CHAPTER 9

The structural and functional status of single-word utterances and their relationship to early multi-word speech*

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INTRODUCTION

Atkinson (1982) has recently pointed out that theories of language development may be teleological in nature, that is, based on an understanding of the endpoint of development. He has also argued that one criterion by means of which developmental theories of language may be evaluated is by considering whether or not such theories form part of a more general theory. We would therefore like to begin by presenting a very general outline of the components of adult language and the communicative system of which it is a part, which can then serve as both a teleology for the early stages and a general model for all stages. Mature linguistic communication has five commonly accepted components: semantics, pragmatics, syntax, morphology and phonology. In this chapter, our interest is not limited to the linguistic system in isolation, but rather to the linguistic system within the broader context of communicative development; a communicative act may, but need not, include all five components.

Semantics is the content or meaning of a message. It is the linguistic encoding of internal cognitive, motivational and perceptual schema and the relationships between them. As Schlesinger (1982) has observed, many

distinctions and categories cognized and perceived in the non-verbal world are not utilized or realized linguistically. The semantic component includes exactly those aspects of real-world perception, cognition and motivation that are encoded linguistically by the mature speaker of a language. This includes both the extension (referent, reference) and the intension (meaning, concept) of a word. The semantic component not only includes the referent and conceptual meaning of a word, but also the role that the referent plays in the utterance. That is, does the linguistic element represent the agent, the location, the action, etc., in the utterance? The role of the argument in the utterance more broadly reflects the role of the referent in the event of which it is a part.

The pragmatic component includes the speaker's perception of verbal and non-verbal context, and his use of particular language structures as they relate to a specific referential situation. This component therefore draws upon the speaker's cognitive structuring of events and entities in the non-linguistic world. It also includes his or her knowledge of how particular linguistic structures function in the discourse as well as the speaker's motivation or communicative intent. Another important aspect of the pragmatic component is the speaker's repertoire of paralinguistic communicative behaviors (e.g. gesture and eye-gaze). Both the speaker's communicative intent and the content of the message (semantics) play a role in communication; thus, both the pragmatic and the semantic components must be accounted for in an accurate representation of linguistic communication.

The last three components are those which Chomsky (1980) has labeled computational: syntax, morphology and phonology. Syntax is the set of rules for combining morphemes; morphology concerns the set of rules governing grammatical word formation; and phonology is the set of rules responsible for the system of sound patterns in the language. In this chapter, we shall not concern ourselves with morphological or phonological development.

We see all of these components as having structure. Structure is not the exclusive province of syntax and semantics. Furthermore, we see a strong relationship between the pragmatic and syntactic components, such that utterances sometimes violate 'correct' grammar to reflect the informational structure of the referential context (Greenfield and Dent, 1982). Syntactic structure is generated partly by abstract rules, and surface production is strongly influenced by the pragmatic context. The linguistic representation of the cognitive structuring of the referential situation is the province of semantics, connecting the word and the world; pragmatics is its particular manifestation in any given situation or context.

A consensus is growing among researchers that the initial achievements in language acquisition, especially prelingually and during the one-word period, are primarily pragmatic and semantic. Cognitively, the child has acquired a sensorimotor structuring of the world, concepts later utilized by the semantic

and, in a more abstract form, syntactic component (Greenfield and Smith, 1976; Golinkoff, 1981). Also during this period, the child begins to acquire a lexicon, linguistically encoding these cognitive structures. Pragmatically, at the one-word stage, the child is harnessing his or her previously acquired communicative knowledge to decide what facet of a given situation should be lexicalized. A linguistic component is developing in the context of the child's preexisting ability to communicate (Bruner, 1975; Snow, 1977; Stern, 1974).

Initially, meaning is rooted in particular contexts of the outside world and the child's use of language is heavily context dependent. Gradually, as the child's internal representational ability develops, meaning becomes decontextualized and the child's internal representations achieve independent identity. The first words are the beginning of the semantic component, where a child's sensorimotor schemes are being differentiated and expressed lexically. These first one-word utterances are rooted in the physical situation and seem to be heavily dependent on the child's existing pragmatic abilities to communicate.

With the advent of two-word utterances, the child begins to express linguistically additional facets of the communicative act, thereby embarking on the explicit linguistic expression of pragmatic and semantic relationships. This step raises the question of continuity and discontinuity in the course and process of language acquisition. Is the two-word sentence a direct outgrowth of the one-word period or does this transition reflect the onset of a new and different, possibly syntactic, cognitive faculty? If there is a distinct syntactic faculty, does it appear full blown, or is it, too, the result of a process of gradual growth?

Using a variety of data sources, we will show that some components of a child's first two-word utterances, especially pragmatic and semantic behaviors, can often be found in a child's earlier one-word productions. In this context of pragmatic and semantic continuity, we see the gradual development and integration of a new phenomenon, syntax. From the beginning, it has its own devices—rules of word order—that are not reducible nor directly transferable from the pragmatic or semantic domains. With growing development, the number and complexity of the formal means for realizing complex structures (e.g. the conditional, Reilly, 1983, and syntactic reorganization, Bowerman, 1982) that cannot be reduced to semantic or pragmatic concepts increase. The autonomy of the syntactic component increases as we see an increased ability for syntactic manipulation, as with the passive construction (Beilin, 1975).

Of equal importance to the partial independence of the syntactic component is its interaction with the semantic and pragmatic domains which provide content and dictate rules of usage for the syntactic forms. Thus, the early two-word utterances of English-speaking children do not only observe English word order; they also order cognitive categories which have been lexically realized. And the precursors of these (semantic) categories can be

found prelinguistically in the repertoire of the baby and from the child's growing ability to manipulate semantic categories at the one-word stage. Thus, concepts such as agent, action and object around which the child has structured perception since pre-verbal infancy, and which have, one by one, received linguistic expression in the one-word period (Greenfield and Smith, 1976), now are the categories of two-word combinations (Bowerman, 1973; Brown, 1973). In other words, the rules for ordering the categories in English specify that agent precedes action, action precedes object, and so forth, at least in canonical sentences. Despite early proposals that the categories underlying two-word speech are abstract and purely syntactic (e.g. McNeill, 1970), Bowerman (1973) and Brown (1973) made convincing cases that abstract syntactic categorization at the two-word stage is not justified by the data.

Those who believe in a totally autonomous syntactic component might at this point raise the following objection. Adults understand and use more abstract syntactic categories; for example, they can form and understand sentences in which the subject is not an agent, or where the agent does not precede the object because it is not the subject of the sentence. An example of the former is *The book is on the table.* An example of the latter is *The senator was slandered by a newspaper reporter.* There are a number of solutions to this problem. Fillmore's (1968) case grammar can be taken as a model for one such psychological solution: the syntactic category of subject of sentence, for example, is the product of a linguistic transformation operating on semantic categories such as agent and object. Thus, we would say that, at the two-word stage, the child has not yet acquired such transformations. However, this solution does not really agree with the recent research which indicates that certain semantic roles have a privileged position in the learning of abstract syntactic structures. DeVilliers (1980), for example, has found that the process of learning the passive transformation begins with sentences which have a prototypical agent in the role of subject and gradually extends to other cases. This finding indicates a semantic core to abstract syntactic structures, and is quite harmonious with Schlesinger's view that 'the semantic relational categories of the child's system gradually grow into the more general grammatical categories of the adult system through a process of "semantic assimilation"' (Matthei, 1983, p. 920).

Other evidence that there exists a semantic core to abstract syntactic categories is present in the finding that when adults are asked what kind of noun makes the 'best' subject, they begin with animate nouns that could function as agents. Similar results are found for other categories (Gvozdev, 1961). This indicates that, although all members of a category may have the same privileges of occurrence in a given syntactic construction, from the point of view of ontogenesis and of performance, there is semantic influence. These

findings suggest that the development of the syntactic component is not totally autonomous, but is affected by the semantic domain.

