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Developmental Sentence Scoring Sample Size Comparison

Marilyn May Valenciano
Portland State University

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APPROVED BY MEMBERS OF THE THESIS COMMITTEE:

[redacted]

Joan McMahon, Chairperson

[redacted]

Mary E. Gordon

Assessment of language abilities is an integral part of accruing information on the development of concept formation and the learning of grammatical rules. The maturity and complexity of a child's language can be assessed through the use of a language sample. The sample consists of a specified number of utterances which are emitted spontaneously and then analyzed according to a given procedure.

Developmental Sentence Scoring (DSS) (Lee, 1974) is a method for making a detailed, readily quantifiable and scored evaluation of a child's use of standard English grammatical rules. In DSS, the sample must have

fifty sentences with a noun and verb predicate relationship. Research on the validity of language samples smaller and larger than 50 utterances for DSS analysis is limited.

The purpose of this study was to determine if there is a significant difference among the scores obtained from language samples of 25, 50, and 75 utterances when using the DSS procedure for ages 4.0 through 4.6 years. Twelve children, selected on the basis of chronological age, normal receptive vocabulary skills, normal hearing, and a monolingual background, participated as subjects.

Three language samples of 25, 50, and 75 utterances were elicited from each child and analyzed according to the DSS procedure. A t-test analysis was conducted to determine the difference among the means of the scores.

No significant difference resulted among the scores for the different-sized samples. The results indicated a speech-language pathologist may utilize the DSS for analyzing 25 and 75-utterance language samples for ages 4.0 to 4.6 years to obtain a valid representation of the child's grammatical skills instead of employing only a 50-utterance language sample. However, it is recommended that one use a 25-utterance language sample for screening and intervention purposes only. According to Lee (1974), the DSS is better used as a method of tracing a child's progress throughout clinical teaching and to aid in determining when to dismiss the child from remedial teaching.

For diagnostic purposes, one should use the 50-utterance sample along with other instruments since Lee (1974) cautioned that a comparison of the child's DSS score with the mean of his chronological group yields only limited and rather gross information about language development.

DEVELOPMENTAL SENTENCE SCORING

SAMPLE SIZE COMPARISON

by

MARILYN MAY VALENCIANO

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TO THE OFFICE OF GRADUATE STUDIES AND RESEARCH

The members of the Committee approve the thesis of Marilyn May Valenciano presented April 21, 1981.

[redacted]

Joan McMahon, Chairperson

[redacted]

Mary E. Gordon

APPROVED:

[redacted]

Theodore G. Grove, Head, Department of Speech Communication

[redacted]

Stanley E. Rauch, Dean, Graduate Studies and Research

DEDICATION

This thesis is dedicated to Doug, Jeanne, Jennie, Kathy, Michelle, and Solé, my "support system" throughout graduate school. I hope today and all days are peaceful and just the kind you want them to be.

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CHAPTER I

INTRODUCTION AND STATEMENT OF PURPOSE

Introduction

Historically, the communicative disorders field has focused primarily on disorders of speech production such as articulation, fluency, and voice. In recent years, the scope of the field has broadened to include consideration of concept formation and the learning of grammatical rules. Assessment of language abilities is an integral part of accruing information in these language areas. The maturity and complexity of a child's language can be assessed through the use of a language sample (McCarthy, 1930; Templin, 1957; Lee, 1974; Darley and Spriestersbach, 1978). The sample consists of a specified number of utterances which are emitted spontaneously and then analyzed according to a given procedure.

Developmental Sentence Scoring (DSS) (Lee, 1974) is a method for making a detailed, readily quantifiable and scored evaluation of a child's use of standard English grammatical rules from a tape-recorded sample of his spontaneous speech in conversation with an adult. The major strength of this procedure is that it enables one to prepare a profile of the child's linguistic structures (Darley

and Spriestersbach, 1978). In DSS, the sample is scored according to the developmental level of certain grammatical forms used by the child. Therefore, the adult is encouraged to elicit the most representative sample of the child's linguistic skills using toys, pictures, and stimulus materials. A sample of 50 utterances was recommended on the basis that this seemed a reasonable number to expect from even an untalkative, language delayed child in a clinical session (Lee, 1974).

