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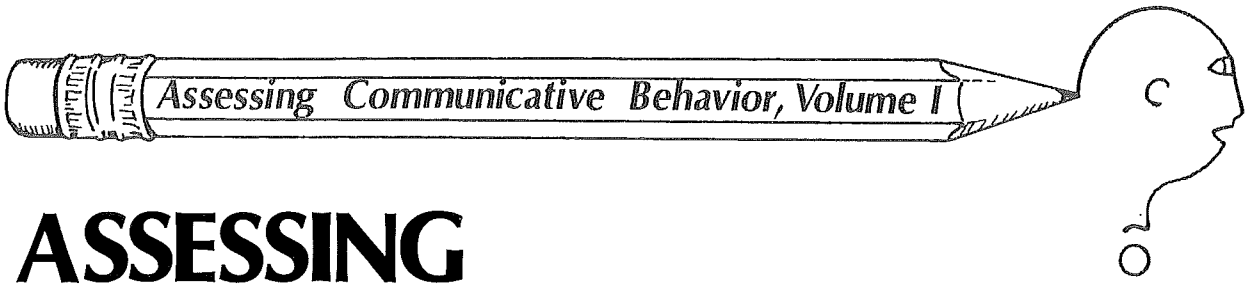

ASSESSING LANGUAGE PRODUCTION IN CHILDREN

EXPERIMENTAL PROCEDURES

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learned from the ASS. First, all the analysis supports the conclusion that the child is structurally delayed and not just uncommunicative. His sentence structures are consistently simple with relatively few falling above the level predicted by MLU. Second, we see some strengths: The child can produce well-formed questions. We might decide in planning therapy that questions would be an appropriate context in which to expand the child's use of auxiliary forms and verb inflections. Using a modeling approach, we might take the question forms he does have ("What's that?" "Does it. . . ?") and model the same forms with different verbs ("What are those?") or different question words ("Where is that?") and so on. The examination of ASS data gives us more than just a stage assignment. It allows us to interpret the child's performance and to infer strengths and weakness that will be relevant in prescribing a syntactic therapy program.

Analyzing Complex Sentence Development

by Rhea Paul

The complex sentence development charts (chapter appendix C, pages 67–71), which outline some milestones in development of complex sentence production, are based on an analysis of transcripts of the speech of 59 children between the ages of 2;5 and 6;11 who are engaged in 15-minute free-play sessions with their mothers. The mother-child sessions were videotaped and transcribed by Dr. Susan Wanska, who also calculated MLU for both the children and their mothers. Dr. Wanska was kind enough to make her transcripts and MLU calculations available for the analysis that led to the development of these charts.

In order to perform the analysis, the children were placed in five groups according to their MLU using 0.5 morpheme intervals: 3.00–3.50 (N=16), 3.51–4.00 (N=15), 4.01–4.50 (N=13), 4.51–5.00 (N=8), and 5.01–up (N=7). Each transcript was examined for the appearance of various forms of embedding, conjoining, and individual conjunctions. The proportion of subjects within each MLU grouping that used each form at least once was then calculated. The charts indicate the first MLU stage in which at least 50% of the children in a group used a structure. In some cases, the same structure reached usage by 90% of the subjects in a higher group. When this occurred, it is also shown on the charts. This procedure follows that used by Chapman (in preparation) to arrive at stage placements for simple sentence constructions.

Regression analyses performed on the data show MLU to be a better predictor of use of most types of complex sentences than either age or cognitive level. This result supports the conclusion that an increase in the use of different types of complex sentences is related to increases in MLU. Three types of embeddings were too infrequent to show a significant relation to MLU. These clause types are included in the charts but are marked with a dagger (†) indicating that although their use also increased with MLU, the increase was not statistically significant.

Two main classes of complex sentences are dealt with in the charts. Both types are mainly characterized by the fact that they contain more than one main verb. The first class consists of conjoined sentences. These are made up of two or more full sentences connected within one utterance, usually by a conjunction such as *and, but, so, before,* or *after.* In the early stages, however, some children may connect two sentences in an utterance without using any conjunction at all simply by juxtaposing the clauses without an intonation boundary. These sentences are also counted as conjoined. The charts show that children first join only two sentences or independent clauses. At a later stage, they can combine the two types of complex sentences, embedded and conjoined, within one utterance.