This view accords very well with, and is influenced by, current knowledge of cognitive processes. In the area of categorization, Rosch and her colleagues have shown that, in general, human categories are not homogeneous but are structured around a central core of 'best examples', with members organized as a gradient of increasingly less typical instances (Rosch, 1973; Rosch and Mervis, 1975). Similarly, findings of Piaget and others in cognitive development recognize the increasing ability for abstraction as development proceeds. It is in accord with this view that the semantics of the child's early grammar should reflect concrete notions, based on point-at-able concepts such as agent and action, which none the less form the basis for the more abstract version to come. This parallels the way in which sensorimotor development forms the basis for the more abstract and symbolic stage of concrete operations which, in turn, forms the basis for the still more abstract stage of formal operations in Piaget's scheme. As in the present proposal, Piaget posits partial isomorphism between levels, with new possibilities appearing at each level because of the more powerful abstractions available. Curtiss *et al.* (1979) have presented case studies to demonstrate the partial autonomy of syntax from other aspects of cognitive functioning. We believe that, as a domain of knowledge, grammar is partially autonomous and may have some special locations in the brain, stemming from its own special source. Nevertheless, there are general processes which govern functioning throughout the brain. These should include principles of categorization and memory as well as developmental limitations. Even with the partial autonomy of syntax, there is no reason to think that its acquisition and use would not utilize and be constrained by such processes. Indeed, this is a basic assumption behind the work on the learnability of grammar.

Let us now return to the two-word stage and the appearance of word order rules, knowledge that is special to syntax and not reducible to the semantic and pragmatic domains. What is its developmental source? We find that this syntactic component, while distinct, does not suddenly appear intact, but begins to develop in the later portion of the one-word period.

Strategy of Approach

The bulk of this chapter will be concerned with the relationship of one-word speech to the child's subsequent two-word utterances. We will explore this relationship by looking at the history of specific lexical items and their use at the one- and two-word periods. We will also look at constructional processes in microdevelopment. These are visible in sequences where the child uses material in one conversational turn to create new structures in a later turn.

Finally, we will compare how the same pragmatic situation is linguistically realized at the one- and two-word periods. Our overall goal is to use the same set of concepts to examine what is added and what remains constant at the one- and two-word stages of language development. This goal satisfies two more of Atkinson's conditions for a successful theory of language development: it must use the same set of concepts at all developmental stages and later stages must either add new elements or involve the removal of constraints. Our findings involve the combination of these two developmental processes.

This chapter is unique in trying to satisfy Atkinson's last condition: the description of a learning mechanism. The general mechanism we will present is a constructive one. In this process, over a period of turns, the child mirrors in microdevelopment the same sequence which is occurring over larger periods of time and throughout his linguistic system. This constitutes the change from the first stage—single words—to the next—two-word sentences. While the general idea of construction holds in different instances, we will see in the examples, not one, but many types of constructional processes. However, before we look at the data, it is necessary to clarify our position on the function and nature of one-word speech.

One-word utterances are the linguistic realization of one aspect of a communicative act; other aspects of the child's message are encoded non-verbally, with gestures, with eye-gaze, and with the use of the situational as well as the linguistic context. In this sense, the child's one-word utterance does not in any way reflect an entire situation or the entirety of his or her intentions; we reject the notion of a 'holophrase'. Rather, one word is encoding one aspect of the situation and it is used in conjunction with a variety of non-verbal and other-initiated linguistic supports. For example, a child, who has eaten bananas before, sees them where they are always kept on the counter. The child reaches up, looking intently at the banana, looks at mother and then back at the banana and says *nana*. In this case the child's prior knowledge of bananas, gaze and reaching behaviors all are used to express a desire or volition to have this certain object, a banana. Thus, these early messages are complex communicative structures with one element linguistically realized, in this case the object of the child's volition, the banana.

The word a child chooses to use in a particular situation often reflects what is the most effective, given the child's limited lexicon, the child's intent, and the particulars of the non-verbal situation. In stating that the one-word utterance is encoding one facet of a situation, one must rely on behavioral evidence to know how much of the non-verbal situation is being perceived by the child. This evidence includes eye-gaze, gesture and action. For instance, a child hears a door open, orients to the sound, looks at the person passing through the door, and names the person. The visual behavior indicates that

the child is not merely perceiving the named person, but is also aware of certain aspects of the person's activity.

At times the single word may be part of a complex situation; at other times a simple one. The term 'pragmatic' is meant to isolate those aspects of the situation that are perceived in relation to the particular communicative intent and content of a given message. It is not meant to include everything the child is capable of perceiving and conceiving in the particular situation.

In this view, there is both a competence and a performance aspect of pragmatics. The competence aspect is that the child can express so many varied communicative functions; it also includes the knowledge that allows the child to choose the appropriate speech act, pronouns and paralinguistic behaviors given the particulars of the situation. Pragmatic performance is the child's actual productions. Because we shall be looking at real data in this chapter, we shall be concerned primarily with performance rather than competence *per se*. However, we take the child's competence to be revealed by the amalgamation of performances in a number of particular situations.

Plan of the Chapter

This chapter is divided into two sections, both of which investigate relationships between a child's earlier monomorphemic productions and his or her later two-word utterances. The first half is based on naturalistic observational data from one child, Kate, the daughter of the second author. The second section is based on a naturalistic experiment conducted by Greenfield, Leaper and Baker. Drawing from two research traditions provides the opportunity to examine more subjects, and allows us to approach the material from different perspectives, yielding a broader and, hopefully, more accurate picture of a phenomenon.

Our goal in both cases is to discover ways in which the new developing syntactic component, reflected in these new two-word utterances, interacts with the child's existing pragmatic and semantic framework. The emphasis in section 1 will be on learning mechanisms that bring the child from the one- to the two-word stage. The emphasis in section 2 will be on principles of lexical selection, the relation between the structure of the communicative act and its linguistic realization in the one- and two-word periods of language development.

1.   LEARNING MECHANISMS

Synthetic vs. Analytic Processes

Some researchers have focused on the processes that individual children use to make the transition from one- to two-word speech. For example, Scollon

(1979), Greenfield and Smith (1976) and Branigan (1976), have suggested that successive single-word utterances are used as a transitional mechanism to two-word utterances. This can be classified as a constructive or building-up process. The contrasting side of this process is where children produce unanalysed sequences and later break them into their component parts which are then used independently in combination with other lexical items. These are similar to MacWhinney's amalgams (1982) and Johnson's (1983) frames. These two complementary processes (build-up constructions and amalgam analysis) have been summarized by Garman (1979) as *synthetic* or *analytic* approaches on the part of the child.

Structural vs. Functional Continuity

Some investigators have suggested functional continuity between the one- and the two-word stage (Greenfield and Smith, 1976; Barrett, 1982). We place ourselves in the functionalist camp, even though Barrett (1982) puts us in the structural one (with McNeill, 1970). It seems to us that his error comes from the confusion between pragmatic structure and syntactic structure. While we differ from others in the field in assigning more structure to the pragmatic component, we do not equate this component with the syntactic one. We see pragmatics feeding into syntax, but not replacing it. Their relationship is one of partial isomorphism and interaction. Indeed, as mentioned above, the syntactic component contains new constituents such as abstract rules of word order that cannot be reduced to any structure in the pragmatic component.

Relating now the synthetic process of construction (build-up sequences) to the issue of continuity, we see that, in fact, the synthetic processes provide evidence for functional continuity. The semantic and pragmatic functions expressed as two successive single-word utterances (occurring either across speakers or within the same speaker) at the one-word stage are, at the two-word stage, expressed in a new form: the sentence, following the rules of English word order. There is continuity of all functions with the addition of a new form.

The analytic processes (amalgam analysis), on the other hand, indicate that even the new syntactic form of the two-word sentence has a thread connecting it to the one-word period. The multi-word amalgam is an unanalyzed multimorphemic phrase that functions as a one-word unit; one or more of its elements cannot be used separately or recombined. Nevertheless, its superficial form is that of the sentence. It therefore constitutes one formal root of the syntactic rule to come and, as Dore *et al.* (1976) have noted, constitutes a bridge to the two-word stage. In addition, there is a prelinguistic prosodic root. Many investigators have reported the phenomenon where a child utters a series of nonsense syllables within a single, sentential intonation contour.