Statisticians have long known that the reliability of a measure increases as the size of a sample of behavior increases (Johnson and Tomblin, 1975). A study explicitly concerned with the effects of sample size on the reliability of language measures of spontaneous speech was conducted by Darley and Moll (1960). The results indicated that a 50-response sample is sufficient for computing the Mean Length of Response (MLR) although a sizeable increase in the number of responses would increase reliability. They suggested that adequate sample size varies with the language measure, and consequently, what is sufficient for MLR may not be for other language measures.

Johnson and Tomblin (1975) used preschool language samples to estimate the reliabilities of the total and component measures of the latest edition of the Developmental Sentence Scoring system (Lee, 1974). Reliabilities were estimated for sample sizes of 5 to 250 sentences, and

it was determined that the estimated reliability values increased for all scoring categories as the sample size increased. Based upon a comparison of the reliability of the DSS total score with the reliability of MLR reported by Darley and Moll (1960), Johnson and Tomblin (1975) suggested that a larger sample must be obtained for the DSS total to attain the equivalent reliability value for MLR and that a very large sample (three and one-half the size recommended by Lee) is necessary before a limited reduction in the standard error of measurement can be achieved. However, their results were limited to the stimulus materials and age range used, and they suggested that reliabilities at different ages might be different.

There have been very few studies in the literature which have investigated the effects of sample size on the reliability of an analysis procedure. The Johnson and Tomblin study (1975) is the only reported study which has investigated the effects of sample size on Developmental Sentence Scoring. Although their experimental group included children aged 4.8 years through 5.8 years, it is critical to investigate the language skills of a younger age group since by four years, most children know the basic semantic-syntactic rules of their language (Menyuk, 1969).

Statement of Purpose

The purpose of this study was to compare the scores obtained from different-sized language samples when utilizing the Developmental Sentence Scoring (DSS) for children aged 4.0 to 4.6 years.

The essential question posed was:

> Is there a significant difference among the scores obtained from language samples of 25, 50, and 75 utterances when using the Developmental Sentence Scoring (DSS) procedure for ages 4.0 to 4.6 years?

CHAPTER II

REVIEW OF THE LITERATURE

Language Sampling

Clinical disciplines are highly reliant on their assessment tools because they provide the clinician with an overview of the client's skills. In a clinical setting, language samples are often obtained during speech and language evaluations by the speech-language pathologist to assess the level of expressive language development of young children. Language samples are assumed to be accurate representations of the children's language skills (McCarthy, 1930; Wilson, 1969; Tyack, 1973). Data from samples can be used for different purposes: to describe the language use of an individual; to compare a child's linguistic performance with that of his peers; to provide a basis for specific remedial language programs; and to measure progress throughout remediation (Tyack, 1973; Darley and Spriestersbach, 1978). Three stages are required in collecting and analyzing a language sample: elicitation; transcription; and analysis.

Elicitation

Clinicians have used various procedures and materials to elicit "spontaneous" language samples. Early studies (McCarthy, 1930; Templin, 1957) utilized toys and pictures which children were asked to describe. Clinicians also have asked questions about an individual's favorite television programs, books, work, hobbies, etc. The most prominent patterns of interaction have been for the clinician to request and for children to respond (Prutting, Bagshaw, Goldstein, Juskowitz, and Umen, 1978). Language samples elicited by unstructured child-adult conversational settings showed significantly more complexity and quantity of language than structured elicitation methods using toys and pictures (Longhurst and Grubb, 1974; Longhurst and File, 1977; James and Button, 1978; Haynes, Purcell, and Haynes, 1979). However, when various stimuli must be used to elicit a sample of the child's speech, the examiner has been cautioned to adapt the selection of materials to the child's preference in the testing situation (Johnson, Darley, and Spriestersbach, 1963).