The second type of complex sentence, the embedded, contains a clause, that is, a sentence-like segment that contains a main verb, within a larger sentence. In embedded sentences, the clause is not independent, but serves as a constituent part of the main, or matrix, sentence. The clause may act as the subject, for example, as in "*What I'm doing* is writing." Often it functions as a direct object, as in "You can see *what I'm doing.*" The following types of embedding were found to reach the criterion of at least one use by over 50% of the subjects in the MLU grouping listed as the stage of emergence for that type on the charts:

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let's, let me:

These clause introducers appear to operate somewhat as unanalyzed catenatives do, and are therefore considered as forms rather than structures.

Example: *Let's* get in.
Let me see.

Simple infinitive clauses with equivalent subjects:

These include clauses marked by *to* in which the subject of the clause is the same as that of the main sentence. The subject of the clause does not usually appear, because it would be redundant. (This category does *not* include the catenative, or the semi-

auxiliary forms *gonna, gotta, wanna, hafta,* or *s'posedta,* which appear to function as unanalyzed wholes and are considered in the simple sentence analysis.)

Examples: He has *to move.*
I need new glasses *to read.*
I'll get the rocking chair for me *to sit on.*
I like *to hear that.*
It gots *to go down here.*

Full propositional complements:

These clauses contain a complete surface sentence. They usually follow a verb such as *know, wonder, guess, think, pretend, forget, say, mean, tell, remember,* or *wish.* The clause may or may not begin with *that,* but does not begin with a Wh-word.

Examples: I think *it is right.*
She said *that I can do it.*
Pretend *that's grass.*
I forgot *you need a truck.*

Simple non-infinitive Wh-clauses:

These clauses begin with a Wh-word such as *when, what, where, why, how, if,* or *like.* They do not contain the infinitive marker *to.*

Examples: See *if it can go on this track.*
He doesn't know *where he's going.*
Do it *like I do it.*
You know *what this is?*
That's *how you do it.*

†Infinitive clauses with different subjects:

The subject of the infinitive clause is not the same as that of the main sentence. The subject of the clause usually does appear.

Examples: How do you get *this to stay on?*
That's for *you to do.*
You want *me to wind it up?*
I got some more tea for *her to drink.*

Relative clauses:

These modify nouns. They can be marked by *which, who, that,* or *what* in child speech, but often do not contain any relative pronoun at all.

Examples: Could we take the pictures home *that we drew?*
Look at the big bubble *I made.*
They're boys *what you know.*

†Gerund clauses:

These contain *-ing* verbs. The *-ing* form must be part of a noun clause. The *-ing* adjectives, as in *Let's play with the stacking cups,* are not considered instances of gerund clauses for the purpose of this analysis.

Examples: I can almost climb up that high one without *climbing on the foot.*
I was trying to get this stuff off by *washing my hands.*
Look at *him moving around.*

Unmarked infinitive clauses:

These do not contain *to* in the surface sentence and are usually headed by *make, help, watch,* or *let.*

Examples: I'll make *the ball stay on that chair.*
You help *us do this.*
I'll let *you try.*
Watch *me run the train.*

†Wh-infinitive clauses:

These are marked by both a Wh-word and *to.*

Examples: Do you know *how to play it now?*
Tell me *when to start.*
I'll show *you what to do.*

Double embeddings:

An embedded clause is contained within another embedded clause, which is in turn embedded in a matrix sentence. One of these clauses may include a catenative.

Examples: I think *I know what this is.*
I'm gonna *let it go now.*
You hafta *try to find one like this.*

Each of the five MLU stages in chapter appendix C contains five sections. Section 1 shows the percentage of true complex sentences a speech sample at that stage will probably contain. The percentage of true complex sentences is calculated by dividing the number of complex sentences in the sample—*excluding* those that contain only the catenative forms *gonna, gotta, wanna, hafta, s'posedta, let's* or *let me*—by the total number of utterances. This percentage does not always change with every MLU increment, and cannot be used alone to determine stage assignment. It must be considered in conjunction with the other indices.

Section 2 shows the forms of embedding that reach criterion for each stage. The forms that are marked with an asterisk (*) at the 50% level will appear again at a later stage, indicating they are used by 90% of the subjects in a higher MLU group. Not every structure reaches 90% usage, however.

