York: McGraw-Hill, 1963.

Burling, R. Language development of a Garo and English speaking child. *Word,* 1959, **15,** 45–68.

Chomsky, N. *Aspects of the theory of syntax.* Cambridge, Mass.: M.I.T. Press, 1965.

Clark, E. What's in a word? On the child's acquisition of semantics in his first language. In T. Moore (Ed.), *Cognitive development and the acquisition of language.* New York: Academic Press, 1973. (a)

Clark, E. Non-linguistic strategies and the acquisition of word meanings. *Cognition,* **2**(2), 1973, 161–182. (b)

Ferguson, C. A.; Peizer, D.; & Weeks, T. Model-and-replica phonological grammar of a child's first words. *Lingua,* 1973, **31,** 35–65.

Fillmore, C. Deixis, I. Unpublished lectures. Mimeographed. 1971.

Flavell, J. *The development of role-taking and communication skills in children.* New York: Wiley, 1968.

Glucksberg, S.; Krauss, R. M.; & Higgins, E. T. The development of referential communication skills. *Review of Child Development Research.* Vol. **4.** Chicago: University of Chicago Press, 1975.

Greenfield, P.; Smith, J.; & Laufer, B. *Communication and the beginnings of language.* New York: Academic Press, in press.

Huttenlocher, J. The origins of language comprehension. In R. L. Solso (Ed.), *Theories in cognitive psychology.* New York: Halsted, 1974.

Huxley, R. The development of the correct use of subject personal pronouns in two children. In G. B. Flores d'Arcais & W. J. M. Levelt (Eds.), *Advances in psycholinguistics.* New York: American Elsevier, 1970.

Ingram, D. Transitivity in child language. *Language,* 1971, **47,** 888–910.

Janota, P. Development of children's vocabulary. In K. Ohnesorg (Ed.), *Colloquium Paedolinguisticum, Proceedings of the First International Symposium of Paedolinguistics, at Brno, 1970.* The Hague: Mouton, 1972.

Labov, W. The social motivation of sound change. *Word,* 1963, **19,** 273–309.

Labov, W. Contraction, deletion, and inherent variability of the English copula. *Language,* 1969, **45,** 715–762.

Leech, G. *Towards a semantic description of English.* Bloomington: Indiana University Press, 1970.

Lightbown, P. Nominal and pronominal forms in the speech of three French-speaking children: a pilot study. Unpublished doctoral dissertation proposal, Teachers College, Columbia University, 1973.

Lyons, J. *Introduction to theoretical linguistics.* Cambridge: Cambridge University Press, 1968.

Macnamara, J. Cognitive basis of language learning in infants. *Psychological Review,* 1972, **79,** No. 1, 1–13.

McNeill, D. Developmental psycholinguistics. In F. Smith & G. A. Miller (Eds.), *The genesis of language.* Cambridge, Mass.: M.I.T. Press, 1966.

McNeill, D. *The acquisition of language: the study of developmental psycholinguistics.* New York: Harper & Row, 1970.

Maratsos, M. The use of definite and indefinite reference in young children. Unpublished doctoral dissertation, Harvard University, 1971.

Melton, A. W., & Martin, E. *Coding processes in human memory.* New York: Wiley, 1972.

Miller, G. A. English verbs of motion: a case study in semantic and lexical memory. In A. W. Melton & E. Martin (Eds.), *Coding processes in human memory.* New York: Wiley, 1972.

Morehead, D. M., & Ingram, D. The development of base syntax in normal and linguistically deviant children. *Journal of Speech and Hearing Research,* 1973, **16,** 330–352.

Nelson, K. Structure and strategy in learning to talk. *Monographs of the Society for Research in Child Development,* 1973, **38**(1–2, Serial No. 149).

Olson, G. M. Developmental changes in memory and the acquisition of language. In T. Moore (Ed.), *Cognitive development and the acquisition of language.* New York: Academic Press, 1973.

Parisi, D. What is behind child utterances? *Journal of Child Language,* 1974, **1,** 97–105.

Park, T-Z. The acquisition of German syntax. Working paper, University of Munster, West Germany, 1970.

Pavlovitch, M. *Le langage enfantin: Acquisition du serbe et du francaise par un enfant serbe.* Paris: Champion, 1920.

Piaget, J. *The construction of reality in the child.* New York: Basic, 1954.

Sankoff, G. A quantitative paradigm for the study of communicative competence. Prepared for the Conference on the Ethnography of Speaking, 1972.

Sankoff, G., & Cedergren, H. Some results of a sociolinguistic study of Montreal French. In R. Darnell (Ed.), *Linguistic diversity in Canadian society.* Edmonton: Linguistic Research, 1971.

Sankoff, G., & Laberge, S. On the acquisition of native speakers by a language. Paper presented at the Northeastern Linguistic Society Annual Meeting, 1971. In *Kivung* (Journal of the Linguistic Society of Papua New Guinea), in press.

Schlesinger, I. M. Production of utterances and language acquisition. In D. Slobin (Ed.), *The ontogenesis of grammar.* New York: Academic Press, 1971.

Sinclair, H. Some remarks on the Genevan point of view on learning with special reference to language learning. In L. Hinde & H. Hinde (Eds.), *Constraints on learning.* New York: Academic Press, 1973.

Slobin, D. Developmental psycholinguistics. In W. D. Dingwall (Ed.), *A Survey of linguistic science.* College Park: University of Maryland, 1971.

Snow, C. E. Mother's speech to children learning language. *Child Development,* 1972, **43,** 549–565.