Whatever elicitation method is chosen, clinicians must follow a standard set of instructions in order to compare the child's performance with that of his peers or with his own later language usage. At present, according to Wilson (1969), there exists a need for a standardized method of obtaining the language sample.

Transcription

Transcription is generally regarded as the most tedious and time-consuming stage of the entire language sampling procedure (Barrie-Blackley, Musselwhite, and Rogister, 1978). The recording methods which precede the transcription phase have also varied with some clinicians writing utterances verbatim during their interaction with the child and others utilizing a tape recorder. Minifie, Darley, and Sherman (1963) stated that real and important differences exist between tape recordings and hand-written recordings. Tape recording allows replaying of the tapes for identifying responses. By tape recording the language samples, the examiner can be sure of obtaining 50 consecutive responses while with hand-written responses, there may often be difficulty in keeping up with the spontaneous speech of children with a possible tendency to omit longer responses. The examiner may also tend to fill in missing words when writing the responses (Minifie, Darley, and Sherman, 1963).

Language transcription should occur soon after taping for fresh recall of contextual information. The transcription is essentially a narrative of the child's verbal behavior which may or may not include the clinician's responses. However, it is advantageous to indicate what the clinician said so one has an adequate reference upon which to focus. While preparing the transcript, one should

double-check his reliability as both the transcriber and typist. Siegel (1962) reported that typists can reliably prepare transcription of tape-recorded responses when provided specific training. An accurate transcription is critical to the analysis which follows.

Analysis

The techniques chosen to analyze the given language sample are dependent on the behavior the clinician is observing. In the past, several analysis methods have been used, e.g., Mean Length of Response (MLR) (McCarthy, 1930); Mean Length of Utterance (MLU) (Brown, 1973); Structural Complexity Scale (SCS) (McCarthy, 1930); Length Complexity Index (LCI) (Miner, 1969); and Developmental Sentence Scoring (DSS) (Lee and Canter, 1971; Lee, 1974).

Response Length

Mean Length of Response

Mean Length of Response (MLR) is usually defined as the number of words per response averaged over a sample of 50 responses (McCarthy, 1930; Shriner, 1969). Shriner and Sherman (1967) in a study designed to evaluate relationships between frequently used expressive measures (Mean Length of Response, Mean of the Five Longest Responses, Number of One-Word Responses, Standard Deviation of Response Length, Number of Different Words, and Structural Complexity Score) and scale values (outside criterion) of language

development obtained by a psychological rating method, concluded that MLR is the most useful among those studied if a single measure is to be used for assessment of language development.

Mean Length of Utterance

Mean Length of Utterance (MLU), a traditional measure of language development, refers to average sentence length measured in terms of morphemes (Barrie-Blackley et al., 1978). According to Shriner (1968), MLU has been found to be highly correlated with psychological scaling judgments of development. Additionally, many specific aspects of syntactic development are correlated with MLU (Brown, 1970).

Structural Analysis

Structural Complexity Scale

The Structural Complexity Scale (SCS) also developed by McCarthy (1930) measures both grammatical complexity and completeness. This procedure requires the division of utterances into complete or incomplete responses. If the responses are complete, they are then classified into the type of sentence and the type of subordination represented. If they are incomplete, classification is based on the type of omission.

Length Complexity Index

A complete analysis of the sentence length and complexity of a 50-utterance sample, according to a numeric weighting system, can be accomplished by using the Length of Complexity Index (LCI) (Shriner and Sherman, 1967). It is a modified combination of MLR and SCS in which the child's final score is the sum of his noun-phrase points, plus verb-phrase points, plus additional points, e.g., for questions and negatives, divided by the number of sentences. The LCI has been used by Barlow and Miner (1969); Griffith and Miner (1969); and Longhurst and Grubb (1974).