Section 3 deals with the appearance of conjoined sentences. It also shows when sentences that contain

both conjoined and embedded clauses within one utterance reach criterion. Examples of such sentences are: "I'm gonna erase it *'cause* I don't want *you to have a D for a head*" and "She had *to take him* 'cause he was a little bit shy."

Section 4 shows when specific conjunctions reach either the 50% or 90% criterion in the sample. Section 5 deals with the average number of different conjunctions that appear in the 15-minute samples. These are conjunction types, not tokens. If *and* appears six times in a sample, for instance, it is only counted once. There is quite a bit of variability among children within an MLU grouping on both these conjunction measures. Again, they should not be used alone to determine stage assignment, but only as a part of the overall picture of the child's language production.

The complex sentence analysis can be done along with the simple sentence procedure (ASS) outlined in chapter appendix B, or it can be done separately. For children with MLUs above 4.5, the simple sentence analysis will probably only provide a baseline level, and the analysis of the complex sentence will be the major factor in overall stage placement in most cases. For children with MLUs between 3.0 and 4.5, complex sentence analysis will most likely serve to supplement the simple sentence procedure. It is possible that even children with MLUs below 4.5 will show more evidence of linguistic growth in their complex sentence use than they do in simple sentences. When this happens it is up to the clinician to decide on which index—complex or simple sentences—to place the greater weight. A suggested procedure for using the complex sentence development charts to augment the analysis of the speech samples is shown below. Certainly other procedures are possible, and each clinician using the charts will develop the method he or she finds most efficient. The procedure suggested here allows most of the complex sentence analysis to be done concurrently with that of simple sentences. The step-by-step guidelines are not meant to imply that no other means of proceeding is valid. They are offered only as a way of familiarizing clinicians with material that may be new to them. (A sample worksheet for this concurrent analysis is provided in Table 10. To use it, one simply goes through the transcript, sentence by sentence, assigning both simple and complex utterances to the stage shown in the charts.)

Procedure for Using the Complex Sentence Development Charts

Step 1: *Decide whether to use the 50% or 90% criterion in assigning structures in the script to stages.* The 50% criterion is perhaps more convenient, since it is present for every item that appears on the charts. Some structures never reach the 90% level. However, the 50% level is more conservative. For any structure at the 50% level, obviously, half of the children in that MLU group *never* use it. The 90% criterion gives the child more of the benefit of the doubt, in that it gives him credit for a higher stage. The 90% level is perhaps the measure of choice when the clinician is deciding whether or not a child has a problem and does not want to risk calling him delayed when he may only be on the slow side of normal.

Step 2: *Identify each complex sentence in the transcript as you go through the sample assigning the simple sentences to stages.* Mark the true complex sentences so they can be counted later. Identify the form of each embedded or conjoined sentence. Then find the stage on the charts at which that form reaches the chosen criterion (50% or 90%). If a worksheet (similar to Table 10) is used, note the utterance's number beside the corresponding form on the worksheet. When the analysis is completed, the worksheet can be scanned to determine the stage in which the greatest number of utterances fall in order to make a stage assignment.

Step 3: *Identify each conjunction used in the sample.* Find the stage at which each one reaches criterion on the charts. Some conjunctions in your sample may not appear on the charts because they did not reach criterion in the data base. Mark the conjunctions that do appear on the charts in the appropriate stage on the worksheet.

Step 4: *Count the number of different conjunctions in the sample.* Count only the first appearance of each conjunction. Place the total number at the stage to which it corresponds on the charts. (Note that there is quite a bit of variability within each MLU group on the two conjunction measures.)

Step 5: *Calculate the percentage of true complex sentences (exclude sentences containing only* gonna, gotta, wanna, hafta, spozta, let's, *and* let me). Find the

