DEVELOPMENTAL SENTENCE SCORING: A CLINICAL PROCEDURE FOR ESTIMATING SYNTACTIC DEVELOPMENT IN CHILDREN'S SPONTANEOUS SPEECH

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Developmental Sentence Scoring (DSS) is a clinical procedure for estimating the status and progress of children enrolled for language training in a clinic. It is based upon a developmental scale of syntax acquisition. By analyzing a child's spontaneous, tape-recorded speech sample, a clinician can estimate to what extent the child has generalized the grammatical rules sufficiently to use them in verbal performance. With such a guide the clinician can plan lessons which present these structures in a presumably developmental sequence, thereby introducing grammatical complexity in systematically graded steps. The DSS procedure gives weighted scores to a developmental order of pronouns, verbs, negatives, conjunctions, yes-no questions, and wh-questions. The mean score per sentence estimates the child's ability to formulate sentences with a high grammatical "load." The DSS procedure was carried out on 80 boys and 80 girls, ages 3 years, 0 months, to 6 years, 11 months, equally distributed within six-month age groups, all coming from middle-income, standard dialect homes, and all scoring between 85 and 115 on the Peabody Picture Vocabulary Test. Percentiles of DSS scores for these 160 normal children provide guidelines for estimating the status and rate of progress of children treated in a clinic.

Recent studies of language acquisition among normally developing children have given new focus to research in communicative disorders, but they have not as readily led to new clinical methods for rehabilitative teaching. There still is a great need to make new information applicable and useful to clinicians in the evaluation of language disorders, in planning effective remedial procedures, and in assessing a child's progress throughout the period of clinical teaching. One important clinical tool would be a developmental scale of syntax acquisition, showing the general order in which normal children achieve particular syntactic structures. With such a guide a clinician could plan lessons which would present these structures in a presumably develop-

mental sequence, thereby introducing grammatical complexity in systematically graded steps. Furthermore, by analyzing a spontaneous, tape-recorded speech sample from a child enrolled for language training, a clinician could estimate to what extent the child had generalized the grammatical rules sufficiently to use them in verbal performance. The Developmental Sentence Scoring (DSS) technique has been devised to provide such a clinical procedure for use with language development cases.

Older methods of judging language growth in children emphasized length of utterance with little attention to syntactic complexity (Templin, 1957). The separation of sentences into simple, compound, and complex did not consider such elements of syntax as pronouns, verb tenses, negatives, and questions. Elaborate psycholinguistic studies on the language development of a few children (Bloom, 1970; Brown and Fraser, 1964; McNeill, 1966) have yielded valuable information on the growth of syntactic structures, employing Chomsky's (1957, 1965) transformational grammar as an analytical instrument. However, the psycholinguist's technique of writing an individual grammar for each child at periodic stages of development is not easily adaptable to the needs of the speech clinician.

Many measures of syntactic and morphological development, such as Berko's (1958), the Grammatic Closure subtest of the *Illinois Test of Psycholinguistic Abilities* (Kirk, McCarthy, and Kirk, 1968) and the *Northwestern Syntax Screening Test* (Lee, 1969), while effective as quick screening tests, have limited usefulness in predicting a child's performance in spontaneous speech. Such tests are based on highly selected items presented in single-sentence tasks. However, in spontaneous speech a child may be inconsistent in his use of the very forms which he accomplished within the structured simplicity of the test. Conversational speech places a grammatical "load" upon a child's performance which cannot be evaluated by selective testing. Thus, a child who could correctly formulate the past tense *It fell down* as a test item, might revert to the uninflected verb if he were trying to formulate a sentence with a heavy grammatical "load," such as *Why didn't you tell me that it fell down?* Clinicians need something more than standardized tests to evaluate a child's consistency and frequency of usage and his ability to combine many transformations into a single sentence in spontaneous speech. Therefore, a clinical procedure such as the analysis of a speech sample may yield more useful information to a clinician than does traditional testing.

Many studies using tape-recorded speech samples have reported the development of particular syntactic structures in a small number of children. Cazden (1968) investigated the development of noun and verb inflections and also employed a scoring system for early noun phrase and verb complexity (1965). Klima and Bellugi (1966) studied the development of negatives and questions. Brown (1968) reported on the development of wh-questions. Carol Chomsky (1969) investigated children's ability to comprehend the base structures of sentences involving infinitives. Menyuk's (1969) analysis of the syntax of three- to seven-year-old children covered a wide range of

both base and transformational structures. Bloom (1970) studied the semantic aspects of negation in relation to the child's activity during speech production. These psycholinguistic investigations have generally been concerned with the development of linguistic competence, the child's gradual generalizing of syntactic and morphological rules at a deep level. A corpus of utterances was analyzed, usually by means of transformational grammar, to determine a single child's grammatical rules and their modification at successive stages of his development.

By contrast, DSS evaluates a child's performance, his use of grammatical rules in spontaneous speech, and measures the child's grammar against adult standard English. A structure is not given a score unless all the required syntactic and morphological rules have been observed. No intermediate steps are credited. A child who shows consistent accuracy in his performance with a particular syntactic structure may be assumed to have generalized a standard rule at the deeper level of competence. However, errors on DSS merely reduce the child's overall score without indicating what erroneous generalizations he is making. This kind of further psycholinguistic analysis of a child's deviations from adult grammar should be made by the clinician to gain the maximum benefit from the sampling and scoring procedure, but it is not an integral part of the procedure itself. DSS uses some of the findings from psycholinguistic research in suggesting what might be a normal progression of syntactic development, but it also employs more traditional terminology and grammatical classifications. It also makes extensive use of findings from the study of syntax development in the children enrolled at the Northwestern University Speech Clinic.

THE SPEECH-SAMPLING TECHNIQUE

An adequate corpus of sentences for the DSS analysis can be obtained from a sample of 50 complete, different, consecutive, intelligible, nonecholalic sentences elicited from a child in conversation with an adult, using stimulus materials, pictures, and toys in which the child is interested. These criteria have been established for the following reasons:

1. While 50 sentences are an admittedly small corpus of data (Darley and Moll, 1960; Minifie, Darley, and Sherman, 1963), the number has been used here simply because it is a reasonable and realistic number to expect from even an untalkative, language-delayed child in the usual one-hour clinic session. More elaborate studies of normal children's language acquisition, based on 100- or 500-utterance speech samples, may yield more accurate information, but they cannot be replicated with a speech clinic population.

2. To be judged complete, sentences must have at least a noun and verb in subject-predicate relationship. Utterances which are not complete sentences should be evaluated for grammatical structure by some other means, such as the Developmental Sentence Types chart (Lee, 1966), but they should not be included in the speech sample for DSS. If a child cannot form 50 sentences

within a reasonable tape-recording period, his language development is not sufficiently advanced to warrant using the DSS technique. In cases where the child gives a grammatical fragment followed by an independent clause, the fragment is omitted, but the independent clause is counted in the speech sample: *(Over there, but) it's too far away.* However, if the fragment is followed by a dependent clause, none of it would be included in the speech sample: *The place where you look out.* Imperatives are counted as complete sentences: *Open your eyes.*

3. All sentences in the sample must be different to avoid overused stereotypes, such as *I don't know* and *What's that?* which may be included only once.

4. Consecutive sentences must be used to avoid selecting only high-scoring utterances. As long as the 50 sentences are consecutive, they may be taken from any section of a longer sample. Thus, a child may be allowed the advantage of a warm-up period or a period of unusually high interest and talkativeness.