Barlow and Miner (1969) compared the test-retest reliability of the LCI with the MLR. Language samples were elicited from seventeen 5-year olds on three separate occasions within a ten-day period. The intra-class correlation coefficient for MLR was $r_i = .65$ for the individual child's responses on subsequent retests of single 50-response language samples. This indicated the considerable variability of MLR as a measure of a child's daily verbal output. The intra-class correlation coefficient for the LCI was $r_i = .80$ for the individual child's responses on subsequent retests of single 50-response language samples. The results indicated that as a language measure, the LCI is a more consistent measure of verbal maturity than MLR. Several factors were considered by Barlow and Miner (1969) which may have possibly affected the reliability of their

results. One was the problem of examiner bias. They suggested the possibility that different examiners obtain different results especially if examiner variables interact with subject and stimulus variables. Another problem was that of stimulus material bias. The pictures used to elicit verbalizations may not have been interesting to the children despite the fact they were so judged by the experimenter. Very few studies according to Barlow and Miner (1969) have implemented the same stimulus materials to elicit verbalizations. Other factors considered were time factors, sample size, and differences between mental ages of males and females.

The reliability of LCI, reportedly, is not significantly increased beyond that determined from a language sample of 15 utterances if the size of the corpus is increased (Griffith and Miner, 1969). Longhurst and Grubb (1974) supported the assumption that LCI is a more sensitive measure than MLR, finding that LCI was least affected by differences in methods of elicitation in their study. The investigators concluded that the grammatical complexity of a child's speech is the most stable verbal characteristic which is least subject to immediate modification by situational variables.

Developmental Sentence Scoring

Developmental Sentence Scoring (DSS) (Lee, 1974) is a subsystem of the Developmental Sentence Analysis (DSA) (Lee, 1974). DSS describes child language on a syntactical level and is a means of analyzing sentences (McCoy, 1977). Based on the analysis of a corpus of 50 sentences, it is intended as an index of a child's use of grammatical rules in spontaneous speech. According to Lee and Canter (1971), only "complete, different, consecutive, intelligible, non-echoic sentences" are to be included in the analysis. The DSS contains eight classifications: indefinite pronouns and/or noun modifiers, personal pronouns, main verbs, secondary verbs, negatives, conjunctions, interrogative reversals, and wh-questions. Weighted scores are assigned to the different forms under analysis, ranging in numerical values of 1 through 8 points. An additional point is given if the entire sentence is "correct" according to adult standard English.

Size of Language Samples

It is not known how large a sample must be to be representative of the child's language skills. The length of the language sample to be analyzed may be an important variable with regard to the results obtained. Traditionally, 60 utterances are obtained of which the first 10 are disregarded because as McCarthy (1930) stated "the

children's responses tended to be somewhat shorter at first, but that there was little change in the mean length after the first 10 or 20 responses." According to McCarthy (1930), fifty utterances "would give a fairly representative sample of the child's linguistic development in a relatively short period of time, without tiring the child with the prolonged observation."

According to Dale (1976), the most informative basic research in language development has been on greater sized samples of 300 to 800 utterances, and in some cases, even larger. Very few studies have dealt explicitly with the effects of sample size on the reliability of language measures. According to the literature, the only studies on sample size were those conducted by Darley and Moll (1960) on Mean Length of Response and Structural Complexity Score; Griffith and Miner (1969) on Length Complexity Index; Johnson and Tomblin (1975) on Developmental Sentence Scoring; and Layton and Stick (1979) on Mean Length of Utterance Measured in Morpheme Units (MLU-M). Darley and Moll (1960) reported that the reliability curve for MLR increased up to 50 utterances then began to plateau; while for SCS, the use of a few more responses than 50 brought about a sizeable change in measurement precision. Layton and Stick (1979) found adequate reliability for MLU-M based on a corpus of 15 utterances extracted from the first portion of a 50-utterance sample. Johnson and Tomblin (1975)

using the DSS reported that the size of an "adequate" sample depended largely on the measure being used. They investigated the reliability of DSS with samples smaller and larger than 50 utterances and concluded that a very large sample (approximately 175 utterances) is necessary before even a limited reduction in the standard error of measurement can be achieved.