Table 10. ASS / Complex Sentence Summary Worksheet

Name: _____ MLU: 3.20 Age: 41 months Number of Utterances: 136 Date: _____

Stage	Verb phrase elaboration	Negatives	Questions	Complex sentences
I	Unmarked V: 39 Absent aux: Absent copula:	no + NP not + VP	Wh: routines: *what, what do, where:*	Criterion: 50% 90%
II	Main V marked: *-ing* without *be:* Catenative alone: Copula appears: 53, 57	Neg→*no, not, can't, don't:* 39, 98	Wh: novel: 89	
III	Aux: present *Can:* 38, 99 *Will:* 56, 117 *Be:* 122, 133 Overgen'l *ed:* 5, 18	Neg→*won't:*	Wh: aux, without inversions: 14 *why, who, how:* Y/n: rising intonation: 118	
Early IV	Past modals: 5 *Be* + *-ing:* 94 Catenative + NP: 9, 24, 42, 53, 55, 56, 92	Neg→ pres. *be, can, will, do, did, does:*	Wh: *do* appears: Aux inverted: 19 *When:* Y/n: *do* appears: Aux inverted:	1. 1–10%: 2. Simple inf: 2, 3, 67 full: 4 *let's, let me:* Wh: 9 3. 2 conjoined: 5 4. *and:* 5. 0–4:
Late IV Early V		Neg→past *be,* past modal:		1. 1–10%: 2. Double embedding: 3. Conjoin and embed in one s: 4. — 5. 1–5:
Late V				1. 10–20%: 2. Inf. dif. subj. relatives 3. — 4. *if* 5. 2–6:
V+	past *be:* *Have* + *-en:*			1. 10–20%: 2. Gerunds: Wh-inf: 10 unmarked inf: 1 3. — 4. *because:* 5 5. 2–6:
V+ +				1. Over 20%: 2. — 3. — 4. When: *so:* 5. 6–8:

stage to which this percentage corresponds. (Note that there is some overlap.)

Step 6: *Assign an overall stage to the transcript by combining information from MLU, simple and complex sentence analyses, and 14 morpheme analysis.* Use either the usual performance criterion (the most frequent stage) or the acquisition criterion (the highest stage that appears), depending on the purpose of the analysis. If the acquisition criterion is used, be wary of relying on the two conjunction indices (Sections 4 and 5 on the charts) alone, because there is so much within-group variation on these two measures. If either of them falls above all the other indices, it is probably wise to choose the next highest stage as the level of emerging structures.

Sample Analysis

A 41-month-old child was the subject of the complex sentence analysis. (See Table 10 for a sample worksheet.) Her MLU was 3.20 and her speech sample contained 136 utterances. The analysis of her simple sentences, which also appears in the worksheet, places her at Stage III to Early Stage IV. A transcript of only her true complex sentences, upon which the complex sentence stage assignment of her speech sample is determined, is shown below.

Transcript of True Complex Sentences

1. Let you try.
2. She wants to get out.
3. She wants to have call by baby.
4. The doctor says that baby's crying.
5. Don't push that button-like thing 'cause that would. . . it operated.
6. I got go home now.
7. It gots to go down here.
8. It go fall down boom.
9. I don't know what it is.
10. You know how to teach this?

Analysis

Structure	Stage Assignment: (50% level)
1. Percentage of true complex sentences: 10/136 = 7%	IV-V
2. Forms of embedding:	
#1-unmarked infinitive clause	V+
#2-simple infinitive (also #3, 6, 7, 8)	IV
#4-full propositional clause	IV
#9-simple Wh-clause	IV
#10-Wh-infinitive clause	V+
3. Forms of conjoining: two clauses only (#5)	IV
4. Conjunctions used: *because*	V+
5. Number of different conjunctions: 1	IV-V

Using the usual performance criterion for overall stage assignment, in combination with this child's MLU and her stage placement for simple sentences, this child would be assigned to Stage IV. In order to decide whether this child has a language problem we refer to her chronological age, 41 months. Since this age falls within one standard deviation from the mean age predicted by her MLU ($\overline{X}$=34–37 months, ± 1 SD=31–41 months), since she is showing the emergence of some higher level forms (the conjunction *because,* unmarked infinitives, and Wh-infinitives), and since the conservative 50% criterion was used for assigning stages, one can feel confident in concluding that her language is developing at a rate that is within normal range.

SEMANTIC ANALYSES

As children grow older, they both expand and change the aspects of a situation that they choose to talk about. At the present time we have no single system that clearly reflects these changes. We have a patchwork of categories, some helpful for one kind of development and some for another.