Thus, the combination of word-like phonological units under a single intonation contour is another aspect of the sentence form also present before the sentence itself. Our thesis is that the two-word stage represents the integration of previously separate strands, particularly syntax with semantics and pragmatics. Indeed, it might not be too far off to speak of the one-word stage as the integration of the semantic and the pragmatic components, the dawning of representation itself. The two-word stage then consists of integrating the syntactic component into the preexisting semantic/pragmatic framework.

Multiple Roots, Multiple Strategies

In the following sections it will become even clearer that there is not one, but many developmental roots of the full-blown two-word sentence. Different aspects of communication and different utterances at the one-word period presage different elements of two-word speech. Late in the one-word period, these roots become constructional strategies for making the transition from single-word speech to sentences. While certain children may indeed demonstrate a preference for certain transitional strategies, many children use a variety of approaches reflecting different aspects of language itself and the complex nature of language development.

In these sections we will draw from the diary and videotape data of one child, Kate, to demonstrate the various relationships between her one- and two-word utterances. A diary was kept from birth to 4 years and videotapes were recorded monthly from 6 months to 24 months.

In Kate's data we have found four distinct behaviors used in the transition from one- to two-word speech. The first two are constructional strategies used by the child. These satisfy the requirement of identifying learning mechanisms. The first such mechanism is sequential synthesis, a building-up process; and the second, a breaking-down process complementary to the first, is amalgam analysis. Although others (e.g. Garman, 1979) have discussed build-up and analysis as separate and distinct processes, they often occur together and interactively. Similar behaviors, expecially the break-down and build-up sequences, were also found by Weir (1962) in Anthony's presleep monologues. These, of course, do not serve a communicative function, but it is interesting to find the same process in a practice or play context.

In addition, each of these strategies for making the transition to syntax build on the semantic, conceptual and pragmatic development that has taken place earlier in the one-word period. To demonstrate the relationship of these processes to earlier semantic and conceptual accomplishments, we will compare the use of relevant lexical items in early one-word utterances and later strategies for making the transition to two-word speech.

Analytic and Synthetic Strategies Used Together

Nearing the final stages of the one-word period (22–23 months), Kate was using a variety of unanalysed multimorphemic utterances, similar to Mac-Whinney's (1982) amalgams and Johnson's (1983) frames. Sometimes, the entire phrase was completely new. For example, in response to either the doorbell or the phone ringing, she would call out: [agedit] (gloss: I'll get it) as she ran to answer it. None of these four potentially separable adult morphemes (I future get it) had yet occurred individually. In other amalgams of Kate's, e.g. [baytyu] (gloss: I'm going to bite you), bite had been productive in isolation for several months, but you had not yet occurred in isolation or in other combinations.

Example 1 shows the breaking down of a partial amalgam. The break-down process comes after an initial build-up sequence from a single-word utterance to a two-word sentence. While the build-up is the result of the adult's question More what?, the subsequent break-down into recombinable elements occurs in the context of Kate's self-initiated repair. In the final step, a new constituent is substituted into the two-part matrix.

(1) Kate (1 year; 10 months: 1;10) was sitting in her highchair eating walnuts:

Kate:	[ba]/
Adult:	[ba], what?
Kate:	[ba]/
Adult:	More?
Kate:	[ma]/
Adult:	More what?
Kate:	[ma] juice/
Adult:	(starts to hand Kate a juice cup)
Kate:	No! (whining)
	[ma] juice/
	[ma]/
	[ma] nuts/
	[ma] nuts/

A history of earlier combinations involving more will explain exactly how more juice is an amalgam. At 1;10 the following combinations had appeared with more: [ma] juice; [ma mˇk]; [ma] soda. Even though Kate had used more as a single-word utterance to request the continuation of activities and additional food as well as beverages, her first combinations seemed limited specifically to these three beverages. It was as if she had three separate amalgams or a frame with more + in which only these three nouns had occurrence privileges. Thus more juice could be called a partial amalgam. The child is able to make a few sentences without a general syntactic rule.

In the first example above, we can see how Kate uses sequential turns and other-initiated repairs to build up from a single- to a two-word utterance. However, when she finally produces the longer utterance, ma juice, it turns out to be a transitional amalgam which evidently does not reflect her intent.

That this is so, is clear from her strong rejection of the juice cup. It takes Kate three additional turns to retrieve and produce the appropriate noun. This example shows the use of successive turns in discourse, or repairs, to construct the longer two-word utterance, and then in subsequent turns, the breaking down of the apparently frozen longer production in order to substitute the appropriate constituent.

Self-initiated Build-up Sequences

In the previous example the build-up sequence was elicited by the mother's request for more what?, but as Scollon (1979) and Reilly (1981) have indicated, a child makes use of his or her own turn in much the same way; these are called self-initiated repairs. This strategy was a frequent phenomenon in Kate's discourse; often she used an additional turn to introduce another major constituent as in example 2. This is similar to Braine's (1973) description of replacement series.

(2) Kate (1;11):
    do-it/
    do-it/
    Katie do-it/

In this case, do-it is a type of amalgam with object incorporation. This is typical of Kate's transitive verbs and is counted as one morpheme. Confirmation of this hypothesis appeared when Kate began to produce the object as well and retained the it as in:

(3) Kate (2;0) banging on the door:
    Open-it door!

Semantic and Pragmatic Roots in Single-Word Utterances

The synthetic and analytic transitional strategies utilize semantic and pragmatic knowledge acquired in the one-word stage, before transitional phenomena were observed. For example, Kate had been using the word [ma]~[ba] for more from the age of 15 months, 7 months before example 1 above. She used it to request the continuation of a game, to request or demand additional food or beverage, and by 1;8 she could negate the morpheme [ba] by shaking her head when she produced the utterance as in example 4.

(4) Kate (1;8) eating and asking for more:
                [ba:]/
    Mother: No, you can't have any more/
    Kate: (negative head shake) [ba:]/

This last example also shows another transitional phenomenon: a word is combined with a conventionalized gesture, forming a two-element message. This occurs 2 months before the first two-word combinations with *more*. Whereas the combination of word with action or non-conventionalized gesture is all pervasive in the one-word period (Greenfield and Smith, 1976), the use of head-shaking represents a new advance in that it is also more detached from the child's own activity than the conventional gesture of pointing. Whereas pointing seems to grow out of the activity of touching an object, head-shaking has no such ties to the child's own activity *vis-à-vis* an object. Werner and Kaplan (1963) emphasize the detachment of symbol from referent as an essential aspect of language development. Thus, this example can be seen as a constructional strategy whereby the child puts together two conventional symbols and prepares the way for the coming two-word stage.

Build-up Motivated by Frustrated Communicative Intention

Build-ups also occurred when there was some stress or frustration involved, such as when Kate wanted something from her brother and her one-word utterance was not effective:

(5) Jamie has a recorder which Kate wanted.
    Kate (1;11): [toen]/ (turn)
                  [toen]/
                  Katie [toen]/

In the above example, the child egocentrically assumes herself as subject in the first turn. Two weeks earlier, in the reverse situation, she did not make this assumption and was able to produce the two-word utterance on the first attempt:

(6) Jamie: Can you ride your motorcycle over to me?
    Kate: (rides over to Jamie and gets off):
            Jamie [toen]/

This is an example of a functional push to two-word utterances provided by informativeness. As Miller (1979), Greenfield and Smith (1976) and Greenfield (1982) have pointed out, the child tends to take herself for granted. In the early stages of language, the presupposed information remains unstated, leading initially to [*toen*], a single-word utterance. Only when the communication does not have its intended effect, does the reference to self get added. In the second example, however, the agent is not the self, and so it is verbalized from the outset, yielding a two-word utterance. (Although these particular examples do not demonstrate a new achievement, it is interesting to see what motivates the child to supply additional information; more will be said about this in the second part of this chapter.)

Build-up sequences or repairs, both self- and other-initiated, continued after Kate was producing a fair number of two-word utterances, and this process continued to be a productive strategy in practising new structures in her later grammar (Reilly, 1981).