5. Intelligibility must be closely judged so that the child is not penalized for articulation errors nor is he credited with things he did not say. Transcribing a recording of a child treated in a clinic is a difficult task, and it is doubtful that two listeners would produce exactly the same transcription. Sentences must be excluded from the sample if any potentially scorable parts of them cannot be understood. During the taping, the clinician can often repeat what he thinks the child has said if it doesn't prove to be distracting to the conversation, and his own repetition can be used as a guide when he transcribes. The appearance of an unintelligible sentence does not require the examiner to start over in his counting to derive the 50 consecutive sentences; he merely omits these unqualified sentences as he continues to count. Prosodic features, such as intonation and stress, should be used as cues in determining exactly what grammatical structures a child formulated, whether he articulated them accurately or not. When transcribing the tape recording, careful attention should be given to the context in which the speech occurred as further clue to its grammatical structure, meaning, and appropriateness. An imperative sentence is usually indistinguishable from a verb phrase without knowledge of the context in which it was spoken. It is advisable for the clinician who makes the tape recording to transcribe it himself so that he can make use of his own recall of context.

6. Echolalic utterances should be excluded from the sample since they are not spontaneously formulated. However, if the child changes the adult sentence in any way, he is credited with having formulated it himself. The adult is encouraged to use syntactic structures slightly more advanced than those the child is using to see if he will pick them up and use them himself. Thus, if the clinician uses plural pronouns, past tense, and modal verbs, the child may be led to incorporate them into his own speech.

7. The speech sample should be taken in a conversational setting with an adult rather than as an egocentric monologue (Weir, 1962) or in play with

other children (Piaget, 1959). This adult interaction is especially important in a clinical setting since language-delayed children seldom engage in self talk and only intermittently talk with one another. The success of the speech-sampling procedure is dependent upon the skill of the clinician in eliciting from the child a verbal performance which is representative of his level of grammatical achievement. The clinician should avoid structuring the child's responses by asking questions which elicit one-word answers, such as "What's this?" and "Where is he?" Instead, he should ask questions which encourage complete-sentence answers, such as "What happened next?" "What would happen if. . . ?" "What did he say?" and "Tell me about it." Sometimes a clinician can elicit complete sentences by telling the first part of a story or picture description himself, thus setting a standard of speech for the child, and then merely saying, "You tell what happened next."

8. In the clinical setting, stimulus materials should include any toys, pictures, or social play which hold the child's interest and allow a high level of syntactic performance. In the DSS project with children who were not enrolled in clinic treatment, reported in a later section, the stimulus setting was held uniform throughout all speech-sampling interviews, but in the clinical setting this procedure is often too rigid. Children with motor problems often cannot manipulate toys; children with visual problems may give poor verbal responses to pictures; children with problems of memory often cannot retell a familiar story. Allowances should be made for a child's handicap, age, sex, interests, and experiences; the stimulus materials should be selected to encourage a good verbal performance.

THE DEVELOPMENTAL SENTENCE SCORING TECHNIQUE

Scoring every individual grammatical feature of a child's language sample would be so time-consuming as to be clinically impractical. Therefore, only eight features have been selected, based upon their early appearance in children's language and their developmental progression. This selection allows weighted scores to be assigned to later-developing forms. In this model of syntax development it is assumed that the child is learning standard English. Considerable modification would have to be made for use with children learning dialects; indeed, an entirely new scoring system would have to be devised.

The scored items are shown in the appendix. They include (1) indefinite pronouns and/or noun modifiers, (2) personal pronouns, (3) main verbs, (4) secondary verbs, (5) negatives, (6) conjunctions, (7) interrogative reversals, and (8) wh-questions. Within each classification, specific words or structures have been grouped into what is believed to be a general developmental order. The scoring procedure would become unmanageable if a different score were assigned to each specific grammatical item. By grouping together words or structures of presumably similar degrees of difficulty, the highest scores in any of the classifications are kept between five and eight.

The Sentence Point

Many important grammatical features are omitted from the DSS system: the use of articles, plurals, possessive markers, prepositional phrases, adverbs, word order, word selection, etc. To account, at least in part, for these unscored items, an additional sentence point is added to the total sentence score if the entire sentence is correct in all respects. Thus, the following sentences would not receive the sentence point even though the errors they contain are not in any of the scorable classifications: *He went in house, He saw two mans, That is Daddy coat, He took off it,* and *He footed the ball* (all sentence points score 0).

Indefinite Pronouns or Noun Modifiers

The words in this classification (Appendix) are similar to what Jones, Goodman, and Wepman (1963) have called indefinites and quantifiers. The list begins with the early pivot words *it, this,* and *that* (score 1). The same credit is given for these words whether they are used alone as pronouns, e.g., *I want this* or as noun modifiers, e.g., *I want this cookie.* A set of early quantifiers may also be used with or without a noun, e.g., *I want some* or *I want some milk* (score 2). The next three groups are indefinite pronouns such as *something* (score 3), *nothing* (score 4), *anything* (score 5), and *everything* (score 5). The words *somewhere, nowhere, anywhere,* and *everywhere* are not scored in this group, since they are clearly adverbs and can not be regarded as either pronouns or noun modifiers. The last group of words is a more difficult set of quantifiers, such as *both, few, each* (score 6), which may be expanded as the child gains sophistication with concepts of quantity and enumeration. Also these words may be used alone as pronouns, e.g., *I want both,* or as noun modifiers, e.g., *I want both cookies.*

Personal Pronouns

Many considerations go into proper pronoun selection: person, number, gender, and case. A child is not given credit unless his pronoun selection meets all these adult requirements. Early use of personal pronouns seems to begin with the speaker-listener distinction; therefore, first and second person pronouns (score 1) are placed first on the list (Appendix). Case seems to be the most difficult aspect of pronoun selection, and children may persist for a long time with such errors as *me see, mine car,* and *you book* (score 0). Errors of gender, *he* for *she,* or number, *he* for *they,* are much less frequent although children enrolled for language training sometimes exhibit these confusions also. Errors of person, such as *I* for *you* and *you* for *he* have not been reported in normal children, although children in a clinic who have been diagnosed as having autistic tendencies often exhibit this kind of confusion with first and second person pronouns.

In general, pronoun development will begin with considerations of person, and this is the basis on which they have been grouped for scoring: first and second person (score 1), third person (score 2), plurals of all persons (score 3). The plurals *those* and *these* (score 4) could have been included under indefinite pronouns as well as under personal pronouns since they are used both ways: *These girls are playing, but those are working; These cars are broken, but those are new.* The first person reflexive pronoun *myself* (score 5) may appear early in a stereotyped sentence, such as *I do it myself,* but it may be some time before it appears as a generalized rule. The irregular form *himself* (score 5) is frequently heard as *hisself* (score 0).

The wh-pronouns (score 6) introduce second kernel sentences which may be complements of the first kernel, e.g., *I know who came* and *That's what I said.* The wh-pronouns are similar to another set of wh-words which have been classified as conjunctions, such as *where, how,* and *when.* However, the wh-pronouns are integral parts of the second kernel sentence. In the sentence *I know who came, who* is the subject of the second kernel; in the sentence *That's what I said, what* is the object of the second kernel. By contrast, in the wh-conjunction sentence *I know where he is going, where* fills a conjunction slot between the two kernels, *I know* and *he is going.* Since these two sets of words, wh-pronouns and wh-conjunctions, are so similar, the scoring has been worked out to give both of them the same weight (score 6). The same confusion could also arise in regard to the wh-word + infinitive constructions. Wh-pronouns + infinitive have the wh-word as the object of the infinitive: *I know what to do* and *I know which to choose* (wh-pronouns score 6). However, in the wh-conjunction + infinitive construction, this object relationship does not exist, e.g., *I know how to do it* and *I know where to go* (wh-conjunctions score 6). If the clinician confuses these two sets of wh-words, the overall score will not be affected since they both score 6; they will merely be credited to the wrong classification.

Another set of pronouns (score 7) has been included to account for further growth into more adult forms. Children use the construction *my own* and *their own* (score 7), but the use of *whatever* (score 7) would be rare. This group of words is included merely to suggest that there is further development and to allow for the scoring of words which have not as yet been found in children's speech samples.