In exploring the growth and change in meanings children express, it is important to be clear about the distinctions among semantics and the other developing systems with which it interacts. One such distinction is between the underlying concepts the child is acquiring as he or she grows (cognition) and the means for expressing these concepts in words (semantics). In this volume, we are primarily concerned with language assessment, and not the evaluation of intellectual development, which will be explored in a later volume in this series. For the present purposes, we will want to evaluate only the child's expression of meanings through language. Cognitive assessment is often useful in setting goals for language therapy, particularly in mentally retarded populations, since it helps us establish very general expectations for language performance. But in analyzing the semantic component of a child's language system we must know more than what meanings cognitive level would predict to be expressed. We must find out what the child actually can and does talk about.

Semantics is a very elusive subject because it overlaps so generously with both syntax and pragmatics. For example, many of the early semantic roles that have been studied in child language—agent, action, object, and so on—are both semantic and syntactic in that they not only characterize the meaning of the words that fill the slots, they represent something about their grammatical function as well. Agents are almost always subjects of sentences. And the consistent word order used in expressing these roles also reflects that the child knows more than meaning categories. The child knows these categories must be combined in a certain (grammatical) structure, or sequence, in order to express the desired meaning. Bloom and Lahey (1978) refer to these early semantic role combinations as "semantic-syntactic" relations. When we evaluate semantic performance in children we want to try to tease out the specifically semantic component of the grammar to as great an extent as possible.

Similarly, semantics and pragmatics overlap in that it is often very difficult to separate the meaning of a sentence from its use. Indirect requests, such as "Can you pass the salt?," are a classic example of this problem, since their literal meaning ("Are you able to pass the salt?") is not what the speaker intends the listener to understand by the utterance. In analyzing the semantic component of a child's production it is important to keep these problems in mind.

This section can only present a very limited introduction to the task of exploring a child's use of semantic knowledge. Many semantic taxonomies have been presented in the developmental literature, but little work has been done in applying these taxonomies to clinical populations as diagnostic tools. Nor is there at the time of this writing a clear developmental sequence for the acquisition of semantic expression beyond the period of Brown's Stages I or II. For these reasons we are unable to present clinic-tested semantic analysis procedures. All we can do is provide a framework for thinking about semantic development and refer the reader to some normative studies that may prove useful in setting up experimental analysis protocols.

De Villiers and de Villiers (1978) proposed a distinction between referential meaning and relational meaning in discussing semantic development. Referential meaning is that which concerns the primarily one-to-one link between words and the objects or concepts they stand for. Relational meaning has to do with the connections among concepts, words, and sentences.

Referential Meaning

For our purposes, referential meaning is primarily explored through analysis of the child's use of individual words. Two analyses might be used here, the type-token ratio, and semantic field analysis. The type-token ratio indexes lexical diversity. Templin (1957) presents a procedure for calculating vocabulary usage based on the *number of different words* produced in a 50-utterance sample and the *total number of words* produced in such a sample (see Table 11). The relationship between these two measures is calculated by dividing the total number of words used into the total number of different words. The resulting number is called a type (number of different word types used)-token (number of total word tokens used) ratio (TTR). Templin reports that for the 480 children she studied, ratios of approximately 1:2 (or a TTR of 0.50) occurred consistently across all age groups, sex groups, and socioeconomic status (SES). The consistency of this measure makes it enormously valuable as a clinical tool. For example, if a normal hearing child's TTR is significantly below 0.50 we can be reasonably certain the sparseness of vocabulary use is *not* an artifact of SES but is probably indicative of a language-specific deficiency.

Table 11. Calculating vocabulary diversity using type-token ratio. N = 480

	Different words		Total words		Type-token ratio
Age	Mean	SD	Mean	SD	(Different words ÷ total words)
3.0	92.5	26.1	204.9	61.3	0.45
3.5	104.8	20.4	232.9	50.8	0.45
4.0	120.4	27.6	268.8	72.6	0.45
4.5	127.0	23.9	270.7	65.3	0.47
5.0	132.4	27.2	286.2	75.5	0.46
6.0	147.0	27.6	328.0	65.9	0.45
7.0	157.7	27.2	363.1	51.3	0.43
8.0	166.5	29.5	378.8	80.9	0.44

From: Mildred C. Templin, *Certain Language Skills in Children.* Copyright © 1957 by the University of Minnesota. University of Minnesota Press, Minneapolis.

Type-token ratios are easy to compute from transcripts and provide a handy means of quantifying vocabulary. It is important to remember that TTRs can only be compared to Templin's data for children 3 through 8 years of age.

The following procedures for computing type-token ratios (Templin, 1957) should be followed as closely as possible to ensure that the data collected are comparable to Templin's.