Dialogue as a Constructional Process

While we have been emphasizing the variety of strategies used by a single child in making the transition from one-word speech to syntax, there is an important type of synthetic strategy which Kate did not use. This was the build-up of a multi-word proposition in dialogue, what Ochs *et al.* (1979) call propositions across speakers. What our earlier study (Greenfield and Smith, 1976) had shown was that two-person discourse, to which the child contributes but a single word, later becomes internalized and appears as a two-word sentence. This can be either a microdevelopmental process, occurring over a few minutes, or a macrodevelopmental process, occurring over a few months. As an example of the former, Nicky's mother asks *Do you want the dance record?* Nicky, 19 months, 29 days old replies, *No!*. A few minutes later, his mother asks, *Do you want to listen to it?* and Nicky replies *No record.* It is as if the sentence elements were available in the earlier dialogue in which mother supplied *record* and Nicky supplied *no;* the proposition 'no record' was expressed in a two-person form. Now, it seems as though the mother's role in constructing the proposition has been internalized and the child takes both roles in creating the two-word sentence *No record.* This is a very Vygotskian strategy in which an interindividual construction precedes an intraindividual accomplishment.

Matthew, the other child in the study, provides a nice example of dialogue construction as a macrodevelopmental strategy for the acquisition of syntax. About 2 months after his first two-word sentence, at 17 months, 18 days, Matthew says *Bye-bye Yaya* (Lauren) after he and his mother have returned from taking his sister Lauren to nursery school. We find the dialogue antecedent to this sentence in one-word speech 6 weeks earlier: his mother says, *We're going bye-bye and get Lauren.* Matthew responds *Bye.* Mother says, *Yea, bye-bye*; Matthew answers *Lala* (Lauren). In this interchange, the mother (P.M.G.) first provides a multi-word model that includes both *bye-bye* and *Lauren*. Next, mother and child cooperatively construct the proposition with mother supplying *bye-bye* and child his sister's name. Six weeks later the child does the whole thing himself in the form of an early two-word sentence. Here there is a gradual progression from mother doing it all to cooperative venture to independent sentence. It is exactly as Vygotsky would have predicted.

Because this particular strategy for making the transition to sentencehood was not used by Kate, it is important to emphasize that not all children use the same strategies, even though many children use a variety. There is variety

both between and within children. In any case, the construction of two-word utterances through dialogue is but one variety of the class of synthetic strategies which we have described.

Structural Growth within Semantic Constancy, Semantic Growth within Structural Constancy

In addition to the first two processes, synthesis and analysis, the third and fourth transitional processes concern the balance of form and function: structural growth in the context of semantic constancy and semantic growth in the context of structural constancy.

The single situation of size comparison provides the pragmatically constant arena for demonstrating that, within a given context, the child can work on only one new aspect of language at a time. We see here that syntactic growth and semantic growth are distinct processes and, in a given domain, do not occur simultaneously.

By the age of 1;9, Kate had both words *big* and *little* in her lexicon and used them productively. It was clear from her usage that she perceived they had some semantic features in common:

(7) Mother: D'you want a banana?
    Kate: [maena]/
              [biyt]/ (big)
    Mother: You wanna a big banana? (handing whole banana to Kate)
    Kate: [biyt]/
              [biyt]/
              [lilə]/ (little)
              [lilə]/
    Mother: Is it big or little? ·
    Kate: [biyt]/

At 1;11, Kate began to make explicit size comparisons using the same semantic and syntactic means; her utterances were still only one word in length and utilized the same vocabulary. In this particular instance, Kate was playing with a Russian wooden doll, the type which is composed of several dolls of graduated size, each one fitting into the next largest. Kate picked up the largest doll and said *[biyk]* (gloss: big). Then she picked up a smaller doll and placed it by the first one, commenting *[lilə]* (gloss: little). This example seems to represent a basically conceptual advance in the use of *big* and *little*. In this particular situation, she used neither *baby* or *doll,* both of which had been productive since age 1;5.

Two weeks later, Kate was coloring, using broken crayons. She lined them up in a row on the table:

(8) Kate (1;11.15):   big one/
                       little one/
                       big one/

In this second situation, Kate is again comparing like elements of differing sizes, a conceptually similar activity. In this instance, however, she has syntactically enriched her previous utterance by adding the proform, *one*. The new form adds syntactic complexity, but is semantically empty. It is not until 2 weeks later, when another comparative situation occurs, that Kate, now somewhat more proficient syntactically, can add the next step semantically. She now produces two full content words as opposed to her earlier 'content word + proform':

(9) Kate (2;0) untying bows on mother's bathrobe:
                       big bow/
                       little bow/
    Mother: (reties bows and only larger one shows)
    Kate: big bow/

This set of examples, using the constant situation of size comparison, demonstrates conceptual advance, followed by the emergence of the syntactic component in the shift from one- to two-word utterances. The first two-word utterances indicate how the child is limited to one advance in complexity at a time; she increases syntactic complexity without simultaneously adding semantic complexity. Rather than two full content words, Kate opted for a proform or place-holder, *one*. It was not until 2 weeks later that a semantically full second constituent was substituted for the proform. It is almost as if the noun phrase node is being expanded laterally and then the lexicon can be later called upon to fill in the slot. This is similar to the presyntactic devices found by Ramer (1974) and Dore *et al.* (1976), except that in Kate's case the proform she used is a full and independent morpheme also functioning in the adult model as a place-holder. Ramer's devices were, in contrast, 'presyntactic', empty phonological forms. These examples of size comparison show that the child is focusing on one aspect of communicative development at a time, first conceptual (playing with the Russian dolls), next structural (example 8) and then semantic (example 9). Within the context of a very specific situation, Kate appears not to make advances on these fronts simultaneously. Rather, she builds on old knowledge and uses preexisting structures, both semantic and formal, to experiment in new areas. This phenomenon is neatly embodied in Slobin's adage, 'New forms first express old functions and new functions are first expressed by old forms' (1973, pp. 183–184).

The next examples further illustrate the third transitional behavior, structural growth in the context of semantic constancy, and they offer additional confirmation of functional continuity between the one- and two-word stage.

Kate produced some of her first two-word utterances with no practising, no repetition and no apparent effort. If we look closely at the situation in which they occurred, however, we often find contextual or situational stability. For example, at 1;10 Kate was in her highchair and had evidently finished eating:

(10) Kate tugging at her bib:
  [biyb af]/ (bib off)
  [biyb af]/

If we look back in Kate's diary, the first mention of *bib* was recorded 2 months earlier in the following vertical construction:

(11) Kate (1;8) pulling at bib:
  biyb/ (bib)
  af/ (off)

In example 10, then, it appears that Kate is producing an entirely new two-word utterance, 'out of the blue' as it were, whereas in fact she had in the very same situation used the same words, singly, 2 months previously. These are the 'vertical constructions' or sequences described by Bloom (1973), Scollon (1979), Greenfield and Smith (1976), and Ochs *et al.* (1979). However, we have added here an important missing link in the argument that such vertical constructions are a source of later two-word utterances. It is clear that in both situations the child has the same communicative intention and uses the same semantic means to achieve it. The only thing that remains to be added at the later point is the linking of the two words under a single intonational contour. It is again a case of syntactic growth in the context of pragmatic, conceptual and semantic constancy.

A similar event occurred at 1;9. Kate heard the little boy across the street crying:

(12) Kate (1;9) Tophie [saet]/ (sad)
      [saet]/
      [wayiŋ]/ (crying)

The first turn in example 12 is one of Kate's first two-word utterances, and she produced it on the first occasion with neither hesitation nor apparent effort. However, for the previous 5 months she had said *Tophie* any time she heard him crying or yelling outside. And several weeks previous to her production of example 12, she started commenting *[saet]* (sad) whenever she heard or saw a baby or child crying. So, once again, the child's language seems to grow incrementally and integratively. These last two examples suggest that the practice afforded by an earlier build-up of meaning through sequential production can result some time later in an apparently effortless

integrative two-word production. It is interesting that at the one-word stage when that same situation occurs—a child cries—there is no record of vertical construction. Thus, it seems as though the constructional process can be either microdevelopmental, occurring in the space of a few minutes, or macrodevelopmental, spreading over months of time.