Main Verbs

The auxiliary verb system is one of the most complicated features of English. Traditional names for verb tenses are of little value in explaining children's acquisition of verb forms. Verb tense development can best be traced by means of Chomsky's (1957, p. 111) schema, which represents the privilege of occurrence for auxiliary verbs in adult standard English:

$$\mathbf{C}\ (\mathbf{M})\ (\text{have} + \text{en})\ (\text{be} + \text{ing})\ \mathbf{V}$$

The first item, C, represents the past or present tense, an obligatory choice, which is always attached to the first of whatever auxiliary verbs are used. If only the lexical verb is used, then the tense markers are placed as word endings on the lexical verb itself, usually taking the form, *-s,* on third person singular present tense and *-ed* on regular past tense verbs. Future tense is not included in item C since future is marked by a modal verb, *will,* in English. The second item, (M), is the set of five modal verbs, *can, will, may, shall,* and *must,* which appear in parentheses because their use is optional. If modals are used, they have an initial privilege of occurrence among the auxiliaries. The next item, (*have* + *en*), an optional choice, shows that the verb ending *-en* is added in the same operation as the auxiliary *have* although it appears morphologically on the following verb whether it be an auxiliary or the lexical verb. The next item, (*be* + *ing*), another optional choice, also adds the verb ending *-ing* to the next verb, in this case the lexical verb itself. Combinations of these rules produce all the verb tenses of English. This analysis of the English auxiliary verb system is further elaborated by McNeill (1970, pp. 157-161).

Table 1 shows a more detailed breakdown of verb development than is shown in the appendix, although both follow the same developmental pattern. The child begins with an uninflected verb (score 1) which he had learned merely as a vocabulary item. The first modification to appear is the ending *-ing* which is found even in single-word utterances such as *walking, sleeping,* and *eating.* The appearance of *-ing* may indicate the child's first distinguishing of form classes, since it seldom, if ever, appears on any part of speech other than verbs in children's utterances. The next item to appear is the *is* + *ing* form (score 2), used with the pronouns *he, she,* and *it.* At this stage most children would simply omit the auxiliary when *am* or *are* is required.

The next features to be incorporated (Table 1) are usually the present and past tense markers, *-s* on third person singular present tense verbs and *-ed* on past tenses. It has been noted by other researchers (Cazden, 1968; Miller and Ervin, 1964) that irregular past tenses often appear before the regular past tense marker *-ed* is used. Children enrolled in clinics seem to follow this pattern, too. Thus, a clinician might expect a child to produce *saw, ate,* and *went* before *played, looked,* and *wanted* (all score 3). As the *-ed* rule becomes generalized, the child may then formulate the irregular *saw, ate,* and *went* (score 3) as *sawed* or *seed, ated* or *eated, wented* or *goed* (all score 0). Further time is required for children to differentiate successfully between regular and irregular past tense forms. A few verbs have the same uninflected forms for both present and past tenses with all but third person singular subjects: *I put, we let, you hurt, they hit,* and *I set* (all verbs score 1). In scoring for past tense, the child is not given the benefit of this doubt even though the clinician may believe that he formulated these verbs as past tenses with a knowledge of their morphological rules. If he does know past tense rules, other verb scores in the speech sample will reduce this unfair penalty. About this same time, both the copular *is* (score 1) and the auxiliary

TABLE 1. Developmental Sentence Scoring for main verbs.

Score	Developmental Verb Forms	Chomsky's Schema: C	(M)	(have + en)	(be + ing)	V	Transformations and Colloquial Forms
1	I *play*. It *is* good. It's good.					V	
0	He *play*. She *play*. It *play*.						
0	I *playing*. He *playing*.				– ing	V	
0	I *is playing*. You *is playing*.				is + ing	V	
2	He *is playing*.						
3	He *plays*. He *played*.	C: present, past			(be + ing)	V	
3	I *am playing*. He *was playing*.	present: am, are					
3	We *are* good. They *were* good.	past: was, were					
4	I *can play*. He *will play*.	C: present	(M): can, will, may			V	Transformations:
	Transformations:						Obligatory *do*
4	I *don't play*. They *don't play*.						+ negative
4	*Do* you *play*? *Do* they *play*?						+ question
4	They *do play*.						Emphasis
5	He *could play*. He *would play*.	C: past	(M): could, would			V	Transformations:
5	He *might play*. He *should play*.		might, should				Obligatory *does, did:*
	Transformations:						+ negative
5	He *doesn't play*. He *didn't play*.						+ question
5	*Does* he *play*? *Did* he *play*?						Emphasis
5	He *does play*. He *did play*.						
6	I *must play*. I *shall play*. (rare)	C: present	(M): must, shall			V	
6	I *have eaten*. I *had eaten*.			(have + en)		V	Colloquial form:
	Colloquial form:						*have got*
6	I've *got* to play.	present, past					
7	The music *was being played*.	Passives of all tenses are scored the same.					Transformation:
7	The music *could have been played*.						Passive
8	I *have been playing*.	C: present, past	(M)	(have + en)	(be + ing)	V	
8	I *may have eaten*.						
8	I *might be playing*.						
8	I *might have been playing*.						
	Etc.						

is (score 2) are beginning to be differentiated into *am, are, was,* and *were* (score 3).

The next stage (Table 1) shows the development of modals *can, will,* and *may* (score 4) in their present tense form. It has been noted by Klima and Bellugi (1966) that the negative *can't* is often used before the affirmative *can.* The modal *will* is often delayed by the preference of *I'm gonna* as a future tense form. The modal *may* often appears first as a past tense *might* (score 5); however, it is included here with early present tense modals, because some children learn a polite form of asking permission, *May I?* (score 4). At this same stage children begin to attempt the transformations with obligatory *do*: *do* + negative, *I don't want it* (score 4), and *do* + question, *Do you want it?* (score 4). The emphatic *do, I do want it* (score 4), is also grouped with obligatory *do* for convenience in scoring although it is a form seldom heard among children in the clinic. The obligatory transformations with *do* are confusing to many children and clinicians should not be discouraged by such attempts as *I don't not want it, He don't wants it,* and even *He don'ts want it* (all score 0). Understanding of the transformational rules by which these forms are produced (Menyuk, 1969) should make clinicians appreciative of children's efforts, even the unsuccessful ones.

Table 1 shows the next step as the formulation of modals with past tense *could, would, might,* and *should* (score 5). The modal *must* has no past tense. Since these words are used to express such concepts as probability and conditionality, their use is more difficult than is their present tense form. Also in this group are the emphatic *does* and *did* and the obligatory *does* and *did* with questions and negatives (score 5). The switching of present and past tense markers from the lexical verb to the *do* is a complicated operation for many children. For example, *play* changes not to *do plays* but to *does play; played* changes not to *do played* but to *did play.* Children who have trouble switching the tense marker to the obligatory *do* attempt such formulations as *He don't goes, Do he fell down?* and *He didn't saw me* (all score 0). The rule which they have not yet generalized is the placement of the tense marker (Chomsky's C) on the first verb in the string. This is a difficult step, especially for children receiving language training who have trouble perceiving the temporal sequence of auditory material.

The next group (Table 1) includes the present tense modals *must* and *shall* (score 6). *Shall* is rarely used in a statement, even by adults, although its interrogative use is common, e.g., *Shall I sit down?* (score 6). Also in this group is auxiliary *have* + *en,* producing such morphologically regular forms as *I have given* and *I have eaten* and such morphologically irregular ones as *I have played* and *I have brought* (all score 6). The colloquial form *have got* (score 6) is also included here. In earlier stages children often confuse *have* with *got,* forming such sentences as *I got* (score 0) *it in my pocket,* just as they would say, *I got* (score 3) *it for Christmas.* When auxiliary *have* is learned, they use both verbs together: *I've got* (score 6) *it in my pocket.*

Table 1 shows all passives of any tense as an individual group (score 7).