I. Utterance sample (Templin, 1957, p. 15) Templin employed McCarthy's (1930) procedures in collecting speech samples. She used picture books and toys as stimulus materials in an adult-child interaction context. Fifty consecutive utterances were recorded (handwritten, on-line) after the child was comfortable and rapport had been established. Utterance boundaries were determined by a "natural break in the verbalization of the child."

II. Rules for counting number of words (Templin, 1957, p. 160)
   - A. Contractions of subject and predicate like *it's* and *we're* are counted as two words.
   - B. Contractions of the verb and the negative such as *can't* are counted as one word.
   - C. Each part of a verbal combination is counted as a separate word: Thus "have been playing" is counted as three words.
   - D. Hyphenated and compound nouns are one word.
   - E. Expressions that function as a unit in the child's understanding are counted as one word. Thus *oh boy, all right,* etc., are counted as one word, while *Christmas tree* is counted as two words.
   - F. Articles *the, a, an* count as one word.
   - G. Bound morphemes and noun and verb inflections are not counted as separate words.

III. Computing TTRs
   - A. Identify 50 consecutive utterances from the transcript, preferably the middle 50.
   - B. Count total number of words expressed employing the rules in II above.
   - C. Count total number of different words expressed.
   - D. Divide total number of different words by total number of words expressed. The result is the TTR.

Semantic field analysis provides another way of looking at the range of the child's vocabulary. Here we have no standardized procedure, but have to create a set of meaning categories for the words that appear in the transcript. We might use such categories as animals, people, vehicles, and buildings for nouns. Movement, existence, desire, etc., might categorize verbs. Modifiers such as adjectives and adverbs may be particularly enlightening in establishing the complexity of the ideas the child expresses. We would expect the expression of notions of duration (long, short), temporal sequence (first, last), manner (hard, loud), and distance (far, near) to be associated with relatively later cognitive development, certainly later than the period of Stage I–II semantic role combinations. If these notions are encoded by children with low levels of structural development, we could predict a discrepancy between their cognitive and linguistic performance. More generally, semantic field analysis gives us another way of talking about the diversity and complexity of the child's vocabulary in terms both of number of meaning categories and different words within categories.

Another aspect of referential meaning that can be explored is the expression of advanced notions of space and time. These notions are somewhat difficult to specify since it is often hard to identify them reliably in particular words or constructions.

The utterance "The car hit the bus" expresses an action that is ongoing or just complete if produced in the clinic room to describe a play event. The same utterance produced in response to questions may give evidence of comprehension of notions of time and space. For example, if the adult asks "What happened yesterday?" and the child responds, "The car hit the bus," he or she indicates that the request (what significant event happened on the preceding day) was understood. This request for information requires the understanding of the lexical time marker *yesterday* and the ability to recall and report the event referred to. The request "What happened

at Grandma's?" requires the child to understand that Grandma resides in a place other than the child's home, a generally spatial notion, to determine the reference to past time, and to recall the significant event.

The development of the ability to think and talk about events removed from the present is a complex sequence and has not been explored in detail developmentally. There is some evidence suggesting that children express spatial notions before temporal notions, noting immediate, present events before past events before future events. Specific lexical quantification of time—seconds, minutes, hours, days, weeks, months—occurs quite late in the preoperational or the early concrete operational period. The prepositional phrase, first used in English to express spatial notions, is later used to express time notions: "The car hit the bus on the bridge", "The car hit the bus on April 27th."

While temporal and spatial notions are difficult to quantify and interpret, they are important indicators of possible discrepancies between notions the child can conceive of and those the child can talk about. We would not expect a child whose productions are typical of Stage I syntax to express notions transcending the here-and-now. A child at MLU 1.71 produced the following series of one- and two-word utterances: *All done. Go home. Eat. TV.* This string could be interpreted in context to express that the child is finished with the present activity, wants to change locations, and in the new location wants to eat and then watch TV. The temporal and spatial notions expressed are far more advanced than the form used to express them. Stage I children generally talk about present, immediate events and produce successive single-word utterances usually marking characteristics of a single event. For example, *Man. Coat. Hat.;* meaning the man has a coat and a hat on. (The single-word period of development is described in detail in chapter appendix B.) This example comes from the transcript of a 4-year-old deaf child with an MLU of 1.71. While we cannot document the exact level of semantic development in this child, the expression of advanced semantic notions relative to syntactic form is significant for program planning. Clearly, programming should focus on developing appropriate grammatical structures to express the semantic notions within the child's repertoire.