CONCLUSIONS

As Brown (1973) pointed out, what is of interest to a child at the one-word stage continues to be important to the child at the two-word stage; children talk about the same semantic relationships at the one- and two-word periods. That is, there is functional continuity during these periods. As we have seen, early two-word utterances utilize old vocabulary for identical semantic functions; there is constancy in the semantic component. Further, the early two-word utterances continue to express similar facets of a given stiuation, with the additional flexibility of a two-constituent utterance. This implies pragmatic continuity. The primary achievement in the transition from one- to two-word speech is structural and occurs in the growth and development of the syntactic component.

With these various examples from Kate, we have tried to show that one child uses several different approaches to make the transition from one- to two-word speech. We are positing these strategies as learning mechanisms which help the child move from one stage of language development to the next. We have seen the construction of two-word utterances using a synthetic build-up sequence, and we have seen the analysis and substitution in frozen amalgams. Both these processes occurred in the context of discourse. We see discourse as the context mediating the integration of the child's semantic abilities of the one-word stage with his or her burgeoning syntactic component.

Equally important is the relationship between the earlier and later utterances. We have found a balance in the growth of form and function; we have found functional continuity which in turn allowed the child to produce longer structures, as in the initial size comparison example. Then, once the two-word utterance stabilized, the child was able to incorporate additional semantic information.

That there appear to be distinctly different routes or threads relating one- and two-word speech indicates that there are, in fact, a variety of co-occurring processes during this stage of language development, reflecting the incredible complexity of language. In order for a child to make the rapid progress that she in fact does, growth in a multiplicity of areas must be occurring simultaneously. An account that attempts to explain the transition from single-word utterances to the first sentences in terms of any single process,

either structural or functional, must therefore be insufficient and inaccurate.

Several themes continue to run through our data. One which we have mentioned several times is the balancing of form and function. The independent rates of growth and spurts which occur, suggest that these aspects of language, formal structures and their meanings and use, have independent roots but come together via discourse as the child learns to integrate the various individual streams. This is not dissimilar to the position Vygotsky (1962) put forth 50 years ago that language and thought have different roots and the two come together in word meaning.

Another recurrent theme is subsequent linguistic representation of earlier pragmatic and semantic concepts and processes. In our data we have discussed functional (semantic) continuity in the transition from one- to two-word speech. This same phenomenon occurs prelingually in discourse situations. Infants and their mothers establish joint reference or topics using non-verbal means, such as eye-gaze and gestures (Bruner, 1975). Once the child has language, he or she participates in these same pragmatic behaviors, but now uses linguistic means to realize them (Scollon, 1979; Ochs *et al.*, 1979). Similarly, sensorimotor infants are constructing relational concepts such as agent, action and object (Greenfield and Smith, 1976; Golinkoff, 1981). Such relations form the content of later messages in which the child combines a single word with non-verbal elements (Greenfield and Smith, 1976). Still later, these same relations are realized in two-word utterances in which the linguistic elements follow the rules of English syntax.

The last point we would like to make is that discourse, while not sufficient to supply the child with the whole of language, does indeed afford him or her an ideal context to practise, to experiment, thereby supporting the transition from one- to two-word speech. Discourse is, in fact, the input data from which the child makes hypotheses about his or her native language; it affords the first opportunities for contingent responses to the child's language and, finally, it is in the child's own discourse that the child actually enacts and creates the links between individual words through successive single-word utterances. What remains to cross the threshold to sentencehood is the internalization of English word order and the ability to place more than one word in a single intonational envelope.

2. ANOTHER ASPECT OF FUNCTIONAL CONTINUITY BETWEEN ONE- AND TWO-WORD SPEECH: INFORMATIVENESS AND PERCEIVED VARIABILITY

Thus far, we have considered functional continuities in underlying meaning and communicative intention, accompanied by changes in form as the child moves from one-word to two-word speech. In considering the relation

between the pragmatic and semantic components, we find that while the communicative act may have several elements, only one is linguistically realized at the one-word stage, two at the two-word stage. From a linguistic point of view, the message at both the one- and the two-word stage is composed of both implicit and explicit elements. The 'implicit' elements are, however, generally explicit from the point of view of the pragmatic component for they are expressed by means of non-verbal communication. In this way, a certain selection has taken place as to which elements will receive linguistic realization in the message. Is there a principle governing this semantic selectivity within the constraints of a given communicative act and propositional content? If so, does the same principle operate as children make the transition from single-word utterances to syntax? Understanding this selectivity is crucial to specifying the relationship between the semantic and pragmatic components.

According to the principle of informativeness (Greenfield and Smith, 1976; Greenfield, 1978; Greenfield and Zukow, 1978), children use their language to encode variability in the environment. This variability manifests itself in the form of alternatives, change or novelty in a given referential situation. Relatively constant features of the environment, constituting old or redundant information, are, in contrast, taken for granted and go unspoken. External variability is one determinant of internal uncertainty (Berlyne, 1974). Thus, the principle of informativeness predicts the verbal expression of uncertain rather than certain information.

Miller (1979) expresses the same idea in a different way: 'the distribution of explicit and implicit information ... can be described as a rule-governed behavior: certain pragmatic conditions determine what the child perceives as being redundant information and thus may remain implicit' (p. 75).

This analysis reveals the cognitive roots of presupposition and assertion in linguistics. What is constant, old or redundant tends to be linguistically presupposed. What is changing, novel, or one of several alternatives tends to be linguistically asserted. At the stages of linguistic development under consideration here, presupposed information is simply omitted. Later, when sentence structure becomes more complex, linguistic devices such as pronominalization marking presupposed or old information are added to omission as ways of dealing with presupposed information.

Recent developments of this concept of informativeness (Greenfield, 1980a; Greenfield, 1982; Leaper, 1982) draw upon an understanding of selective perception (i.e. attention). The child's perceptual processes direct attention to the most variable aspects of an event. Selective perception becomes the basis for selective word use; the child verbalizes that aspect of the situation to which he or she is attending. The connection between attention and reference has been noted by several investigators (e.g. Atkinson, 1979; Kagan *et al.*, 1978; Neisser, 1976; Ochs *et al.*, 1979).

Greenfield and Zukow (1978) carried out the first systematic test of the informativeness principle at the one-word stage. In their study, elements fulfilling various semantic functions, such as agent, action or object, were scripted into a series of actions in a particular task. Scripted verbal description by the mother accompanied each step of the task. For example, the mother would roll a ball into a tube and declare *Mommy makes the ball all gone.* Because the mother linguistically realized all elements of the action situation—agent, object and change of state—the child had all three available to imitate. Since, however, the child was at the one-word stage and could only imitate one, the test was to see which one was selected for linguistic realization. What we found was that the child consistently expressed the single most informative element from both the sensorimotor event and the parent's description. In this example, the displaced object, the ball, was expressed rather than a more constant and therefore less informative element such as the agent, the child's mother. As Miller (1979) points out, the mother is, in many routine situations, taken for granted as an agent; the child sees no alternative agent in the context and therefore does not put mother as agent into linguistic form. A longer, later example of this phenomenon from our data shows how the informativeness principle has characterized word selection beyond the one-word stage as well.

(13) Kate (2;2):   Took Daddy office/
     Mother: You took Daddy to the office?
     Kate: Mommy took Daddy office/

Similarly, Weisenberger (1976) found that young children's telegraphic utterances tended selectively to encode 'new' information, while omitting 'old' information that was obvious from the non-verbal situation or redundant with previous discourse. Wieman (1976) also studied children's telegraphic utterances and observed that they used stress selectively to emphasize new linguistic information. Such findings are further corroborated by observations that adults' speech also accentuates variability, while omitting the obvious or unchanging (Greenfield, 1982; Greenfield and Dent, 1980; Rommetveit, 1968; Vygotsky, 1962).

Miller (1979) looked at children using three-word utterances and found that message elements assumed from an egocentric perspective tended to be omitted. The children did not mention themselves or their present location, even when it was an implicit part of the message. This results in utterances that are shorter than the children's maximum production. Example 5, above, illustrates this point. When Kate says *[toen]* alone, without specifying herself, she egocentrically assumes herself. However, 2 weeks earlier, in a situation where it was not her own, but another person's turn, she could not make this assumption and was able to produce the two-word utterance on the first

attempt (see example 6). This is an example of a functional push to two-word utterances provided by informativeness. At the transitional stage represented by example 5, the self is pragmatically presupposed (a term originated by Bates, 1976), leading initially to *[toen]*, a single-word utterance. Only when the communication does not have its intended effect, does the reference to self get added. In example 6, however, the agent is not the self, and so it is verbalized from the outset, yielding a two-word utterance.