Truncated passives, which do not state the actor, are also included in this group: *A picture was taken, The girl was pushed, A movie was shown* (score 7). Some very early sentences of children are similar in form to truncated passives: *The car was broken, The boy was lost, My thumb was hurt* (all score 1). It was decided that young children probably learn such words as *broken, lost,* and *hurt* as adjectives, not as grammatically derived verb forms, and that they compose such predicates as copula + adjective. To avoid overscoring such examples as passives, a rule was made that if the past participle verb form could be used as an adjective in a noun phrase, the sentence would be scored as copula + adjective, not as a passive. Thus, *the broken car, the lost boy,* and *the hurt thumb* all seemed acceptable noun phrases and allowed those sentences to be scored as copula + adjective (score 1). However, *the taken picture, the pushed girl,* and *the shown movie* did not seem acceptable as noun phrases and required those sentences to be judged true passives (score 7). Any passive composed with the verb *get* was considered a true passive: *The car will get broken. The boy might get lost,* and *My thumb got hurt* (all score 7).

The last group (Table 1) includes any verb forms which employ at least two of the auxiliary components of Chomsky's schema, (M) (*have* + *en*) (*be* + *ing*). At this final stage a child could tell the story of *The Three Bears* using the sentence *Who has been sleeping in my bed?* (score 8).

Certain deletions of the main verb are permissible in conversational English. A child might simply say, *I can, I won't,* or *He doesn't* as complete statements without adding the lexical verb. These statements qualify as sentences since they contain both subject and predicate. While the verbs are incomplete, they are not exactly incorrect in a conversational, spontaneous speech sample. In scoring these optionally shortened forms, the decision was made to withhold the verb score but to allow the extra sentence point mentioned earlier: *I can* (pronoun 1 + main verb 0 + sentence point 1 = 2); *I won't* (pronoun 1 + main verb 0 + negative 3 + sentence point 1 = 5); *he doesn't* (pronoun 2 + main verb 0 + negative 4 + sentence point 1 = 7). This scoring method avoids overscoring a child who has learned *I can't* or *I won't* as stereotyped statements rather than as grammatically formulated verb deletions; at the same time, it reduces the penalty by the one sentence point since the construction is allowable in English. However, a deletion is sometimes obligatory rather than optional. In these cases, the completed form of the verb would be incorrect, so credit is given as though the complete verb had been spoken: *The dog is sleeping but the cat isn't* [sleeping] (main verb 2 + conjunction 2 + main verb 2 + negative 3 + sentence point 1 = 10); *Mom could see the car but Dad couldn't* [see it] (main verb 5 + conjunction 2 + main verb 5 + negative 4 + sentence point 1 = 17).

Secondary Verbs

Secondary verbs (Appendix) occur when two kernel sentences are com-

bined by transforming the second kernel verb into an infinitive, participle, or gerund. While some secondary verbs carry tense, they do not follow the auxiliary system that Chomsky schematized for main verbs. The earliest of these secondary verb forms, an immature infinitival complement, often appears even before sentence structure is complete: *wanna see it, gonna take it out,* etc. It is doubtful that a child at this presentence stage has formulated these structures as real infinitival complements, especially since they are articulated as contracted forms: *wanna, gonna, gotta, lemme,* and *let's.* Only these five verbs are included in the first group of infinitival complements since they appear so early. If the child omits the second syllable, saying, *I wan go* he would be credited only with the main verb *want* (score 1) but not with the infinitival complement. The second syllable, *na,* at least indicates an awareness of the *to* slot for the infinitive and he should not be penalized for this articulatory error. Actually, the adult speech upon which he is modeling his own, contains *wanna* and *gonna* more often than *want to* and *going to.* However, if the child says, *I gonna see,* he would be credited for the infinitival complement *to see* (score 1) but not for the main verb which should have been *I'm going* (score 3) rather than *I going* (score 0). At this early stage a child would almost never use *have got,* even though the infinitival complement might be correct: *I gotta see* (main verb 0 + infinitival complement 1). The infinitival complements with *let, lemme see* and *let's play* involve an obligatory deletion of the *to;* thus, the appendix shows this item in brackets. In the case of *let's* even the *us* is placed in brackets, since it is doubtful that the child has really formulated this as a plural pronoun. *Lemme see* would be scored as *Let me* [to] *see* (main verb 1 + pronoun 1 + infinitival complement 1 + sentence point 1 = 4), and *Let's play* would be scored only for the two verbs, *Let* [us to] *play* (main verb 1 + infinitival complement 1 + sentence point 1 = 3). Conversational English allows the deletion of the second kernel main verb when this item has already been mentioned in previous statements. In such cases, the incomplete infinitive would not be scored, but the sentence point would be allowed: *I want to* [do it] (pronoun 1 + main verb 1 + infinitival complement 0 + sentence point 1 = 3).

The second group of infinitives include those that are not complements of the main verb. Frequently they express purpose, as in *I stopped to play, I went to look,* and *He came to see* (infinitives score 2). They also include other instances where purpose may be implied but is less obvious: *I'm afraid to look, It's easy to do,* and *It's for me to play with* (infinitives score 2).

The second kernel verb may be transformed into a participle, as in *I see a boy running* (participle scores 3). No difference in score is made when the participle is in past tense, as in *I found the toy broken* (participle scores 3).

The next group includes those infinitival complements which the child may be presumed to have formulated with grammatical rules. If the early infinitival complements with *want* and *let* (score 1) have different subjects in the two kernels, they would be considered as grammatically formulated by the child: *I want you to come* and *Let him* [to] *go* (both infinitives score

4). Infinitival complements with *gonna* and *gotta* would always have the same subjects in both kernels and would, therefore, always be placed in the first group (score 1). All other infinitival complements are placed in this group, whether they have the same subjects as the main verbs or not: *I had to go, I tried to go, I told him to go, I asked you to go* (all infinitival complements score 4). Sometimes the infinitive forms require the deletion of the *to,* as in *Make it* [to] *go, I'd better* [to] *go,* and *I heard the bell* [to] *ring* (all infinitival complements score 4).

Another set of infinitives in this group are those with wh-pronouns or wh-conjunctions: *I know what to get* and *I know how to do it* (both infinitives score 4). In conversational English certain deletions are permissible with the wh-word + infinitive constructions: *I know how* [to do it] or even *I know how to* [do it]. To avoid overscoring a child who may have learned these sentences simply as stereotyped statements, credit is withheld for the incompleted items, but the sentence score is allowed since they are legitimate conversational deletions. In *I know how* [to do it], the wh-conjunction does not fulfill its conjunctive purpose and, therefore, does not score (pronoun 1 + main verb 1 + conjunction 0 + sentence point 1 = 3). In *I know how to* [do it], the conjunction scores but not the incompleted infinitive (pronoun 1 + main verb 1 + conjunction 6 + infinitive 0 + sentence point 1 = 9).

A special group is made for all passive infinitives, whether they are complements or not and whether they are made with the five early verbs or not: *I want to be pulled, I have to get dressed, It's easy to get lost, It's time to get washed* (all infinitives score 5).

The last group consists of second kernel verbs which have been transformed into gerunds in order to fill a noun slot in the sentence: *Swinging is fun, I like fishing, He started laughing, It stopped my coughing* (all gerunds score 6).