The Need for Sample Size Comparisons for DSS

Since a major responsibility of the speech-language pathologists in the public schools is testing large numbers of children, it is intrinsic to an effective diagnostic program to use instruments which are systematic, efficient, and economical in identifying a potential disorder (Hill, 1970). The time factor involved in administering and scoring an instrument is crucial in terms of its applicability and efficiency. However, according to Magnusson (1967), while the need for rapid administration is acute, reliability generally is enhanced by increasing test length. Contrary to this, reliability was found in shortening the length of the Northwestern Syntax Screening Test (NSST) (Lee, 1971) to be 99 percent for a shorter version of the NSST.

The NSST is a way of looking at syntax as is the DSS. In order to develop a time saving, yet clinically valuable instrument for speech-language clinicians with

major screening responsibilities, Ratusnik, Klee, and Ratusnik (1980) shortened the NSST from 20 test items to 11 items receptively and expressively. This shortened version took approximately 10 minutes to administer as opposed to 20. It was also normed in 6-month intervals instead of the one-year intervals of the original NSST since language performance varies greatly from child to child within a year's period, especially in children three to five years of age (Ratusnik et al., 1980). A cross-validation sample of 301 children was administered both versions of the test to determine if identical clinical judgments could be arrived at using either form. Results were very favorable.

A telephone survey by this investigator of 18 speech-language pathologists in the Portland, Oregon area (1980) revealed that although the DSS was regarded as a "favored" analysis method for language samples, the requirement of obtaining, transcribing, and analyzing 50 utterances was too time-consuming and demanding. However, if the DSS could be applied to a shorter sample than 50 utterances, the speech-language pathologists indicated they would be more receptive to using DSS in their diagnostic evaluations of children.

As yet, only the Johnson and Tomblin study (1975) studied the effects of various sample sizes on the reliability of DSS scores. The current study was designed to determine the reliabilities of scores obtained from samples smaller and larger than 50 utterances.

CHAPTER III

METHODS AND PROCEDURES

Subjects

Twelve normally developing children, ranging in age from four years to four years, six months, were chosen to participate in this investigation. The subjects were selected with no preference to sex of the child from the Helen Gordon Child Development Center, Childpeace Montessori School and Day Care, and First Christian Church Day Care Center, all Portland, Oregon, agencies.

Initially, parents of potential subjects were sent permission form letters explaining the nature and purpose of the study (see Appendix A). The children with returned, signed permission forms were then screened for inclusion in the investigation. Other criteria for inclusion were (1) a monolingual speaking background, (2) normal hearing, bilaterally, as defined by audiometric screening at 20 dBHL, and (3) normal receptive vocabulary age which was consistent with chronological age plus or minus 6 months according to the Peabody Picture Vocabulary Test.

Instrumentation

A Sony tape recorder, Model TC-104A and a Sony dynamic microphone, Model MTL F-96 were utilized to record language samples. A portable Beltone 10D audiometer, ANSI 1969, was used to conduct the audiometric screening of the subjects.

The Peabody Picture Vocabulary Test, Form A (Dunn, 1971), an instrument designed to provide an estimate of a subject's verbal intelligence through measurement of receptive vocabulary, was used to determine normal receptive vocabulary age.

The Developmental Sentence Scoring (DSS) (Lee, 1974) procedure was used to analyze individual samples (see Appendix B). The DSS analysis is based on fifty "complete" sentences, in which the term "complete" means that the sentence "must have at least a noun and verb in a subject-predicate relationship" (Lee, 1974). The DSS makes use of eight classifications: indefinite pronouns and/or noun modifiers, personal pronouns, main verbs, secondary verbs, negatives, conjunctions, interrogative reversals, and wh-questions. In this procedure, weighted scores are assigned to later-developing forms. An additional point is given if the entire sentence is "correct."