Traugott, E. Explorations in linguistic elaboration: language change, language acquisition, and the genesis of spatio-temporal terms. In J. Anderson & C. Jones (Eds.), *Proceedings of the First International Conference on Historical Linguistics* (Edinburgh, September 2–7, 1973), in press.

Tronick, E. Stimulus control and the growth of the infant's effective visual field. *Perception and Psychophysics,* 1972, **11,** 373–376.

Vosniadou, S. Strategies in the acquisition of Greek. Unpublished M.A. thesis, Teachers College, Columbia University, 1974.

Werner, H., & Kaplan, B. *Symbol formation.* New York: Wiley, 1963.

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COMMENTARY AND REPLY

COMMENTARY BY MELISSA BOWERMAN

The issues which the authors of this *Monograph* undertake to explore are complex, challenging, and of the greatest relevance to our current state of knowledge about the processes involved in language acquisition. Two important research questions are posed. First, is there a consistent order in which children acquire the ability to encode various relational notions syntactically? Second, can the variation which exists among children be described systematically, within the limits imposed by a shared sequence of acquisition? The conclusions the investigators arrive at are plausible and intriguing, and are accompanied by interesting discussions of related theoretical issues such as possible determinants for sequential acquisition, and the relationship between cognitive, semantic, and syntactic development. However, some of the findings are not conclusively demonstrated by the data and so should be the subject of some lively discussion and debate, as well as the inspiration for further studies designed to substantiate them. This is a measure of the difficulties involved in finding ways to investigate the questions asked in this study and in evaluating the relative merits of different interpretations of the same set of data.

In my remarks below, I have selected three issues for consideration. The first is an examination of a methodological problem in the design of the research which renders some of the central findings of the study equivocal because the data they are based on can too readily be explained in a different and less interesting way. This problem reflects a difficulty in trying to establish orders of emergence from spontaneous-speech data which is very general, extending well beyond the scope of this study itself. Following this section is a consideration of the potential "psychological reality" of the semantic-syntactic categories used to classify children's utterances. The final section is an exploration of the issue taken up by Bloom et al. concerning whether children at the two- and three-word stage of development have knowledge of syntactic concepts like "subject" and "predicate."

A Methodological Problem

Brown, Cazden, and Bellugi-Klima (1969) have observed that "in certain facts concerning construction frequencies there lies a major trap for the student of child speech who is interested in the development of knowledge of grammar. The first fact is that in mother-to-child speech the various constructions that English grammar permits are of grossly unequal frequency. The second fact is that the frequencies are astonishingly stable across the three mothers in our study [of Adam, Eve, and Sarah]. The third fact is that the frequencies in child speech, within the limits of the child's competence, tend to match adult frequencies." Brown et al. go on to point out the trap, which is that, when children emit constructions with unequal frequencies, the use of an *arbitrary frequency* criterion to establish that a form is productive for a child could cause the more frequently produced constructions to *appear* to become productive earlier than the less frequently produced constructions, even though this might not be the case. Suppose that, in fact, children have ability with *all* the types of constructions under investigation from the beginning but produce these with a frequency profile like that of their parents. "The chance that any particular construction would attain an arbitrary frequency criterion in an early sample would be greater for frequent constructions than for infrequent constructions. So what looked like a pattern of successive 'emergences' might simply be a kind of sampling phenomenon" (Brown & Hanlon 1970). In other words, the more frequent forms "would appear first on a strict probability basis. The student of child speech *might then conclude that the hypothesis of simultaneous development was false when it could indeed still be true*" (Brown et al. 1969; italics added).

This warning appears to be directly applicable to the interpretation of certain of Bloom et al.'s findings. The authors first outline a number of semantic-syntactic categories into which they classify the utterances produced by their subjects. They then try to determine whether children gain knowledge of how to produce utterances in these categories in a particular developmental order. Rightly recognizing that a child's *productive* (i.e., rule-governed) ability cannot be established on the basis of only one or two utterances (memorization would be too plausible an alternative explanation), they decide to consider a category productive only if "five or more utterance types were observed in the category in the data from a particular child in a particular sample" (p. 9). Using this criterion of productivity, they found (among other things) that "encoding of action events [action and locative action] preceded encoding of stative events [locative state, state, and notice]; and nonlocative relations were generally encoded before locative relations" (p. 16). In addition, action-plus-place did not become productive until after locative action.

In considering possible determinants of this order of acquisition, the authors note that the relative frequency of utterances in these categories in the speech of the children's parents matched the order of emergence,

such that "action was more frequent than locative action, locative state, and notice, in that order" (p. 25). They rule out frequency as an important determinant of order of emergence, however, because certain other construction patterns such as wh-questions and attributives were even more frequent than action relations in the speech of parents, yet these were apparently acquired relatively late by the children. However, the authors evidently did not consider the additional possibility that the apparent sequence of emergence itself was an illusion, created by the use of an *arbitrary frequency* criterion of productivity (five utterances in a sample) coupled with *unequal frequencies of production* by the children—frequencies which for at least certain of the categories (action, locative action, locative state, notice) matched in rank order of those of the parents.