In trying to investigate the child's knowledge of temporal and spatial relations in cases where we might suspect a discrepancy between grammatical and conceptual abilities, as with deaf children, the clinician can increase the chances of finding such notions encoded in a speech sample by introducing topics about absent objects and events. The judicious use of questions that request such information can be helpful if care is taken not to overload the interaction with adult requests for information.

Relational Meaning

In thinking about the semantics of relational meaning, we can conceive of at least three levels of analysis: intrasentence relations, intersentence relations, and contextual, or nonlinguistic, relations. At the intrasentence level, the most extensively studied aspect of semantic development is the semantic roles coded in children's early two- and three-word combinations (Brown, 1970, 1973; Schlesinger, 1971; Bloom, 1973; Greenfield and Smith, 1976; Retherford, Schwartz, and Chapman, in press). Although there are many relations children could talk about in 2-3 word sentences, it appears that they actually produce a rather restricted number. Brown (1973) presents a set of prevalent relations to look for in the speech of children in Stages I–II. The scheme used by Retherford, Schwartz, and Chapman (definitions of semantic categories are listed in Table 12) has been used to code the relations in the sample transcript, chapter appendix A. Careful consideration should be given to undertaking the semantic role analysis for children above Stage II because we have no developmental data to indicate what kinds of changes in roles encoded we should expect to see in normal children. If we encountered children with longer utterances still only coding the early relations found in Stage I–II and no others, we might suspect either a cognitive or cognitive/semantic disability, but we could not make a definitive diagnosis because there are no data on the normal acquisition of semantic roles to assure us that our suspicion is correct. If, on the other hand, a Stage I–II child is producing two- to three-word utterances but coding only a few of the relations the literature reports to be predominant, the expression of a broader subset of the early roles might be chosen as a target for therapy. And if children with MLUs in the Stage I–II range can be shown to be talking about manner, duration, frequency, causality, temporality, and other relations missing from the early lists we would want to explore their cognitive development to validate the hunch that the child's understanding of the world is more complex than his or her language structures indicate. This finding would also have important implications for programming, since our goal might then be to teach the child some more conventional means for expressing the ideas he or she already has in mind.

APPENDIX C
Complex Sentence Development

STAGE: Early IV **MLU: 3.00–3.50** **PREDICTED AGE: 34–37 MONTHS** **NUMBER OF CHILDREN IN GROUP (N) = 16**

Section	Development: Reached by 50%–90% of children	Development: Reached by over 90% of children	Example
1		Percent of TRUE complex sentences (excluding those containing catenatives: *gonna, wanna, gotta, hafta, s'posedta, let's,* and *let me*) in a 15-minute speech sample is between 1% and 10%. Both conjoined and embedded sentences are included.	When calculating percentage of complex sentences: *EXCLUDE* sentences like: The car's *gonna* crash. I *wanna* go home. We *gotta* work fast. I don't *hafta* play. *Let's* play fish.
2	*Simple infinitive clauses (not unanalyzed catenatives listed in #1) with subjects that are the same as that of the main sentence. The subject of the clause is usually deleted.		He *has to move.* She *wants to get out.* *Try to brush* her hair. Daddy *wanted to wear* shorts. He *likes to bite.* I *need to go.*
	Sentences containing *let's* or *let me*		*Let's* get in. *Let me* see.
	*Sentences containing full propositional complements, headed by verbs like *think, guess, wish, wonder, know, hope, show, remember, pretend, forget.* The clause may or may not be marked by *that.*		The doctor says *that baby's crying.* I think *we have some here.* Pretend *you said it.* You mean *the scooper goes* back of the bulldozer?
	*Sentences containing simple non-infinitive Wh-clause marked by *what, where, why, how, if,* etc.		I know *what we could play.* Look *how big I am.* Remember *where it is?*
3	*Sentences with two clauses conjoined		*Then it broke* and *we didn't have it anymore.*
4	*Conjunction *and*		Then it broke *and* we didn't have it anymore.
5	Number of different conjunctions $\overline{X} = 2, \pm 1\ SD = 0–4$		