Procedures

Hearing screening and administration of the Peabody Picture Vocabulary Test, Form A, was performed by the investigator at the time of initial contact with prospective subjects. The children were individually tested in a quiet room at their preschool. The investigator also asked the teacher of each child questions about fluctuating hearing disorders and the native language of the child's family (see Appendix C; Schnabel, 1979). All children meeting the criteria were then included in this investigation.

Each subject was interviewed on 3 separate days at their preschool. Two days but no more than one week elapsed between each visit. Each spontaneous language sample was obtained in a setting familiar to the child and involved the investigator and the subject. The investigator and the child sat across from each other with a small table between them. A brief, unstructured warm-up session lasting no more than 15 minutes preceded each sampling session to help the child feel comfortable with this investigator and the experimental situation. The recording devices were set up prior to the child's entrance into the room. A large piece of felt material was situated under the tape recorder to minimize extraneous noises.

During each visit, a language sample consisting of 25, 50, or 75 utterances was collected. The utterances for each sample were elicited mainly through spontaneous

conversation between the investigator and the child. The child was asked questions which encouraged a complete and syntactically varied sentence response, i.e., open-ended questions. The questions dealt with the subject areas of home, school, future events, and imaginary situations. Various stimuli were introduced only if the child did not respond to conversation.

The stimuli employed in eliciting language samples whenever necessary were toys and pictures. These stimuli were selected with a consideration of the ages and interests of the preschoolers. The picture stimuli were commercially prepared gamelike. One was an assortment of cards depicting pictures of anomalous scenes. The child was instructed to describe each picture. The other picture stimuli were sequential picture cards that consisted of a series of pictures that depicted a story if put in proper sequence. With these stimuli, the subjects were directed to put the pictures in order and tell a story about what was occurring. The toys used were a small barn with farm animals, a doll family and plastic furniture, and a transport truck with cars in it.

The children were divided into groups of two to gather the different-sized samples (see Table I).

TABLE I

ORDER OF SAMPLE COLLECTION

Session	1	2	3
Group I	25	50	75
Group II	25	75	50
Group III	50	25	75
Group IV	50	75	25
Group V	75	25	50
Group VI	75	50	25

Transcription of Samples

After the samples were recorded, the investigator and two speech-language pathology students at the post-baccalaureate and graduate levels, respectively, transcribed the recordings into typed transcripts (see Appendix D; Mathis, 1970). Siegel (1962) suggested that specific training should be provided for typing the transcripts to increase the reliability of the transcripts. The two students were thus trained by this investigator on the method of transcription. After the recordings were transcribed, a corpus consisting of complete, consecutive, different, non-echoic, and intelligible sentences as defined by Lee (1974) were transferred onto the Developmental Sentence Scoring Record Forms (see Appendix E). A sentence

did not need to be correct to be included in the corpus as long as it had the basic subject-verb requirement. Transcriptions were limited to the child's utterance and did not include the adult's statements.

Analysis of Samples

All language samples were analyzed by this investigator according to the Developmental Sentence Scoring (DSS) (Lee, 1974). Weighted numerical scores were given to selected grammatical forms present in the sample (see Appendix B). Scores were entered in eight columns on the DDS Record Form corresponding to the eight categories of grammatical structures. If a structure was attempted, but lacked a feature or requirement of standard English, then an "attempt mark" (a line) was inserted in place of a numerical score. According to the DSS, each acceptable sentence by adult standards received a sentence point (score of 1) even if it was elliptical, i.e., "I can." Any attempt mark within the sentence automatically withheld the sentence point. After the sentences were scored, the sum of the points for each sentence was divided by the number of sentences contained within the corpus to derive a developmental sentence score.

Reliability of Data

Inter- and intra-judge reliability was determined between this investigator and a speech-language pathologist

with a Certificate of Clinical Competence of the American Speech-Language-Hearing Association. A 50-utterance language sample was randomly chosen from the 36 available transcripts, and presented independently to the two judges for the DSS analysis. Inter-judge reliability was .99. A calibration session between the two judges was conducted during which decisions were made about the analysis of various utterances. The remainder of the analyses were then based on these decisions.