The figures presented in table 2 of the *Monograph* tend to support this interpretation. The table shows the proportion and number of utterances in the different categories in each sample for each child. The verb categories (e.g., "action") which appear to have emerged earliest on the basis of the child's producing five or more utterances of that type are also proportionately the most frequent throughout the samples. Those which are said to emerge later (e.g., "locative state," "action and place") are proportionately less frequent, both in those samples in which they are finally considered productive and in subsequent samples. Utterances in several of the "later-emerging" categories constitute a relatively stable *proportion* of the total number of multiword utterances in each sample from the earliest samples for a particular child; sometimes the proportion even decreases slightly. Yet, because sample size was not held constant but, rather, increased dramatically as the children matured (more multiword utterances could be collected in a given unit of time during the later samplings), the absolute frequencies of these utterances rise in later samples, such that the frequency criterion of five instances is finally met. For example, the category "notice" is said to emerge late for all the children, well after "action" and "locative action." In the samples in which "notice" is said to become productive for Eric, Gia, and Kathryn, "notice" utterances constituted only 1% of the total multiword corpus; for Peter it was 2%. However, "notice" utterances did occur in earlier samples of all the children. When a child emits constructions of a certain pattern relatively infrequently such that they account for only 1% of all his word combinations, 500 of his constructions must be collected on the average before five exemplars of the pattern will be found—and the earlier samples collected for the children were not nearly this large. For Eric, there is the paradox that, although "notice" constructions constitute 10%, 3%, and 3% of the first three samples, respectively, the category is not considered productive until the fourth sample, even though at this time it constituted only 1% of the total. This is because the first three samples consisted of only 10, 39, and 108 construction types (semantically distinct

constructions), respectively, while the fourth sample is far larger at 427 constructions.

Similar observations could also be made about the consistently low proportions of utterances in several of the other "late" emerging categories (e.g., locative state, state). The proportions of utterances falling into the categories said to emerge earlier (e.g., action) are almost always far higher. It is clear that the use of an arbitrary frequency criterion to establish productivity could easily cause utterances which are produced relatively infrequently to appear to emerge later than more frequent ones, even though a child might have been consistently producing utterances in each category from the start.

The caution that certain categories may only appear to have emerged late due to the way in which productivity was established is primarily applicable to those categories in which the children produced at least a few utterances from early on. There are some categories in which particular children produced virtually no utterances, sample after sample (e.g., instrument for all the children, intention for Eric and Peter, wh-questions for Gia and Peter). While the appearance of a later emergence for these categories *may* also be an artifact of the method of analysis, there is a strong possibility that a genuine onset of ability is reflected in the sample in which such utterances finally start to appear. In this case, the delay would really be due to some extra cognitive, semantic, or syntactic difficulties which these constructions involve.

How can an investigation of the order in which children acquire a productive ability with constructions of various kinds be conducted so as to avoid the ambiguous outcome described here? At a minimum, sample size would need to be held constant (and large) rather than allowed to increase as the child matures. In this way, construction patterns with which a child is fluent but which he emits relatively infrequently would have as good a chance of being represented in the early samples as in the later ones. If under these conditions certain constructions are still absent or extremely rare in the early samples and begin to proliferate only later, one may be more certain that the emergence is real. Brown et al. (1969) make other methodological suggestions, arguing for "the utilization of data that are better indices of knowledge or competence than is an arbitrary frequency of production." For example, they suggest that one can compare child frequencies to known adult frequencies and "so set frequency criteria that are not entirely arbitrary." There are no doubt several other ways to approach the problem which would allow the question Bloom et al. pose about order of emergence to be answered more conclusively, but these will not be pursued here.

The Psychological Reality of the Categories

Let us assume that a study with adequate controls against the effects of different relative frequencies of production would substantiate Bloom et al.'s

finding that children acquire the ability to produce utterances in the categories in a certain developmental order. Would this mean that the categories are "psychologically real"—that they correspond to concepts which are functional in a child's own system of grammatical rules?

Bloom et al.'s position on this is not entirely clear. On the one hand, they caution wisely that "the taxonomy of linguistic structures that has been presented here is a linguistic description of speech data that can represent the child's knowledge and changes in the child's knowledge in only a very gross way. There is no way of knowing, at the present time, the form in which such knowledge about linguistic structure is represented in the child's mental grammar" (p. 33). On the other hand, however, they argue that "the categories were not a superimposed a priori system of analysis," but rather were "presumably derived from an individual child's own rule system and were, therefore, functional for the child" (p. 9). They do not elaborate on what they mean by "functional."

One possible interpretation of the term might be that the categories correspond to concepts which children actually use in producing (and presumably understanding) utterances (see Bowerman 1974, pp. 201–202; Brown 1973, pp. 173, 118, 146). For example, children might generalize their existing knowledge (e.g., of appropriate word order) to novel constructions along the lines suggested by terms like "action" and "notice." If this were the case, then children would regard all action verbs (or, more accurately, their referents) as similar to each other in some sense, such that constructions involving "open," "cut," "make," "dance," etc., would all be produced by reference to the same body of information about sentence structure. This information would be broad enough to allow the distinctions between different kinds of simple actions to be disregarded for purposes of sentence construction, but not so broad as to allow the formulation of "notice" strings with "see" or "hear," or "state" strings with "want" or "have." Producing these latter types of sentences would require recourse to information which would either be somewhat different from, or at least an elaboration of, the knowledge governing action constructions.

However, the discovery that the various categories of construction emerge sequentially would not in itself provide enough grounds for concluding that all the utterances classified together are actually seen by the child as similar in some sense (although this would of course be a possibility warranting further exploration). Most of the categories are heterogeneous, in that they embrace a variety of distinguishable subcategories. The knowledge with which children construct sentences involving one of the subcategories might or might not be abstract enough to apply to sentences of the other subcategories as well. For example, within the category "action relations" are included sentences with change-of-state verbs like "open" and "break." A child might initially produce change-of-state utterances with knowledge which did not apply to non-change-of-state action verbs like

"jump" and "read." Making constructions with the latter verbs would require a different kind of information which might not be acquired at exactly the same time.