STAGE: Late IV–Early V **MLU: 3.51–4.00** **PREDICTED AGE: 38–42 MONTHS** **(N) = 15**

Section	Development: Reached by 50%–90% of children	Development: Reached by over 90% of children	Example
1		Percent of TRUE complex sentences: 1%–10%.	
2	*Sentences containing more than one embedding (One of the clauses may include a catenative)		The tea is *gonna start to fall.* I *think* we *gotta pour* some lemon in it.
3	*Sentences containing both a conjoined and embedded clause (One may be a catenative)		It's *not a bulldozer,* ***'cause*** *it don't have something* ***to scoop.*** *He wants* ***to stay at his home today,*** and *I don't know why.*
4	No new conjunctions		
5	Number of different conjunctions $\overline{X} = 3$, ± 1 SD = 1–5		

STAGE: Late V **MLU: 4.01–4.50** **PREDICTED AGE: 43–46 MONTHS** **(N) = 13**

Section	Development: Reached by 50%–90% of children	Development: Reached by over 90% of children	Example
1	Percent of TRUE complex sentences: 10%–20%.		
2	†Sentences containing infinitive clauses with subjects different from that of main sentence		This is the way *to do it.* I want *it to go* chug-chug. Daddy made this *for me to sit on.* I can't get *this thing to move.*
	Sentences containing relative clauses (They may or may not contain *that* or *which*)		This kind is not the kind *that I like.* They're boys *what you know.* Where are the tracks *that belong to this?*
		Sentences containing full propositional clauses	I know *that we have some.* I think *we should go home.* Pretend *you said it.*
		Sentences containing simple non-infinitive Wh-clauses	I know *what we could play.* Remember *where it is?*
		Sentences containing more than one embedding. (One may be a catenative)	I *think we gotta* ***pour some lemon in it.***
3		Sentences with two clauses conjoined.	*Then it broke,* and *we didn't have it anymore.*
4	*Conjunction *if*		We always go outside, *if* it's not raining.
5	Number of different conjunctions, $\bar{X} = 4$, ± 1 SD = 2–6		

STAGE: V+ **MLU: 4.51–5.00** **PREDICTED AGE: 47+ MONTHS** **(N) = 8**

Section	Development: Reached by 50%–90% of children	Development: Reached by over 90% of children	Example
1	Percent of TRUE complex sentences: 10%–20%		
2	†Sentences containing gerund (-ing) clauses [Note: gerunds used as adjectives are not counted. The following sentences are *not* complex: These are *running* shoes. I have a *fishing* rod. The *stacking* cups are red.]		I felt like *turning it.* We could make it start *working* with this. Go *fishing.* They'll hear us *talking on the recorder.*
	†Sentences containing Wh-infinitive clauses		You know *how to make one.* I don't know *where to put the neck.* Show me *what to do.*
	Sentences containing unmarked infinitive clauses headed by *help, make, watch, let*		She made *him talk today.* Help *me pick these up.* I'll let *it go now.* Watch *me jump.*
		Sentences containing simple infinitive clauses with subjects the same as that of the main sentence	She wants *to get out.* Daddy likes *to wear shorts.*
3	No new forms of conjoining		
4	Conjunction *because*		This car is winning, *'cause* he's got the faster horn.
		Conjunction *and*	Then it broke, *and* we didn't have it anymore.
5	Number of different conjunctions, $\overline{X} = 4$, ± 1 SD = 2–6		

STAGE: V + + **MLU: 5.01-up** **PREDICTED AGE: 47 + MONTHS** **(N) = 7**

Development			
Section	**Reached by 50%–90% of children**	**Reached by over 90% of children**	**Example**
1	Percent of TRUE complex sentences: over 20%		
2	No new forms of embedding		
3		Sentences containing both a conjoined and an embedded clause	*He wants* ***to stay at his home today*** and *I don't know why.*
4	Conjunctions *when* and *so*		I can get the train out *when* it's like this. Let me close the gate *so* it won't come out.
		Conjunction *if*	We always go outside, *if* it's not raining.
5	Number of different conjunctions $\bar{X} = 7, \pm 1\ SD = 6–8$		

Developed by Rhea Paul.
*These forms appear at a later stage, indicating use by 90% of subjects in a higher MLU group.
†Although the use of the clause increased with MLU, the increase was not statistically significant.