Negatives

It has been noted by other investigators (Klima and Bellugi, 1966; Bloom, 1970) that many negative forms first appear as contractions rather than as the insertion of *not* after the first auxiliary, as the transformational rule requires. However, the first group of negative forms (Appendix) is an exception to that general rule. Here are placed three *not* insertions with the earliest indefinite pronouns as subjects: *It is not, This is not,* and *That is not* (score 1). Children at the clinic have a tendency to omit copular and auxiliary *is* considerably beyond the time when they are using negatives, producing such presentence forms as *It not mine, This not a dog,* and *That not moving.* The inclusion of the *is* or its contraction, *'s,* seems to be a second step in producing the sentences *It's not mine, This is not a dog,* and *That's not moving.* These sentences generally appear before the contraction, *isn't,* (score 3) is used. Therefore, the first group of negatives include only *it, this,* and *that* + copular or auxiliary *is* or *'s* + *not* (score 1).

Children enrolled for language training seem to follow the general pattern of normally developing children in first using the contractions *can't, don't, isn't,* and *won't* as a set of negative words rather than as grammatically formulated negative transformations performed on already-learned auxiliaries. As with normal children, *can't* is apt to appear before *can, don't* before *do,* and *won't* before *will.* The negatives *can't* and *don't* (score 2) have been found to emerge somewhat earlier than *isn't* and *won't* (score 3) in the children studied in the clinic, and, therefore, they have been placed in different groups. The negative score is given only for the negative transformation; the main verb continues to be scored in addition: *I can't see* (pronoun 1 + main verb 4 + negative 2 + sentence point 1 = 8); *I won't go* (pronoun 1 + main verb 4 + negative 3 + sentence point 1 = 9).

Beyond this point a child may be said to have generalized the negative rules with auxiliaries so that he can formulate further contracted forms spontaneously: *aren't, wasn't, weren't, doesn't, didn't, couldn't, wouldn't,* and *shouldn't* (all score 4). The same credit is given if the contraction is between the pronoun and the auxiliary or if no contraction is made: *You're not going, He's not here, I can not go, I should not go* (all negatives score 4).

The remaining auxiliary, *have,* is so late appearing that its negative forms (score 5) comprise a separate group: uncontracted negative, e.g., *I have not eaten it,* auxiliary-negative contraction, e.g., *I hadn't eaten it,* and pronoun-auxiliary contraction, e.g., *I've not eaten it* (all negatives score 5). To an extent, the higher negative scores are a result of higher main verb scores. Yet it presumably requires greater grammatical skill to manipulate the optional contractions of auxiliary with negative or pronoun with auxiliary when the auxiliary system has become highly elaborated. Even without the complication of contractions, just the insertion of *not* requires the child to find its proper location after the first auxiliary. This greater grammatical "load" justifies the weighted scores for negatives as well as for the main verbs.

In scoring sentences with double or multiple negatives, only the first negative would be considered correct, and the sentence point would, of course, be withheld: *I didn't see nothing* (pronoun 1 + main verb 5 + negative 4 + pronoun 0 + sentence point 0 = 10); *Nobody didn't see nothing* (pronoun 4 + main verb 0 + negative 0 + pronoun 0 + sentence point 0 = 4).

Conjunctions

The earliest conjunction, *and* (score 1), can be found even in presentence pivot combinations, e.g., *and cookie, and doggie,* long before it is used to join parts of a sentence. *And* may be used in sentences to join two kernels or to make a compound subject or a compound predicate: *I looked and he was there* (conjunction scores 1), *He and I did it* (conjunction scores 1), and *I ran and found it* (conjunction scores 1). However, caution must be used in scoring children's spontaneous speech, because some of them have a tendency to introduce or join all utterances with *and,* and less often, but

occasionally, with *so*. Since there is no grammatical constraint on the endless use of conjunctions, special rules had to be created to avoid deceptively long, high-scoring sentences. In DSS, sentences which begin with conjunctions are counted as complete sentences, but the conjunctions are not scored:

1. (Because) I wanted it.
2. (But) I saw them.
3. (And) then we came home.

Only one *and* conjunction per sentence is allowed when the *and* connects two independent clauses. Sentences are broken up as follows:

1. I came home and my dad was there . . .
2. (and) he saw my dog and he started laughing . . .
3. (and) the dog got scared and he started to bark.

And used in a series or compound subject or predicate is always counted and does not require the sentence to be broken up:

1. I like red and blue and green and yellow.
2. My brother and sister came and we went out and played . . .
3. (and) it began to rain and get cold and we came home and played.

Internal conjunctions, other than *and,* do not require the sentence to be broken up:

1. He came back and we played but we got tired so we quit . . .
2. (and) then we had lunch and some kids came over but we didn't like them . . .
3. (and) we told them to go home so they went.

This treatment may be given to any other overused conjunction:

1. (So) they wanted a dog so they told their dad . . .
2. (so) their dad said they could have one so they went to the pet shop.

The next conjunctions (Appendix) follow in a presumed developmental order: *but* (score 2), *because* (score 3), *so, and so, so that, if* (score 4), *or, except, only* (score 5). The next group is a large set of conjunctions (score 6), including the wh-conjunctions mentioned previously under the discussion of personal pronouns. The proper use of these high-scoring conjunctions requires concepts of time, causality, conditionality, comparison, etc. If a child used any conjunction inappropriately, the score would be withheld: *I like candy because I have some in my pocket* (conjunction scores 0); *He went home so his sister was there* (conjunction scores 0). Sometimes obligatory deletions (Appendix) require the predicate of the second kernel to be omitted: *I can run faster than you* [can run]; *He is as big as a man* [is big]. In these cases the conjunction receives its score (score 6), even though the sentence which

it conjoins is incomplete. However, there are other times when a child chooses to delete part of the sentence which could just as well have been added: *She was hungry, that's why* [she ate it]. Here the conjunction score would be withheld (score 0), since the sentence it was supposed to be conjoining is not stated. However, since this is a legitimate colloquialism, the sentence point is not withheld (sentence point 1).

Another type of conjunction in this same group is the wh-conjunction + infinitive: *I know how to do it*; *I know where to go* (conjunctions score 6, infinitives score 4). This is very similar to the wh-pronoun + infinitive, previously discussed under personal pronouns. Also, the same optional deletion, mentioned above and discussed in the section on secondary verbs, applies here. Thus, conversational English would allow *I know how* [to do it] (pronoun 1 + main verb 1 + conjunction 0 + sentence point 1 = 3), or even *I know how to* [do it] (pronoun 1 + main verb 1 + conjunction 6 + infinitive 0 + sentence point 1 = 9).

A final group of conjunctions is added to accommodate further growth beyond the ages typically studied in a speech clinic setting. This group would include such words as *therefore, however,* and *whenever* (score 7) and any other conjunctions beyond the ones previously scored.

Interrogative Reversals

Children's first questions are indicated by a rising intonation on declarative statements. The speech sample may include such questions, since they contain a subject and a predicate, but they are scored as incorrect questions: *He is coming?* (pronoun 2 + main verb 2 + interrogative reversal 0 + sentence point 0 = 4). The question transformation requires the reversal of the subject with the first auxiliary verb: *Is he coming? Can he come? Can he be coming? Has he been coming? Would he have been coming?* If no auxiliary is in the original kernel sentence *The boy comes,* then the obligatory *do* transformation supplies the necessary auxiliary, and the tense marker is transposed from the main verb to the *do,* e.g., *The boy does come.* Then the interrogative reversal can be performed, e.g., *Does the boy come?* (main verb 5 + interrogative reversal 3 + sentence point 1 = 9). It would be possible to perform the interrogative reversal even with an incorrect main verb, e.g., *Do the boy comes?* (main verb 0 + interrogative reversal 3 + sentence point 0 = 3).

In DSS (Appendix) the first group of questions involves the copula, either present or past tense: *Is it red? Isn't it red? Were they there?* (interrogative reversals score 1). The second group involves auxiliary *be,* present or past tense: *Is he coming? Wasn't he coming? Weren't they coming?* (interrogative reversals score 2).