In short, the discovery of a sequence of emergence can provide some important hints as to what categories may be functional for the child, but does not in itself establish psychological reality.

Evidence in Child Speech for Syntactic Relations

In their sections on "Semantic Complexity" and "Pronominal-Nominal Variation," Bloom et al. continue the debate, opened in Bowerman's (1973) and Schlesinger's (1971) articles and furthered in Schlesinger's (1974) chapter, on the subject of whether children should be credited with a knowledge of syntactic relations at the two- and three-word utterance stage. Their discussion raises a number of important points which are worth close examination.

Before the substantive issues involved are taken up, however, a misunderstanding should be clarified. In my 1973 article I examined children's two- and three-word utterances for evidence which would justify crediting children at this stage of development with an understanding of syntactic relationships like subject and predicate. Finding none, I suggested that it is possible that children's earliest two- and three-word constructions are produced with "simple rules to order words which are understood as performing various semantic functions" such as agent, action, and possessor. Bloom et al. object to this proposal, evidently interpreting it as a claim that "children are learning *only* semantic structures" (p. 28; italics added). They argue that "Bowerman appears to confuse the claim that children are learning only the semantics of sentences when she fails to consider word-order rules as manifesting knowledge of syntax" (p. 28).

A misinterpretation has led here to an apparent disagreement where there is in fact none. I have never argued that children in the initial stages of word combination have learned *nothing* about syntax. Insofar as constraints on word order are by definition treated by that part of linguistic description called syntax, knowledge of word order must be called syntactic knowledge. However, there is more to syntax than word order. An adequate representation of the syntactic structure of a sentence must specify not only the order in which the elements in the sentence appear but also the *functional relationships* which hold between them. The two aspects of syntax are by no means synonymous, as will be discussed subsequently. My arguments were concerned not with whether children possess any kind of knowledge at all which might be called syntactic but with whether the functional relationships between the elements in children's sentences can properly be called "syntactic" (with a specific meaning to be described shortly), or are better characterized in another way.

However, even when attention is restricted to the specific question of what would constitute evidence that children have learned syntactic relationships, as opposed to relationships of some other kind, there are differences of opinion. This is the true issue at hand, and it is examined below.

Relationships between the words (or phrases) in a sentence can be specified either on the basis of the way in which the *referents* of these words are related to each other or in terms of the way in which the words themselves function within the sentence regardless of their referents. Relationships of the former kind are commonly called "semantic"; those of the latter kind are called "grammatical," or, as in Bowerman (1973), "syntactic" (to distinguish them from "semantic" relationships, which could also be considered a part of "grammar"). Semantic relationships thus have to do with meaning. Meaning can be characterized at various levels of abstraction. At the most concrete level, a semantic relationship can be identified on the basis of the specific lexical meaning of one of the words involved: for example, "recurrence" as the relationship holding between the word "more" and the name for that to which "moreness" is attributed. At various middle levels of abstraction, relationships can be specified on the basis of shared elements of meaning among groups of words. For example, "mommy eat," "daddy read," and "Johnny jump" can all be classed as agent-action strings because "eat," "read," and "jump" all identify activities which are initiated by animate beings (agents). Agent-action strings can be distinguished on the basis of their shared semantic features from, for example, experiencer-state sentences like "mommy see," "Johnny want," and "Daddy hear," in which the verbs name not actions but internal states which are passively experienced. Finally, there are semantic relationships which are not defined on the basis of lexical meaning at all but by the fact that the referents of the words involved appear to be situationally related to each other in ways which are relatively easy to characterize: for example, when a child says "daddy shoe" while pointing to his father's shoe, "daddy" seems to identify the possessor of the object mentioned; hence the utterance can be characterized as exhibiting a "possessor-possessed" relationship.

In languages as they are spoken by adults, semantic relationships are less important as determinants of the way in which sentences are structured than syntactic relationships like "subject-predicate" and "verb-direct object." Syntactic relations are very abstract in that they subsume a number of semantic distinctions which could be made. For example, in adult speech, a relationship between subject and predicate is manifested in both the sentences "Johnny eats an apple" and "Johnny wants milk," despite the difference in the meanings of the two verbs. By virtue of the existence of syntactic relations which are relatively indifferent to distinctions of lexical or situational meaning, languages are able to express an infinite number of semantic distinctions with a limited number of basic structural patterns and operations.

What kind of evidence in a corpus of utterances would justify crediting the speaker with knowledge of syntactic relations? Is this evidence present in early child speech? In the present *Monograph,* Bloom et al. take the following position: "The fact that the same words (e.g., animate nouns) could function differently in relation to different kinds of verbs (e.g., as agents and movers) was taken as evidence that the children had made higher-order linguistic inductions about superordinate grammatical categories [e.g., sentence-subject]" (p. 3). More specifically, they point to the fact that some children can use the same sorts of words in the *same position* in different sentences to express different semantic functions. For example, in Kathryn's and Gia's speech, words like "Baby" and "Mommy" occurred in initial position and functioned variously as agents, actors, movers, and possessors. In final position, words like "book" and "cookie" functioned as objects of actions or of locative actions and as possessions, and words like "bag" and "floor" functioned as place names. This is "interpreted as evidence that [the children] had learned the superordinate grammatical categories sentence-subject (including agents, actors, movers, and possessors), predicate-object (including objects of actions, locative actions, and possession), and predicate-complement (place), so that a number of semantic distinctions could be encoded within the same grammatical system" (p. 19).