While parallel results at the one- and two-word stages regarding the role of variability and informativeness have been found, the conclusion of continuity cannot be drawn with assurance because such continuity had, up to now, never been tested longitudinally. Longitudinal study of this question is one of the main purposes of the data to be presented shortly.

Many other questions remain to be answered concerning the role of semantic selectivity and its relationship at the one- and two-word stages. For example, the above review implies that it is always the new information that is expressed linguistically, even if message length expands. Yet Bates (1976) proposes that whereas a one-word message presents new information only (the comment part of a topic-comment structure), the two-word sentence combines new information with old, providing topic as well as comment. However, this view is not supported by our data. For instance, example 13, above, indicates that even a three-word utterance can have an unspoken topic that is egocentrically assumed. The three-word sentence represents an expanded comment more than a topic-comment structure.

Miller's view, in contrast, is more compatible with the observation that all elements in a two- or three-word sentence represent the more variable or novel elements in the situation. Miller claims that sentence length at the two- and three-word stages is controlled by the number of variables perceived by the child. If fewer elements are seen as constant and 'obvious', sentences will realize more such uncertain elements, and sentence length will be correspondingly longer. Given this phenomenon, will a situation that elicits a single word at the one-word stage elicit but a single word at the two-word stage? Such a result would imply that the simpler types of situation, having but a single locus of variability, tend, more than more complex situations, to elicit speech at the one-word stage. Another way of understanding this possible result is that young children cannot cope with the linguistic realization of more complex situations when language development is just beginning. On the other hand, if most situations that elicit speech at the one-word stage elicit word combinations at the two-word stage, this would indicate either that a redundant element was being linguistically expressed or that situational complexity (number of variables) was not a limiting factor for linguistic expression at the one-word stage.

We conducted a study to examine the nature of continuity in the selection function from one- to two-word speech. Utterance choice was examined

longitudinally by looking at children at the one-word stage and then again 6 months later when the same children were making frequent word combinations. Our longitudinal investigation examined the influence of non-verbal patterns of variability and constancy on the child's language use. We intervened by constraining the parents' verbalizations, so that, unlike in the earlier study (Greenfield and Zukow, 1978), old and new information in the accompanying linguistic context could not play a role. Instead of having mothers describe their actions, we had them say things like *Look at Mommy; can you do that?*, which helped orient the child's attention, but did not verbally describe the event. Hence any tendency to use speech, either single- or multi-word utterances, to mark variability would be attributable to the perception of variability in the non-verbal context.

Most interesting for longitudinal analysis were identical situations which elicited speech at both the one- and the two-word periods. The analysis which follows is based on the small subset of the corpora for which this condition held.

Method

Two boys, Ben and Chris, and two girls, Kitti and Catherine, participated in the study. All children came from English-speaking, middle-class families of different ethnic backgrounds and resided in the Los Angeles area. The children were initially selected for their use of one-word utterances (mean length of utterances (MLUs) 1.0–1.3). They were then followed up several months later, once frequent word combinations were being made (MLUs 2.0–3.5). Table 9.1 indicates the respective ages and MLUs for each child at the two points in time. Ben, Chris and Kitti had very similar productive proficiencies at both times. All three were truly at the one-word stage at the beginning with MLUs of 1.0. Catherine, however, was already making some two-word utterances and had a MLU of 1.3. Later in time, Ben, Chris and Kitti's same MLU of 2.0 reflected a combination of one-word and multi-word utterances. The multi-word utterances were typically comprised of only nouns and verbs. This was in contrast to Catherine's MLU of 3.5 which included fewer one-word utterances and more modifiers.

A preliminary interview was conducted with one or both of the parents to assess each child's existing repertoire of spontaneously used words and semantic functions. Following the interview, a script of tasks was designed individually for each child, whereby all scripted elements in the tasks were presented in the child's existing vocabulary and repertoire of semantic functions. Thereafter, this script was used for the procedure during both the first and the follow-up sessions. These sessions consisted of the mother modeling each step of a scripted task as she coaxed her chld to 'Do what I do'. The mother's language was limited to these requests for imitation. Otherwise,

Table 9.1 Ages and mean length of utterances (MLU)

| | Point 1 | | Point 2 | |
	Age	MLU	Age	MLU
Ben	1;6	1.0	2;3	2.0
Catherine	1;8	1.3	2;3	3.5
Chris	1;5	1.0	2;0	2.0
Kitti	1;7	1.0	2;0	2.0

her actions were carried out non-verbally. Thus, the possible confounding effect of the verbal context that accompanied Greenfield and Zukow's (1978) study was limited. For example, one script involved the movement of a toy car up and down a ramp. The use of this script necessitated the availability of the semantic functions of agent, action, object and location as well as the corresponding vocabulary items such as *mommy, up, down, car* and *wood*.

The sessions were videotaped, and the verbal and non-verbal contexts associated with each child's utterances were transcribed for both sets of data. Existing and changing stimuli in the child's environment were described in the transcription. The semantic function—the role that an element has in an event (see Greenfield and Smith, 1976)—was coded for utterances that occurred during the scripted routines. These included AGENT, the animate instigator of the action identified by the verb; ACTION or STATE; OBJECT, anything represented by a noun that is affected by the action or state identified by the verb; INDICATIVE OBJECT, a word that refers to the object of some indicative act; LOCATION; and OBJECTS ASSOCIATED WITH ANOTHER OBJECT OR LOCATION, the naming of an object that is not present in connection with an object or location that is present.

Two coders mutually agreed on instances in which similar situations had stimulated speech at both points in time. Table 9.2 provides a transcript of these comparisons. Although it is impossible to create two identical contexts, the two situations in each case are similar in the composition of action roles and relationships.

The comparison utterances at the earlier session (Point 1) were examined for their adherence to the rules for informativeness (see Greenfield and Zukow, 1978, for a description of these rules). This analysis constitutes a baseline replication of the earlier studies of the role of perceived variability or informativeness at the one-word stage (Greenfield and Smith, 1976; Greenfield and Zukow, 1978; Greenfield, 1982). All together, the four children provided a combined corpus of nine comparison utterances at Point 1 and eleven at Point 2. Chris produced six utterances at Point 1; each type of

Table 9.2 Transcripts

Point 1	Point 2
	CHRIS
I. [Sliding down ramp] *Slide/*	[Climbs up ramp] *Up/* (Makes car noise)

II.   [Pushes toy bug down ramp]
    Down/
    [Pulls toy bug up ramp]
    Up/Up/Up/Up
	[Pushes toy truck down ramp]
	Down wood/Down wood/Down wood/
	
	[Pushes toy truck up ramp]
	  Up/

[Pushes toy bug down ramp] *Down/*	[Pushes toy truck up ramp] *Up a wood/* [Pushes toy truck up ramp] *Up/Up a wood/Up a wood/*
III. [Trying to get down from box] *Down*	[Goes up ramp] *Chris up a wood/* [Goes up ramp] *Chris walk up/*
IV. [Lifts, holds ball in air] *Up/*	[Throws block in air] *Up/*
V. [Takes apple juice bottle from mother and turns to show it to her]	[Takes empty jar from researcher]

situation was associated with one or more utterances at Point 2. Ben, Kitti and Catherine produced one pair of comparison utterances each.

    A situation that elicited speech during the first observation rarely offered a comparison utterance when the event was repeated at the follow-up session several months later. The children would often verbally respond to a situation at one time and not at another. Furthermore, while both observations involved the same scripted set of tasks for each child, it was common for the children to stray from a task. The difference between what was scripted to occur (e.g. put rocks in a jar) varied between observations; this tendency also limited the size of our language sample. Although the corpus is small, it is unique in the way the specific referential contexts are similar across time.