The next group of questions includes several different types which seem to develop at roughly the same time. The first of these is questions requiring obligatory *do, does,* or *did*: *Do they run? Does it bite? Didn't it hurt?* (inter-

rogative reversals score 3). The reversal of any modal verb also falls into this group: *Can you play? Won't they come? Shall I sit down? Couldn't you find him?* (interrogative reversals score 3). The use of a tag question (Menyuk, 1969) of any tense and with any set of auxiliaries is also included in this group: *It's fun, isn't it? It isn't fun, is it? He has gone, hasn't he? He hasn't gone, has he?* (tag questions score 3). Some of these tag questions involve higher level verb tenses than others and some of them include negatives, but to keep the scoring as simple as possible, all tag questions are scored the same. The main verb score will reflect the higher level verb tenses.

The next group includes reversals with auxiliary *have,* which is the latest auxiliary to develop: *Has he seen you? Have they gone? Haven't you been there?* (interrogative reversals score 4). Also in this group are reversals which involve any two auxiliaries: *Has he been eating? Can he be sleeping? Couldn't he have gone?* (interrogative reversals score 4). Children in the clinic would rarely use these sentences.

The last group includes sentences which might be composed occasionally by adults, almost never by children, and certainly never by children with language problems. These reversals involve three auxiliaries: *Could he have been going? Wouldn't he have been sleeping?* (interrogative reversals score 5).

Questions are scored for the performance of the reversal transformation only. If the sentence happens to be negative as well, the negative item is scored in addition: *Isn't he coming?* (pronoun 2 + main verb 2 + negative 3 + interrogative reversal 2 + sentence point 1 = 10). Thus, the combining of many types of transformations into one sentence yields a higher score.

Wh-Questions

Roger Brown (1968) has described the child's learning of the wh-question transformation as a three-part procedure. First, he learns the set of wh-words by hearing his mother replace parts of his own sentences which she didn't understand. The mother's speech to the child includes such sentences as *You didn't go where?* and *You took a what?* The child himself never composes such sentences, but through hearing them he learns which part of a sentence each wh-word replaces. The second step is the recognition of the privilege of occurrence of the wh-word, which is always first in the sentence. When a child begins to use wh-words himself, he always observes these two rules, even if he is still speaking in presentences: *Where Daddy?* and *Who that?* As sentence structure becomes complete, these wh-questions are expanded into *Where Daddy is going?* and *Who that boy is?* Children needing language training tend to persist a long time on this second stage. The third step is the reversal of the subject and first auxiliary, as in the question transformation: *Where is Daddy going?* and *Who is that boy?*

The scoring of wh-questions (Appendix) involves only the first two of Brown's three steps: the selection of the appropriate wh-word and its placement in the initial position. Scores for wh-questions increase largely on a

semantic basis, the higher-scoring wh-words requiring more sophisticated concepts: person, *who* (score 1); thing, *what, what book* (score 1); place, *where* (score 2); quantity, *how many, how much* (score 2); action, *what . . . do* (score 2); purpose, *what . . . for* (score 2); time, *when* (score 3); manner, *how, how big* (score 3); causality, *why, how come* (score 4); probability, *what if, how about* (score 4); identification, *whose, which, which book* (score 5). The third step in the formation of wh-questions, the reversal of the subject and the first auxiliary, is the same as for yes-no questions. Therefore, wh-questions score under two headings, wh-questions, for the choice of the wh-word, and interrogative reversal for the subject-auxiliary reversal: *Where is he going?* (pronoun 2 + main verb 2 + interrogative reversal 2 + wh-question 2 + sentence point 1 = 9); *Why doesn't he see me?* (pronoun 2 and 1 + main verb 5 + negative 4 + interrogative reversal 3 + wh-question 4 + sentence point 1 = 20). Thus, the children need not be entirely penalized for failing to make the third-step reversal: *Where he is going?* (pronoun 2 + main verb 2 + interrogative reversal 0 + wh-question 2 + sentence point 0 = 6); *Why he doesn't see me?* (pronoun 2 and 1 + main verb 5 + negative 4 + interrogative reversal 0 + wh-question 4 + sentence point 0 = 16). Wh-words used as subjects do not require the reversal: *Who has been here?* (main verb 6 + wh-question 1 + sentence point 1 = 8); *What is coming?* (main verb 2 + wh-question 1 + sentence point 1 = 4). Some colloquial forms do not require a reversal: *What if he comes?* (pronoun 2 + main verb 3 + wh-question 4 + sentence point 1 = 10); *How come you did that?* (pronoun 1 and 1 + main verb 3 + wh-question 4 + sentence point 1 = 10).

The Developmental Sentence Score (DSS)

With possible scores in each of the eight classifications of grammatical structure, plus the additional sentence point if the sentence is correct in all respects, a child's ability to handle the grammatical "load" in spontaneous speech can be estimated. Individual scores for the 50-sentence speech sample are totaled, and the mean score per sentence is derived. This number is called the Developmental Sentence Score (DSS). The DSS technique provides a clinician not only with a quantitative measure of syntactic development but with a corpus of spontaneous sentences for further analysis. An examination of any child's errors should reveal specific teaching goals for future clinical sessions.

Table 2 represents a score sheet with a miscellaneous set of scored sentences which illustrate some of the procedures just discussed. It includes some extremely immature sentences and some with a very heavy transformational load; it is doubtful that any real speech sample would ever contain such extremes. A comparison of sentences 1 through 9 reveals the increase of individual sentence scores as more transformations are added to the same kernel. A DSS of 11.23, which is the mean sentence score, has been derived from this hypothetical corpus to demonstrate the procedure.

TABLE 2. Hypothetical corpus of 30 sentences illustrating Developmental Sentence Scoring. The actual score sheet includes places for recording the child's name, birthdate, and chronological age, and the date the test was administered.

Sentence	*Indefinite Pronoun*	*Personal Pronoun*	*Primary Verb*	*Secondary Verb*	*Negative*	*Conjunction*	*Interrogative Reversal*	*Wh-Question*	*Sentence Point*	*Total*
1. Boy eat.			0						0	0
2. Boy eat cookie.			0						0	0
3. The boy is eating a cookie.			2						1	3
4. The boys are eating cookies.			3						1	4
5. They ate them.		3,3	3						1	10
6. They didn't eat them.		3,3	5		4				1	16
7. Didn't they eat them?		3,3	5		4		3		1	19
8. Why didn't they eat them?		3,3	5		4		3	4	1	23
9. Why didn't they?		3	inc.		4		3	4	1	15
10. All the cookies were eaten.	2		7						1	10
11. I want to eat some cookies.	2	1	1	1					1	6
12. I want him to eat some cookies.	2	1,2	1	4					1	11
13. I tried to find some cookies.	2	1	3	4					1	11
14. Could you find them?		1,3	5				3		1	13
15. You couldn't find them, could you?		1,3	5		4		3		1	17
16. Nobody knows where to find them.	4	3	3	4		6			1	21
17. Who knows where she keeps them?		2,3	3,3			6		1	1	19
18. I looked but I couldn't find them.		1,1,3	3,5		4	2			1	20
19. I like eating cookies.		1	1	6					1	9
20. Nobody told me that I shouldn't eat them.	4	1,1,3	3,5		4	6			1	28
21. I only ate a few.	6	1	3						1	11
22. Somebody else must have eaten all the rest.	3,2		8						1	14
23. Let's eat some more.	2,2		1	1					1	7
24. Mommy said, "Don't eat those cookies."		4	3,4		2				1	14
25. That isn't what she said.	1	6,2	1,3		3				1	17
26. Him can't have some.	0	0	4		2				0	6
27. What you eating?		1	0				0	1	0	2
28. Her don't gots any.	5	0	0		0				0	5
29. Mommy find out.			0						0	0
30. You want to get spanked?		1	0	5			0		0	6
									Total	337
									337/30 = 11.23	DSS

DEVELOPMENTAL SENTENCE SCORING WITH A NORMAL POPULATION

The DSS procedure has been used for the past few years in the Northwestern Speech Clinic as a way of estimating the children's progress from one quarter to another. While the comparison of a child's score against his own previous scores has provided helpful information to the clinicians, no comparison could be made with the performances of normally developing children in his own age group. Therefore, the DSS procedure was carried out on 160 children between the ages of 3-0 and 6-11 who were not enrolled in the clinic. The children were selected to represent a midline on as many variables as could be controlled. All the children were from monolingual homes where standard English was spoken, and all except two came from middle-income families, as judged by fathers' occupations, classifications 3, 4, and 5 on the 7-point Warner scale (Warner, Meeker and Eells, 1949). All children obtained IQ scores between 85 and 115 on the Peabody Picture Vocabulary Test. Five boys and five girls were selected for each three-month age group, thus assuring equal representation by sex and equal distribution of ages within a six-month age group.