Is the ability to use similar words in the same position in different sentences to express different semantic relationships sufficient evidence that a speaker has "made higher-order linguistic inductions about superordinate grammatical categories"—that he has learned syntactic concepts like sentence-subject? Not necessarily. Bever, Fodor, and Weksel (1965) point out in connection with adult language that "identity of order relations is compatible with considerable differences in syntactic form." This fact about syntactic structure is well illustrated by sentence pairs in which the same or similar words occupy identical positions and yet do not function syntactically in the same way. For example, in the famous pair "John is eager to please" versus "John is easy to please," the first John functions as the deep structure *subject* of "please" while the second John functions as its *direct object.* In "Making mistakes can be annoying," "mistakes" functions as the direct object of "making," but in "Recurring mistakes can be annoying," "mistakes" functions not as the direct object of "recurring" but rather as a noun modified by it. In "John saw the house," "the house" functions syntactically as both deep and surface structure direct object of "saw," but in "John went home," "home" is not the direct object of "went."

In all these sentence pairs, the syntactic difference between the constituents in question—the fact that they are *not* instances of the same relational concept—is not apparent when the utterances are looked at in isolation. But the distinction is clearly revealed by differences in the way in

which the constituents behave when they are subjected to the same linguistic operations. Consider the following examples (an asterisk indicates ungrammatical sentences):

1a. John is eager to please someone.
1b. *John is easy to please someone.
2a. Whom is John eager to please?
2b. *Whom is John easy to please?
3a. Making mistakes is annoying.
3b. *Recurring mistakes is annoying.
4a. Mistakes which recur are annoying.
4b. *Mistakes which make are annoying.
5a. The house was seen by John.
5b. *Home was gone by John.
6a. Where did John go?
6b. *Where did John see?

These examples demonstrate an important fact about syntactic function. Sentence constituents can be considered to perform the same syntactic function in their respective sentences only if they are *functionally equivalent*—that is, if they act as if they are at some level of abstraction instances of the *same concept*. Constituents with the same syntactic function do occupy the same position in a given sentence frame, but, as the examples above show, not all constituents in that position necessarily share that function. Constituents which are not actually equivalent sometimes appear superficially to be so when they occur in sentence frames which neutralize the distinction between them. However, their lack of equivalence is revealed when the neutralizing sentences are taken apart and reconstructed along slightly different lines. Then we see that the constituents behave differently with respect, for example, to their effects on other parts of the sentence (e.g., in the determination of verb agreement, as example 3 above illustrates) or in terms of how they are treated in related sentences (see examples 1, 2, 4–6).

In sum, occupation of the same sentence position is not a reliable clue to identity of syntactic function in adult speech. Yet Bloom et al. argue on the basis of word order evidence that children have made "linguistic inductions about superordinate grammatical categories such as sentence-subject." It is not clear why word order should be a more reliable guide to syntactic function in child speech than in adult speech. It simply is not strong enough to answer the critical question of whether children perceive certain words which in their respective sentences perform different semantic functions (such as agent or possessor) as functionally equivalent at some higher level of abstraction. It is theoretically quite possible that sentences like "mommy open" (agent-action) and "mommy coat" (possessor-possessed) are produced by reference to different sorts of linguistic knowledge (e.g., "agent precedes action" and "possessor precedes possessed") such that the two

"mommys" need not be regarded by the child as functionally similar in any sense.[1]

In short, identity of word order is not a sufficient basis for establishing equivalence of syntactic function. Children who have learned to place words naming agents and possessors in initial position might or might not see any abstract similarity of function among these words. More information is needed before a conclusion can be drawn. However, Bloom et al. object to my (1973) insistence on stronger evidence for functional equivalence, such as the presence of transformations which operate the same way on constituents with different semantic roles. They argue that the "existence of a structure in child language needs to be justified by a test of the child-language data and not by tests that apply to adult-speech data" (p. 29). The problem with this objection is that the syntactic structures whose existences they wish to justify (e.g., subject-predicate-object) were originally identified by linguists on the basis of rather specific characteristics of language as it is spoken by *adults*. How can such structures be proven to exist in child language unless one is willing to be held to at least *some* of the tests which demonstrate their existence in adult speech? If the putative structures in child speech are to be labeled by the adult terms, it seems essential that they be able to meet some (not necessarily all) of the same tests rather than entirely different ones; otherwise, it is not at all clear that the same phenomena are being described. Rather than characterize the structural phenomena which Bloom et al. have identified with terms which have specific meanings in the linguistic description of adult language, I would prefer to take the advice Bloom et al. offer elsewhere in their paper, that it is "more

[1] The authors themselves appear to resist following their own test for the existence of superordinate grammatical categories to its logical conclusion, apparently recognizing that implausibly dissimilar sentence constituents thereby would have to be interpreted as performing the same grammatical function. In accordance with their test, they consider animate nouns appearing in first position in two-word sentences to be sentence-subjects regardless of whether they function semantically as agents, actors, movers, or possessors. However, inanimate nouns in second position are not all interpreted as having the same syntactic function. Rather, their *semantic* function is used to assign them to one of two different superordinate grammatical categories: predicate-object (object of action or locative action, possession) or predicate-complement (place). Thus, "box" in a sentence like "put box" would be considered to function syntactically as a predicate-object if the box were the object being moved, while it would be considered a predicate-complement if it named the location to which something else was being moved. If identity of words and of sentence position does not necessitate that the two "boxes" be assigned to the same superordinate grammatical category, why should the three "mommys" in "mommy open" (agent-action), "mommy go" (mover-locative action), and "mommy coat" (possessor-possessed) necessarily be considered to share the same syntactic function; that of sentence-subject?

profitable to describe such facts of child language on their own terms . . . rather than in terms of goodness of fit with one or another preconceived system of analysis or linguistic theory" (p. 25).