Table 9.2 continued

Point 1	Point 2

Apple?/
    [Shakes bottle]
    Apple ba (Bottle)/
 	
    [Drops bottle]
    Apple bottle/
	Juice/

	KITTI
VI. [Puts rocks in bottle] *Juice/*	[Puts all rocks in jar] *More rocks?/*
	CATHERINE
VII. [Mother turns pages of book to 'ring-around-a-rosy' picture and points to it, Catherine looking at it] *Rosey ashes/*	[Turns pages of book to picture and points to it] *Big bad man/*
	BEN
VIII. [Sees banana for first time]	[Sees banana for first time, reaches for it, but father withdraws it]
Nana/ [Later reaches for it]	*Nana/*

Note. Non-verbal context is provided in brackets in the transcripts. When no agent is mentioned in bracketed description, the agent is the child. Parentheses indicate an English gloss.

Results and Discussion

The informativeness principle at the one-word stage

The children's one-word utterances from the Point 1 corpus adhered without exception to the informativeness principle. For example, an explicit rule of informativeness is that, in a situation involving a speaker acting on an object in hand, the change of state rather than the object (or agent) will be expressed (Greenfield and Zukow, 1978). As Miller (1979) puts it, the child takes his or her own situation for granted, including self as agent and object in his or her possession. When Chris says *up,* pushing a toy bug up in one case, lifting a

ball up in another, we see examples of this rule in operation. Table 9.3 presents a detailed analysis of this, as well as all the other relevant utterances from Point 1.

Functional continuity

The corpus shows strong support for the functional continuity of the informativeness principle. Even though the corpus is small, it should be remembered that this is not a sample, but is, rather, the totality of utterances produced in parallel situations during the observation period at both stages.

Table 9.3 Adherence of Point 1 utterances to informativeness principle

CHRIS

I.   [Chris slides down a ramp.]

slide

Applicable principle: 'When the speaker is acting, the self as agent is taken for granted, and the action receives verbal expression ... the agent is a constant while the action represents a change in the situation' (Rule 6; Greenfield and Zukow, 1978, p. 302).

Semantic prediction: ACTION (*slide*)
Semantic alternative: AGENT (*Chris*)
Agreement with principle: YES (see discussion in the text).

IIa.   [Chris pushes a toy bug down the ramp.]

down

Applicable principles: 'When an object is in the speaker's possession or is being acted upon by the speaker, it is generally taken for granted through its connection with the self. Its identity is not in question, and it will, therefore, go unexpressed. When the object is being acted on, uncertainty will inhere in the change of state, which will be expressed' (Rule 2; Greenfield and Zukow, 1978, p. 302).

Semantic prediction: ACTION (*down*)
Semantic alternative: OBJECT (*bug*)
Agreement with principle: YES

IIb.   [Chris pulls the toy bug up the ramp.]

up

Applicable principle: 'If, in a sequence of events, the object remains constant while the action varies, the action will be given verbal expression' (Rule 11; Greenfield and Zukow, 1978, p. 303).

Semantic prediction: ACTION (*up*)
Semantic alternative: OBJECT (*bug*)
Agreement with principle: YES

Table 9.3 continued

III.   [Chris tries to get down from a box.]

down

Applicable principle: Same as for utterance I.
Semantic prediction: ACTION (*down*)
Semantic alternative: AGENT (*Chris*)
Agreement with principle: YES

IV.   [Chris lifts and holds a ball in the air.]

up

Applicable principle: Same as for utterance IIa.

Semantic prediction: ACTION (*up*)
Semantic alternative: OBJECT (*ball*)
Agreement with principle: YES

V.   [Chris takes a juice bottle from his mother and looks at her.]

apple?

No *a priori* rule was developed to cover the use of the semantic function, Object Associated with Another Object. However, the subsequent two-word expansion, 'apple bottle' (see Table 9.2), indicates the semantic alternatives. An extension of the rule that applied in utterances IIa and IV (Greenfield and Zukow's Rule 2) is necessary: 'When an object is in the speaker's possession or is being acted upon by the speaker, it is generally taken for granted through its connection with the self. Its identity is not in question, and it will, therefore, go unexpressed.' The alternative element in the relationship, here Object Associated with Another Object, therefore is expressed verbally. The fact that the object (apple juice) is not present makes this element all the more uncertain and its verbalization informative.

KITTI

VI.   [Kitti puts rocks in a bottle.]

juice

No *a priori* rules were developed for 'make-believe' assertions. However, the imaginative quality of Kitti's assertion that, in shaking rocks she is shaking juice, makes juice the least certain element in the situation and therefore the most informative to express verbally.

CATHERINE

VII.   [Catherine's mother turns to 'ring-around-a-rosy' picture, says 'See?', and points to it. Catherine looks at the page.]

rosey ashes

No *a priori* rule was developed which would cover this case. However, it fits the principle because the new information in the situation is the picture which has just changed. Catherine's way of labeling the picture is by quoting two words from the nursery rhyme that presumably corresponded with the picture.

Table 9.3 continued

This label thus takes the form of a pure PERFORMATIVE—an action performed by words. The picture here functions as the object of the indicative actions of pointing and looking. Indicative action has just been verbally encoded by Catherine's mother, who says 'see'. Thus, indication becomes old information on the verbal level, leaving the indicative object as the new information for Catherine to verbalize.

BEN

VIII.   [Ben sees a banana for the first time, and later reaches for it.]

(ba)nana

No *a priori* rule covers this utterance. However, it fits with the principle that a novel stimulus will tend to be named (Greenfield, 1982). In so far as the banana is also an object of volition, the prediction would be that the object would be verbalized rather than the volition because the child would egocentrically take his or her own state of desire for granted (Greenfield and Smith, 1976).

Chris A review of Table 9.2 will show that most of Chris's Point 2 comparisons corresponded closely to expressions at Point 1. Two utterances from Point 1 (the two examples of *up*) are almost exactly the same at Point 2. The two repeated events involved in these comparisons are pulling a toy up a ramp, and throwing or lifting an object into the air.

In example V, the Point 2 utterance is a different word that has the same semantic function as the Point 1 utterance. During both sessions Chris received a potential juice container and verbalized an associated object: *apple* at Point 1 and *juice* at Point 2. The semantic similarity of the utterances at the two points is confirmed by Chris's next utterance at Point 1; he says, in a two-word utterance, *apple ba* (bottle), as he shakes the bottle. On the next turn, he comes up with the correct pronunciation, saying *apple bottle*. Note that we have here an example of a constructional process in which a single-word utterance on the first turn (*apple*) is expanded on subsequent turns to a two-word utterance (*apple bottle*).

The comparison from example I is linguistically ambiguous and presents an interesting methodological problem. At Point 1 Chris says *slide* while sliding down a ramp. At Point 2 he climbs up the ramp and says *up*. One possible interpretation is that he has expressed the same semantic function (action) by means of a different utterance at the two points in time. This interpretation rests on the assumption that *slide* was being used as a verb. However, *slide* could also function as noun, to label Chris's new location.

This linguistic ambiguity is resolved by the behavioral evidence, supported by his word use at other points in the session. Behaviorally, it is clear from the videotape that Chris is not focusing on the slide as a physical object, but is totally involved in his action of sliding. Also, at other points, when he does refer to the slide as a physical object, he calls it *wood* (it is in fact made of a plank of wood). Thus, at both times, Point 1 and Point 2, while moving on the slide, a single word referring to the child's action is produced. As Table 9.3 indicates, action rather than agent would be predicted because it represents the change in the situation. According to Miller (1979), children not only take themselves for granted as agents; they also egocentrically assume their present location. Hence, Miller would make the additional prediction that a single-word utterance in this situation would not refer to location; and this is exactly what we find.