Intra-judge reliability was determined by the investigator one week later using 25 utterances randomly picked from the sample utilized in inter-judge comparison. Intra-judge reliability was .96.

Analysis of Data

Analysis I

The means of the developmental sentence scores for each sample size (25, 50, and 75) were computed, thus producing three individual mean scores. Two-tailed t-tests for dependent means were then applied to these scores to determine the significance of the differences among the developmental sentence scores.

Analysis II

Each child's 75-utterance language sample was used for analysis II. A developmental sentence score was computed for the first consecutive 25 utterances of each

sample. The next consecutive 25 utterances were then added to the original 25 to form a sample of 50 utterances for developmental sentence scoring. Thus, two new DSS scores and the original DSS score for the individual 75-utterance language samples were compared using two-tailed *t*-tests for dependent means.

CHAPTER IV

RESULTS AND DISCUSSION

Results

This study sought to compare the scores obtained from different-sized language samples when utilizing the Developmental Sentence Scoring (DSS) (Lee, 1974) for children aged 4.0 through 4.6 years. The research question posed was: Is there a significant difference among the scores obtained from language samples of 25, 50, and 75 utterances when using the DSS procedure for age 4.0 to 4.6 years?

Individual language samples consisting of 25, 50, and 75 utterances were elicited from 12 preschool-aged children. The 36 language samples were scored according to the DSS for Analysis I (see Appendix F). For Analysis II, each child's 75-utterance sample was divided into 3 language samples by scoring the first consecutive 25 utterances to derive a developmental language score, then adding the following 25 consecutive utterances to the original 25 to derive another score for 50 utterances. These scores were then compared with the DSS score for 75 utterances derived from Analysis I. Raw data appear in Appendix G.

Results of a two-tailed *t*-test analysis indicated no statistically significant difference between the 3 different-sized samples used for analysis at the 0.5 level of confidence (see Table II). Similar results were obtained from the data of Analysis II according to the two-tailed *t*-test analysis at the 0.5 level of confidence (see Table III).

TABLE II

COMPARISON OF DSS SCORES FROM DIFFERENT-SIZED LANGUAGE SAMPLES FOR ANALYSIS I

Number of Utterances	Mean	S.D.	df	*t**
25	8.78	2.56	11	.77
50	8.17	1.26		
25	8.78	2.56	11	0.26
75	8.61	1.12		
50	8.17	1.26	11	-1.12
75	8.61	1.12		

*Critical value of *t* = 2.20

TABLE III

COMPARISON OF DSS SCORES FROM DIFFERENT-SIZED LANGUAGE SAMPLES FOR ANALYSIS II

Number of Utterances	Mean	S.D.	df	t*
25	8.89	1.56	11	.34
50	8.78	1.31		
25	8.89	1.56	11	.76
75	8.61	1.12		
50	8.78	1.31	11	.84
75	8.61	1.12		

*Critical value of t = 2.20

Discussion

The size and age of the population, experimental design, and results in the present study differed from those of Johnson and Tomblin (1975). In the literature reviewed by this investigator, their study proved to be the only other study which investigated the reliability of the DSS with different-sized language samples. While their study included 50 children, aged 4.8 to 5.8 years, this study sampled 12 preschoolers, 4.0 to 4.6 years old, since it has been suggested that most children know the

basic semantic-syntactic rules of their language by age four (Menyuk, 1969). In the Johnson and Tomblin (1975) study, 25 sentences were randomly selected from each corpus of 50 sentences for analysis according to the DSS. Each selected sample was then divided into five, five-response segments and DSS total and component scores were tabulated for each segment. Whereas results from the present study indicated that samples smaller or larger than 50 utterances can validly represent a child's grammatical skills, Johnson and Tomblin (1975) reported that a very large sample (175 utterances) is necessary before even a limited reduction in the standard error of measurement can be achieved.