Conclusions

Since space is limited, I have elected to focus primarily on methodological and interpretive problems rather than to comment on the many positive features of this *Monograph*. The reason the problems are worth talking about is that this is an important work at this point in the study of child-language development. The authors have raised some critical questions about the processes involved in language acquisition, and their answers to these questions may have considerable influence on the direction taken by future studies in the field.

References

Bever, T. G.; Fodor, J. A.; & Weksel, W. On the acquisition of syntax: a critique of "contextual generalization." *Psychological Review*, 1965, **72**, 467–482.

Bowerman, M. Structure relationships in children's utterances: syntactic or semantic? In T. E. Moore (Ed.), *Cognitive development and the acquisition of language*. New York: Academic Press, 1973.

Bowerman, M. Discussion summary: development of concepts underlying language. In R. L. Schiefelbusch & L. L. Lloyd (Eds.), *Language perspectives: acquisition, retardation, and intervention*. Baltimore: University Park Press, 1974.

Brown, R. *A first language: the early stages*. Cambridge: Harvard University Press, 1973.

Brown, R.; Cazden, C.; & Bellugi-Klima, U. The child's grammar from I to III. In J. P. Hill (Ed.), *Minnesota Symposia on Child Psychology* (1967). Vol. **2.** Minneapolis: University of Minnesota Press, 1969. (Reprinted in A. Bar-Adon & W. F. Leopold (Eds.), *Child language: a book of readings*. Englewood Cliffs, N.J.: Prentice-Hall, 1971.)

Brown, R., & Hanlon, C. Derivational complexity and order of acquisition in child speech. In J. R. Hayes (Ed.), *Cognition and the development of language*. New York: Wiley, 1970.

Schlesinger, I. M. Production of utterances and language acquisition. In D. I. Slobin (Ed.), *The ontogenesis of language*. New York: Academic Press, 1971.

Schlesinger, I. M. Relational concepts underlying language. In R. L. Schiefelbusch & L. L. Lloyd (Eds.), *Language perspectives: acquisition, retardation, and intervention*. Baltimore: University Park Press, 1974.

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COMMENTARY BY MICHAEL P. MARATSOS

The present *Monograph* by Bloom et al. presents important naturalistic evidence relevant to two kinds of early structural development: the problem of alternative initial structures children use in beginning the formulation of the grammatical structure of their language, and the sequence of semantic relations children use language to express. The discussion strikes me as most important and best supported in the consideration of the different ways young children may initially acquire grammatical structure. There is already some history of reported differences among children in grammatical acquisition styles. Summarizing evidence from different investigators, Brown (1973) noted that children seem to vary in how strictly and in what manner they use word order to express semantic relations, particularly in languages where word order is more flexible than English. Brown, Cazden, and Bellugi-Klima (1969) discussed how one of their three subjects, Sarah, tended to put in more verb and noun inflections at a given level of average sentence length than the other two subjects studied, who employed more content words such as nouns and verbs at the same MLU. Most relevant, Bloom (1970) and Brown (1973) each noted that in the beginning of grammatical acquisition in English, some children have more of a "pivot look" than do others. Such children more often used single words in a constant position to mark a particular relation. To mark recurrence, for example, the child might use the formula *more* + *word*, as in *more ball, more shoe*. Brown hypothesized that the expression of some relations might lend itself more to such a look than others. Other relations seem more naturally to take a wider range of freely varying words in appropriate orders: for example, the relation action-affected object is expressed in *get ball, push table, kick chair*, where no single word marks the relation. The form of the child's speech could thus be largely determined by the semantic functions the child chooses to express in his speech.

In the present work, however, the authors have raised considerations suggesting that semantic function and grammatical form may be partly autonomous even in early speech, and children may structure their early acquisition on the basis of a preference for one grammatical form over another. Two of their children seem consistently to have produced pivot-like sentences, corresponding as the authors note to a *synthetic* grammatical style. For a brief time these two children appear consistently to have marked the affected-object relation with an inflection-like attachment to the verb, for example, *get it, push it, kick it, get this one*, where *it* and *this one* appear as constant markers for the affected-object relation. Similarly, pronominal forms such as *there* and *right there* often marked location. The other two children consistently used the style corresponding to *get ball, kick table*, or for location, *put in box*, with no particular single-word markers for the relation, corresponding to an *analytic* grammatical style.

As the authors note, for these children form does not appear completely to follow function but to be a partly autonomous consideration. Such a finding shows in a particularly sharp way the availability of different kinds of structural analyses to children as they acquire language. Recent work in early grammatical acquisition has tended to emphasize the cognitive and semantic base of language structure. This development has been a healthy one that has rendered more comprehensible the facts of early acquisition. But on the other hand, there has perhaps been an accompanying tendency to dilute or forget the importance of the acquisition of structural devices per se. The present *Monograph* strikes me as containing a potentially dramatic corrective influence in its finding that the reality of different structural devices may be very strong for the child beginning acquisition.