All of the other examples involve the same semantic function at both points in time, incorporated with an expansion at Point 2. The examples include not only the same semantic function, but also the same word at both points in time. For instance, where Chris says *down,* pushing a toy bug down a ramp at Point 1, he expands it to *down wood* at Point 2. As predicted by the rules (Table 9.3), in these examples, the most variable element/or the newest element at both points in time is reference to action or change of state: the child egocentrically takes self as actor or takes object in his possession for granted and therefore leaves it unexpressed. Instead, he verbally expresses the action, the area of greatest change in the situation. What is added in the expansions is the location of the action (*down wood* as he pushes the toy truck down the ramp, *up a wood* as he pushes the toy truck up the ramp). Essentially this involves adding the second most variable element in the situation. The ramp as a location has been recently introduced by the mother and, from the child's perspective, is certainly more novel or 'newer' than the child as agent, or the truck as object in hand, other semantic possibilities for linguistic expansion. Thus we find expansion on the side of new information rather than adding the old information, as Bates (1976) implies. Two-word utterances constitute an expanded comment rather than a topic-comment structure, as has commonly been thought. As in one-word speech, there remains an unspoken topic, the truck in this particular example.

Example III also presents comparisons where the Point 2 utterance includes the same semantic function (action or change of state) as the Point 1 utterance, although, because the situation is slightly different, it is expressed by a different word; it also occurs in the context of a multi-word utterance. At Point 1, Chris said *down* when trying to get down from a box. The two parallel utterances at Point 2 were (1) going up a ramp: *Chris up a wood,* and (2) repeating the same action: *Chris walk up.* These expansions add an element not seen before in the shorter, two-word utterances: expressing self as agent. In the first example, *Chris* is relatively 'new' information, marking a

change in the situation, as he had just made a truck go up the ramp. *A wood is*, however, 'old' information linguistically, as well as non-linguistically, as Chris had just commented that the truck went *down wood, down wood, down wood.*

In the second example, *Chris walk up,* the structure of new and old information in the situation is the same. This time the old information, the location, is omitted. In addition, a word coding action-process (*walk*) is added to that coding change of state (*up*). Thus, the action component is differentiated by the addition of the word referring to 'walk', the more constant, less changing of the action's two components. The fact that both of these longer sentences contain relatively 'old' information—location in the first example, agent in the second—indicates that it is with the arrival of three- and four-word utterances that the more presupposed information becomes verbally explicit. This conclusion is supported by Miller's (1979) observations of children learning German as well.

Kitti   Kitti offered one comparison. In the earlier session, Kitti said *juice* after putting rocks in a bottle, while at Point 2 she said *more rock?* after putting all the rocks in a jar. Both utterances describe a characteristic of the object. *Juice* does so with a fantasy description, *more* does so with a quantifier. *More rocks?* at Point 2 adds some older information, for the rocks are a known quantity. Here is an instance, relatively unusual in the Point 2 corpus as a whole where the two-word utterance constitutes a topic-comment structure.

Catherine   Catherine's speech was substantially more advanced than that of the other children in the study. Her MLU is greater at both points (1.3 vs 1.0 at Point 1; 3.5 vs 2.0 at Point 2). Catherine also offers only one comparison, and it involves parallel multi-word utterances in similar situations. At Point 1, her mother turns the pages of a nursery rhyme book and points to a picture illustrating the nursery rhyme, 'Ring-around-a-rosy', and Catherine, looking at it, says *rosey ashes*. In the later session, Catherine turns the pages of a book and points to a picture of a man and says *big bad man*. In both situations, Catherine's speech functions to label a particular picture, one among many that are visible as the pages of the book are turned. In the first example the two-word label takes the form of a pure performative, an action performed by words. In the second, it has expanded to three words and is in the form of a complex description.

Ben   Ben's one comparison suggests functional continuity for the informativeness principle. At both points, he sees a banana for the first time, reaches for it, and names it (*nana*) (although at Point 1 the reach occurs a bit later). In both cases, the novel stimulus has been verbalized. In both cases, too, the

object of the child's desire or volition has been verbalized rather than the less informative state of volition (e.g. *want*).

Structural change

Often the utterances at Point 2 represented more complex linguistic structures than the corresponding utterances at Point 1. Using standard English word order, they expressed explicitly some of what was implied in the single-word utterance. It is probably more accurate to say that they expressed linguistically what had previously been expressed by non-verbal means or was available from the situational context.

It is notable that all the multi-word utterances conform to standard English word order. Whereas the various forms of perceived variability continue to influence selection of semantic functions, this pragmatic constraint does not influence their syntactic arrangement.

Miller (1979) has made parallel observations for the transition from two- to three-word speech, noting the addition of self-reference, for example, as the child's egocentric assumptions wane. Miller attributes such expansions to the child's increasing awareness of contextual alternatives that must be linguistically rendered unambiguous. However, it is hard to distinguish such developments in non-verbal aspects of cognition from developments in linguistic forms which make the longer, elaborated utterances possible.

The most important point to note about all of these expansions is that the least variable, oldest, most obvious information is generally still omitted in the two-word utterances. Somewhat 'older' information appears in three- and four-word sentences. Even here, though, the information often still refers to situational elements where alternative possibilities exist (e.g. when Chris refers to himself as going up the ramp, a toy truck and toy bug have used the ramp previously). There is both continuity and change in the semantic selectivity at the two points in time. There is continuity in that points of greatest variability continue to be emphasized through linguistic expression. There is change in that, as sentences get longer, relatively less variable or novel elements of the situation are linguistically realized. The child is no longer limited to mentioning the single most novel, changing or informative element.

The overall finding from these four children is that the principle of informativeness continues to characterize children's word choice at the two-word stage. The operation of this principle yields utterances that are usually informative from the listener's point of view—even though the child probably does not have the listener's point of view in mind—because the child avoids the old, the redundant and the obvious. In so far as the listener's point of view matches the child's—which it often does at the early stages of

language development when talk is of the here and now—the listener will not be exposed to the old, the redundant and the obvious.

In particular examples, the principle of perceived variability yields consistency in children's verbal encodings of situations that are repeated after several months: when an utterance constructed at a later time is compared with one constructed in an earlier, similar context, the semantic function expressed in the one-word stage is generally expressed again at the later point in time.

It is interesting that the situations that elicited verbalization at both the one-word and the two-word period sometimes resulted in only single-word utterances at Point 2, even though two-word sentences were the rule in the children's speech at that time. Our hypothesis is that this is because these situations were scripted to have only one variable element. Thus, the use of a single-word utterance, when one is capable of longer sentences, functions to reflect a referential situation in which there is not much new or variable information and much is taken for granted. Similar observations at the two-word stage have been made by Weisenberger (1976), Leonard and Schwartz (1978) and Miller (1979) for humans and by Greenfield and Savage-Rumbaugh (1984) for chimpanzees. This might well motivate the adult use of single-word utterances as well, as some of Vygotsky's (1962) and Rommetveit's (1968) examples indicate.

However, our data also contain some examples which go against this thesis. In essentially the same situation of pushing the truck up the ramp, Chris at one point produces a one-word sentence (*up*), at another point a multi-word utterance (*up a wood*), and at still another point, a one-word utterance followed by a multi-word expansion (*Up/Up a wood/Up a wood/*). The number of novel or variable factors in the situation appear to remain constant, yet utterance length varies. This series of examples shows that factors other than the number of variable factors in the context exert an influence on utterance length.

GENERAL CONCLUSIONS

The transition from one- to two-word speech involves constructional strategies whereby the child takes familiar elements—conceptual, pragmatic, semantic and phonological—and puts them together (or takes them apart) in a new way. This process yields a new syntactic form, the two-word sentence which conforms to the rules of English word order. This represents a qualitative change from the one-word period and a new component in the child's language system. The leap from one- to two-word speech is achieved in the context of the child's preexisting semantic and pragmatic communicative framework via discourse interaction. We have presented evidence suggesting that, in each domain, a child is limited to working on one new piece of the

language puzzle at a time, and so tends to take small steps. We have also shown that, although a child may prefer a certain approach, individual children have access to a variety of processes to bridge the transition. Although the syntactic component reflects a new type of linguistic knowledge, our data have shown that syntactic innovation occurs in an environment of pragmatic and semantic continuity. An important aspect of the pragmatic continuity as the child moves from single words to syntax is the use of language to mark variability. Analysis of this use reveals an important principle of development. The use of single-word utterances at the two-word stage often occurs in a situation that has only a single variable element. Thus, an earlier stage, the single-word utterance, does not disappear with further development. Instead it becomes, at the later stage, an alternative means of expression, with its own specialized function.

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