An attempt was made to keep the recording sessions as uniform as possible in a spontaneous conversational setting. The children were first shown three sets of toys, a small barn and farm animals, a transport truck with removable cars, and a doll family with some plastic doll furniture. They were invited to play with the toys and to talk about them. The children were next asked to tell about a set of pictures chosen from the preprimer series, *We Read Pictures, We Read More Pictures,* and *Before We Read* (Robinson, Monroe, and Artley, 1962). The children were finally asked to tell the story of *The Three Bears,* using the pictures from *What's Its Name?* (Utley, 1950) as a guide, if they wished. The adult interviewer tried not to direct the conversation but interacted verbally with each child, attempting to elicit from him as high level grammatical sentences as he was able to give. All interviewers were trained speech pathologists at the master's degree level, and they attempted to duplicate in this research setting the kind of child-clinician conversation which is traditional in clinical teaching. Recording sessions varied in length from 15 to 30 minutes, depending upon the talkativeness of the child.

Recognizing the value of a warm-up period and also recognizing the possibility that pictures and stories might elicit more sophisticated language than free play, the last 50 sentences that each child formulated were selected as the corpus to be scored.

Table 3 shows the percentiles for these 160 children by six-month age groups. The score distributions within each age group were fitted to normal curves and percentile values were then computed from the normalized distributions for the 90th, 75th, 50th, 25th, and 10th percentiles. Figure 1 shows the progression of these percentiles by six-month age groups for these 160

TABLE 3. Percentiles of DSS scores of 160 children by six-month age groups.

			Percentiles				
Age group	*N*	*SD*	*10th*	*25th*	*50th*	*75th*	*90th*
3-0 to 3-5	20	1.00	5.02	5.63	6.30	6.97	7.58
3-6 to 3-11	20	0.84	5.61	6.12	6.69	7.26	7.77
4-0 to 4-5	20	1.51	5.46	6.38	7.40	8.42	9.34
4-6 to 4-11	20	1.24	6.57	7.32	8.16	9.00	9.75
5-0 to 5-5	20	1.75	6.80	7.86	9.04	10.22	11.28
5-6 to 5-11	20	1.70	6.74	7.77	8.92	10.07	11.10
6-0 to 6-5	20	1.70	7.66	8.69	9.84	10.99	12.02
6-6 to 6-11	20	2.07	8.41	9.66	11.06	12.46	13.71

children. While this chart should not be considered as highly developed normative data, it does provide a clinician with a guide for comparing the verbal performances of children treated in the clinic with others of their age group. Much more experimental use of the DSS procedure must be made before it can be considered a determining factor in recommending a child's enrollment in or dismissal from clinical teaching. It is by no means certain how closely a child's performance should approximate even the 10th percentile before he is considered ready for dismissal. DSS should not be considered by clinicians as a test of syntactic or morphological development, but rather as a clinical procedure for analyzing verbal performance and planning appropriate remedial measures. The chart is probably best used to compare a child's rate of progress with that of normally developing children.

Figure 1 shows the progress of an individual child throughout the period of clinical teaching as measured by the DSS procedure. JM had an expressive vocabulary of only a few words, which she spoke in single-word utterances, at the time she was enrolled for language teaching in the Northwestern University Speech Clinic at age three years, eight months. Her first recorded speech sample, taken at age four years, one month, contained only one sentence, which scored 0. The next four speech samples contained less than 50 sentences; therefore, these first few DSS scores could be considered merely tentative estimates of her syntactic development. From age five years, five months, onward, her recordings contained many more than 50 sentences, from which an adequate corpus could be extracted. By plotting JM's successive DSS scores on the same chart as that for the 160 normal children, it could easily be seen that although she was considerably delayed in language performance, she was progressing at a faster-than-normal rate.

Since there is room for judgment both in transcribing and in scoring sentences, a reliability check was made by 24 speech pathology students in a graduate level course in language development. After about eight hours of classroom presentation of the DSS procedure, each student was given a different tape, randomly selected from the nonclinic collection. Each student made his own transcription and selected his own corpus of the last 50 sen-

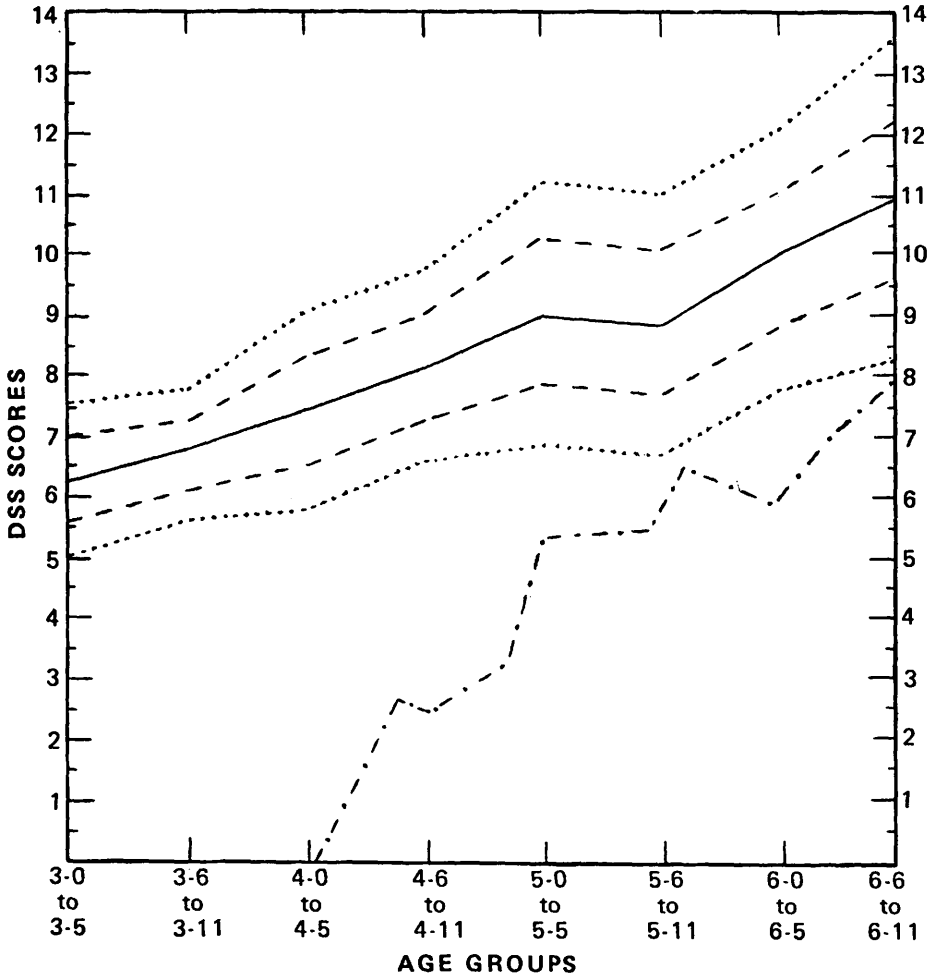

Figure 1. Percentiles of DSS scores of 160 children by 6-month age groups compared with successive DSS scores of a child enrolled for language training. The dotted line represents the 90th and 10th percentiles; the broken line, the 75th and 25th percentiles; the solid line, the 50th percentile; the lowest line, the scores of the child enrolled for language training.