In the preceding discussion I have largely assumed that the evidence strongly supports the authors' conclusions. By and large I believe it does (see table 3), but not as strongly as do the authors. The authors claim, for example, that there was an "impressive consistency" for preference of one linguistic system over the other before MLU of 2.0. The period that supports this claim seems to me to end considerably earlier. For example, Eric at MLU of 1.69 uses pronominal expression (e.g., *get it*) of affected-object 32 times, but full noun expression (e.g., *get ball*) 33 times. Similarly, Kathryn at MLU 1.89 has a preference for noun over pronominal expressions of affected-object, but the occurrences are 81 and 41, respectively, which seems like a preference, not the exclusive use of one system (compare to MLU = 1.32, where the ratio is 44 to 4). Nor is the evidence as strong in general as one might desire for the two pivot-look subjects. The periods where pronominal dominance is really marked are ones where expression of the relevant relations is often barely or marginally productive. The authors note at the end of the paper that the present evidence provides only a beginning, and I laud their caution.

The other major topic treated by the authors is the sequence of semantic relations coded in the children's speech. Some of the work here seems less convincing than in the grammatical variation section. The evidence seems good that the verbal expression of actions (e.g., pushing, putting) preceded that of states (e.g., wanting, possessing). But the authors seem to waver between judging productivity by absolute numbers of a semantic relation produced in a sample and judging by the changes in proportion. For the data here, setting an absolute number threshold seems more satisfactory. Some conclusions change, I think, when this is done. One claim in the paper is that referential relations of recurrence, negation, and existence develop before verb relations (e.g., action, state, locative action, locative state). The evidence for this conclusion is that, although the absolute number of expressions of both major semantic types rises with development, the proportion of total utterances which express referential relations

decreases. Such general proportion measures may be too gross, though. Using the absolute number criterion for productivity (roughly, five instances of a type corresponds to productivity), we find that action relations are productive as early as any of the three referential relations for three of the four children. For three of the children, at least one of the three referential relations reaches productivity only after at least one of the verb relations. Negation, clearly a crucial relation, reaches productive status for two of the children only after two verb relations have become productive. Recurrence comes very late for a third child. Only existence (pointing out or naming objects) is consistently at least tied with the earliest verb relations in productivity. Other problems arise with the claim that the expression of location follows nonlocative expressions. As the authors note, this sequence holds for two of the children, while locative and nonlocative relations appear together for the two girls. At this time, a score of two wins and two ties seems like motivation to proceed with extreme caution. In general, I find less constancy in the developmental sequences of semantic relations than do the authors.

Aside from such problems, however, the work of this section offers considerable interest, particularly in the remarks about accounting for sequentiality in acquisition. Especially useful is the distinction between cognitive and semantic acquisition. As the authors note, a child might well have a concept for a long time before it finds linguistic expression for any of a number of reasons, including his motivation to communicate linguistically, the availability and difficulty of the relevant linguistic forms, or the salience of the form and meaning in contexts. A natural hypothesis, for example, is that, even for a child who cognizes both actions and internal states, states would achieve later expression: simple actions are more overtly conspicuous in a context than are internal states such as wanting or needing, and the child should find it easier to divine that linguistic expressions refer to them.

In short, the present *Monograph* offers a rich mass of evidence and conceptualizations dealing with semantic and grammatical structural problems in early language acquisition, often with interesting and important implications. The section on early grammatical variation in particular offers the beginning of important evidence about the structural resources and inclinations the child brings to the acquisition of linguistic structures, and the work on semantic relations provides a beginning wide range of suggestions and possibilities for use in future work.

References

Bloom, L. *Language development: form and function in emerging grammars.* Cambridge, Mass.: M.I.T. Press, 1970.

Brown, R. *A first language: the early stages.* Cambridge: Harvard University Press, 1973.

Brown, R.; Cazden, C.; & Bellugi-Klima, U. The child's grammar from I to III. In J. P. Hill (Ed.), *Minnesota Symposia on Child Psychology* (1967). Vol. **2.** Minneapolis: University of Minnesota Press, 1969. (Reprinted in A. Bar-Adon & W. F. Leopold (Eds.), *Child language: a book of readings.* Englewood Cliffs, N.J.: Prentice-Hall, 1971.)

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REPLY BY THE AUTHORS

The theoretical issues raised by Melissa Bowerman and Michael Maratsos have been discussed at length elsewhere (Bloom, Miller, & Hood, in press), and we will reply here to only the methodological question that was raised in their comments: when is the evidence adequate for supporting one or another set of conclusions about child language? The issue is a substantive one that is important to us (see Bloom 1970; Bloom 1974). In particular, Bowerman questioned the basic methodological decision of setting an arbitrary frequency criterion for productivity in the language behavior of the children we observed. In order to test the developmental sequence of semantic-syntactic relations that resulted from the descriptive analysis, and to respond to the criticism of Bowerman and Maratsos, we have performed a statistical analysis of the data that supports the conclusions that had been reached.

The requirement that was imposed on the data, and the issue in question, was the occurrence of five different utterances within a category for assuming that the utterances within the category derived from knowledge of a linguistic rule or rules. Setting the number of required utterances at precisely five was an arbitrary decision. The frequency of a category within a given time span is relevant to determining productivity in any paradigm for the study of child language that assumes a developmental model. That is, at an early point in time the child does not know or does not use some rule, and at some later time he does. Although one can never be sure of the exact moment of onset, given the time span of each observation and the number of speech events observed, five different utterances was *presumed* to represent evidence of linguistic knowledge. We have less confidence that four or fewer utterances clearly shows the absence of such knowledge. The problem is one that exists in any developmental study that depends upon sampling behavior, where a complete record is not possible. While quite aware of the problem, we are not aware of any wholly satisfactory answer.