tences for DSS scoring. The discrepancies between the students' scores and the authors' scores ranged from 0.62 points above to 0.72 points below, with a mean absolute discrepancy of 0.29 points, which represented an overall discrepancy of 3%. As a further check, the senior author then scored the students' transcribed sentences to see whether the score discrepancies had occurred only in the transcribing or whether the scoring procedure itself had been misunderstood or misapplied. The discrepancies between the students' scores and the author's scores of the students' transcriptions range from 0.68 points above to 0.24 points below, with a mean absolute discrepancy of 0.19 points, which represented an overall discrepancy of 2%. Thus, while indi-

vidual judgments were not in perfect agreement, the DSS technique seemed to be a reliable procedure which could be learned and applied effectively by speech clinicians.

The DSS technique is, admittedly, a time-consuming, painstaking procedure. There is room for error both in transcribing and in scoring, and caution should be used in judging a child's overall language development on the basis of any single speech sample. Furthermore, the usefulness of this procedure is dependent upon the clinician's skill in eliciting a representative sample of a child's grammatical performance in a conversational setting. However, the use of the DSS procedure thus far indicates that it provides more information about a child's language performance than do quicker, more superficial screening tests. It also provides the clinician with immediate teaching goals, based upon an analysis of the child's errors and inconsistencies. The DSS procedure allows a clinician to estimate the child's ability to formulate and produce grammatically "loaded" sentences in the kind of conversational setting which he encounters daily with his parents, his teachers, and his peers.

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APPENDIX
DEVELOPMENTAL SENTENCE SCORING

Score

Indefinite Pronouns or Noun Modifiers

1 it, this, that
2 no, some, more, all, lot(s), one(s), two (etc.), other(s), another
3 something, somebody, someone
4 nothing, nobody, no one, none
5 any, anything, anybody, anyone, every, everyone, everything, everybody
6 both, few, many, each, several, most, least, much, next, first, last, second (etc.)

Personal Pronouns

1 1st and 2nd person: I, me, my, mine, you, your(s)
2 Third person: he, him, his, she, her, hers
3 Plural pronouns: we, us, our(s), they, them, their
4 those, these
5 Reflexive pronouns: myself, yourself, himself, herself, itself, themselves
6 Wh-pronouns: who, which, whose, whom, that, what, how many, how much:
I know *who* came.
That's *what* I said.
Wh-word + infinitive:
I know *what* to do.
7 (his) own, one, oneself, whichever, whoever, whatever:
Each has *his own*.
Take *whatever* you like.

Main Verbs

1 Uninflected verb:
I *see* you.
Copula, is or 's:
It*'s* red.
2 is + verb + ing:
He *is coming*.
3 -s and -ed:
plays, played
Irregular past:
ate, saw
Copula am, are, was, were:
I *am* good. You*'re* good.

Score

Auxiliary am, are, was, were:
I *was going*. We *were going*.

4 can, will, may + verb:
may go
Obligatory do + verb:
Don't go.
Emphatic do + verb:
I do see.

5 could, would, should, or might + verb:
might come, could be
Obligatory does, did + verb
Emphatic does, did + verb

6 must, shall + verb: *must come*
have + verb + en: *I've eaten.*
have ('ve) got: *I've got it.*

7 Passive, any tense.

8 have been + verb + ing,
had been + verb + ing,
modal + have + verb + en: *may have eaten,*
modal + be + verb + ing: *could be playing*
Other auxiliary combinations: *should have been sleeping*

Secondary Verbs

1 Five early-developing infinitival complements:
I wan*na see* (want *to see*).
I'm gon*na see* (going *to see*).
I've got*ta see* (got *to see*).
Lemme [*to*] *see* (let me [*to*] *see*).
Let's [*to*] *play* (let [us *to*] *play*).

2 Noncomplementing infinitives:
I stopped *to play.*
I'm afraid *to look.*

3 Participle, present or past:
I see a boy *running.*
I found the toy *broken.*

4 Early infinitival complements with differing subjects in kernels:
I want you *to come.*
Let him [*to*] *see.*
Later infinitival complements:
I had *to go.* I told him *to go.*
I tried *to go.* I asked you *to go.*
Obligatory deletions:
Make it [*to*] *go.*
I'd better [*to*] *go.*
Infinitive with wh-word:
I know what *to get.*
I know how *to do* it.

Score

5 Passive infinitival complement:
I have *to get dressed.*
I want *to be pulled.*

6 Gerund:
Swinging is fun.
I like *fishing.*
He started *laughing.*

Negatives

1 it, this, that + copula or auxiliary is, 's + not:
It's *not* mine.
This is *not* a dog.
That is *not* moving.

2 can't, don't

3 isn't, won't

4 Any copula-negative or auxiliary-negative contractions, other than #1, 2, 3, or 5:
They are*n't* here.
I could*n't* go.
Any pronoun-auxiliary contraction + not, other than #1 or 5:
You're *not* going.
He's *not* here.
I'm *not* sure.
Any uncontracted negatives, other than #1 or 5:
I can *not* go.
I should *not* go.

5 Negatives with have: Uncontracted negative:
I have *not* eaten it.
Auxiliary have-negative contraction:
I had*n't* eaten it.
Pronoun-auxiliary have contraction:
I've *not* eaten it.

Conjunctions

1 and

2 but

3 because

4 so, and so, so that, if

5 or, except, only

6 where, when, while, why, how, whether (or not), for, till, until, since, before, after, unless, as, as + adjective + as, as if, like, that, than:
I know *where* you are.
I see *why* you want it.
Don't come *till* I call.

Score

Go *before* he sees you.
Obligatory deletions (score 6):
I can run faster *than* you [can run].
I am *as big as* a man [is big].
Optional deletions (score 0):
She was hungry, that's *why* [she ate it].
Wh-words + infinitive:
I know *how* to do it.
I know *where* to go.

7 therefore, however, whenever, wherever, etc.

Interrogative Reversals

1 Reversal of copula:
Is it red?
Isn't it red?
Were they there?

2 Reversal of auxiliary be:
Is he coming?
Isn't he coming?

3 Obligatory do, does, did:
Do they run?
Does it bite?
Didn't it hurt?
Reversal of modal:
Can you play?
Won't they come?
Shall I sit down?
Tag question:
It is fun, *isn't it?*
It isn't fun, *is it?*
He has gone, *hasn't he?*
He hasn't gone, *has he?*

4 Reversal of auxiliary have:
Has he seen you?

Score

Reversal with any two auxiliaries:
Has he been eating?
Can he be sleeping?
Couldn't he have gone?

5 Reversal with three auxiliaries:
Could he have been going?
Wouldn't he have been sleeping?

WH-Questions

1 who, what, what + noun:
What do you want?
Who is there?
What is coming?
What book are you reading?

2 where, how many, how much, what . . . do, what . . . for:
Where is he?
How many do you want?
How much do you want?
What are you *do*ing?
What is a hammer *for?*

3 when, how, how + adjective:
When shall I come?
How do you do it?
How big is it?

4 why, what if, how come, how about + gerund:
Why are you crying?
What if I won't do it?
How come he is crying?
How about coming with me?

5 whose, which, which + noun:
Whose car is that?
Which do you want?
Which book do you want?