Bowerman observed that such an absolute frequency criterion is more likely to be met as more utterances occur, so that a category that was considered nonproductive at an earlier time may have been productive at that time if the sample had been larger, and thus Bowerman suggests that sample size should be constant. However, the number of multiword utterances was small in the earliest observations because the children had barely begun to use multiword utterances. Restricting the size of the later samples to conform with the size of the earlier samples could have eliminated just those utterances in the later data that represented developmental change.

What Bowerman suggests, essentially, is that it is not the absolute number of occurrences but the proportional number of occurrences at successive observations that indicates development. In fact, it was proportional interactions in the data which were the major source of evidence in this investigation, as indicated throughout the text and in the tables and figures. Using the same number of utterances for each observation as Bowerman (quoting Brown, Cazden, & Bellugi-Klima 1969) recommended is only a way of assuring a proportional comparison. If proportional measures are used, then it is not necessary to obtain a constant number of utterances in each sample. The developmental sequence of verb relations reported in our study (the first six categories in table 2) was based upon the criterion of five or more different utterances in a category, but the proportion of utterances in the categories in each observation can also be compared, and we have done so here.

The developmental sequence of verb relations was tested in the following ways. First, the proportional distribution of the categories was determined (N = the total number of verb relations in all samples) for each child. For example, for Eric, Times I through V, there were 707 verb relations, counting only different utterances, and the proportional distribution was action (.45), locative action (.19), locative state (.07), state (.16), notice (.11), intention (.02). For each of the categories, the overall proportion was used as the expected proportion and compared with the proportion of utterances in that category in each sample. In that sample in which the criterion of productivity ($N \geq 5$) first occurred, the proportion (p) was either equal to or greater than the expected p in 19 out of 24 trials (six categories, four subjects). In the last samples, for the action category (the earliest category to appear), p was always less than expected, but in 12 of 16 trials when the category was either state, notice, or intention (the later developing categories), p was equal to or greater than expected. The most revealing result of this analysis was that in 46 of 59 samples before the criterion for productivity occurred, p was less than expected. The hypothesis that the observed proportional frequency would be the same as the expected (overall) frequency before the criterion for productivity was reached was tested by sign test, and rejected; the probability of a lower p in 46 of 59 trials, using a one-tailed test, was less than .001. As an example of these interactions, the proportional frequencies in the category locative

action from Eric were: expected (overall) p, .19; Time I, $N = 0$; Time II, p = .08; Time III, p = .17, $N = 7$ (productivity); Time IV, p = .22; Time V, p = .19.

The proportional interactions were tested by χ^2 as follows for those categories that were presumed to develop later than the action categories according to the productivity criterion. The data from the four children were combined to compare the number of utterances in a particular category in all the samples before the productivity criterion was reached, with the number of utterances in the four samples (one from each child) in which the criterion was reached, and the number of utterances not included in the test category. For example, in the category locative state, there were nine locative-state utterances and 279 non-locative-state utterances in 11 observations before productivity criterion, and 84 locative-state and 700 non-locative-state utterances in the four criterion samples. The null hypothesis of no difference in the proportional occurrence of utterances before and after criterion was rejected for locative state, $\chi^2 = 15.0$, $p < .001$; state, $\chi^2 = 16.26$, $p < .001$; and intention, $\chi^2 = 86$, $p < .001$. The differences were not significantly different for the notice category (the category singled out by Bowerman for discussion).

One can conclude from these analyses that the proportional occurrence of utterances within a category is not constant developmentally; the observed proportional values for each category reached the expected values or exceeded the expected values when the absolute frequency criterion for productivity ($N \geq 5$) was reached. The χ^2 analysis provided statistical support for the arbitrary frequency criterion that was used as an index of productivity for evaluating sequential development in the original analysis.

One other point: the alternative explanation that is suggested by Bowerman for the developmental sequence we reported has to do with the corresponding relative frequencies of categories of utterances in parent speech. However, cause-effect relations in correlation data are difficult to establish. In this regard, it is noteworthy that the many recent studies of parent input to children have reported an important influence in the opposite direction—that what parents say to children is dependent upon what their children have already learned about language (e.g., Phillips 1973).

Both Maratsos and Bowerman have questioned the developmental sequence, and our result as well as their challenge to it can be tested with other data. We do not expect that the entire sequence will be "universal." Potential variation among the verb categories may reflect a number of factors; for example, "want" often predominates in the early sentences of other (usually not firstborn) children from whom anecdotal evidence is available. At the same time, a more interesting finding in our data was the fact that early locative sentences involved movement, and stative locative sentences appeared subsequently. We expect that this result (among others), which is

based on aspects of cognitive development, will be replicated in studies of other children, whereas verbs of notice and state may be subject to greater variation, possibly due to influence from different environmental inputs.

References

Bloom, L. *Language development: form and function in emerging grammars.* Cambridge, Mass.: M.I.T. Press, 1970.

Bloom, L. Comment. In F. F. Schachter et al., Everyday preschool interpersonal speech usage: methodological, developmental, and sociolinguistic studies. *Monographs of the Society for Research in Child Development,* 1974, **39**(3, Serial No. 156), 82–88.

Bloom, L.; Miller, P.; & Hood, L. Variation and reduction as aspects of competence in language development. In A. Pick (Ed.), *The 1974 Minnesota Symposia on Child Psychology.* Minneapolis: University of Minnesota Press, in press.

Brown, R.; Cazden, C.; & Bellugi-Klima, U. The child's grammar from I to III. In J. P. Hill (Ed.), *Minnesota Symposia on Child Psychology* (1967). Minneapolis: University of Minnesota, 1969.

Phillips, J. Syntax and vocabulary of mother's speech to young children: age and sex comparisons. *Child Development,* 1973, **44,** 182–185.