Examination of the raw data of Analysis I (see Appendix F) revealed that 8 subjects exhibited internal consistency in their DSS scores across all sample sizes. Although subjects 5, 6, and 9 presented higher DSS scores for their 25-utterance samples than for the 50-utterance samples, the latter sample was still within age level norms. This finding may have resulted from the day or time the particular language sample was elicited. The 25-utterance language samples for subjects 5 and 6 were elicited on the second visit. Their familiarity with the examiner by the second visit might have influenced the increased DSS value of their 25-utterance sample over the 50-utterance sample. However, the DSS score exhibited by subject 9 on his 50-utterance sample which was elicited on the last

visit was lower than the scores for his 25 and 75-utterance samples.

Comparison of the DSS scores of subjects 8 and 10 in Analysis I (see Appendix F) with the DSS norms for ages 4.6 and 4.5, respectively, revealed that their scores were below the norms for the 25-utterance samples, and they may have received a false-positive rating in language delay. However, the DSS scores for the 50-utterance samples of subjects 8 and 10 showed their performance to be within normal limits. According to Lee (1974), the DSS is a measure of a child's spontaneous use of grammatical rules at a particular time in a particular setting, and children scoring close to the 10th-percentile line need to be evaluated further. Lee (1974) also emphasized that the decision on enrollment or continued enrollment in remedial language teaching should never be made on the basis of one DSS score alone. Therefore, if a child appears to be language delayed according to a 25-utterance language sample, another language sample should be elicited and analyzed to determine if the child is indeed functioning below the norms or is normal.

Further examination of the raw data of the 25-utterance language samples for all subjects in Analysis I (see Appendix F) showed there were no trends toward higher scores in the language samples if sampling occurred after the first visit. A 25-utterance language sample taken on the

first visit appeared to be a typical sample of the child's grammatical skills when compared to larger-sized language samples elicited on subsequent visits.

Through visual inspection, all grammatical categories were observed in all the different-sized samples in all children. The grammatical categories represented in the 25-utterance samples were similar to those in the 50- and 75-utterance samples. Although not statistically examined, this observation supports Koenigsknecht's (1974) finding that the effects of warm-up and general adjustment to the conversational setting did not favor significantly better grammatical usage on the latter utterances in a corpus.

During most of the interviews, only conversation was employed to elicit the responses for the language samples. Toys and other stimuli were used on only 2 occasions, both of which were last visits with 2 individual subjects. One child had just returned to school after a brief illness, and did not appear willing to talk. The other child was "tired of talking." Generally, this investigator prepared a list of 10-15 new open-ended questions before the next visit with each child. Variety in the subject matter of the questions posed seemed to be important in stimulating creative conversation. If the same question was used over two visits, i.e., "What did you do this weekend?" the child's response tended to be identical to the one from the last visit.

By way of summary, one may say that the speech-language pathologist can expect to obtain a representative sample of the child's grammatical skills when using language samples that are shorter or longer than the 50-utterance sample required by Lee (1974) if the population tested is similar to those of this study. The difference among the scores from the different-sized samples used in this study was not statistically significant. This author, therefore, believes that a clinician, who would like to utilize the DSS but does not have the time to elicit and score 50 or more utterances, can utilize the DSS on a 25-utterance sample to obtain a valid overview of the child's grammatical development. However, there are two cautions when using the 25-utterance sample for DSS analysis. As stated by Lee (1974), the DSS is far too complicated to be a satisfactory initial diagnostic tool. It is better used as a method of tracing a child's progress throughout the period of clinical teaching and also to aid in determining when to dismiss him from remedial teaching. Further, the shorter sample would be more appropriate for screening purposes since the results of this study indicated the possibility of achieving false-positives.

CHAPTER V

SUMMARY AND IMPLICATIONS

Summary

Assessment of language abilities is an integral part of accruing information on the development of concept formation and the learning of grammatical rules. The maturity and complexity of a child's language can be assessed through the use of a language sample. The sample consists of a specified number of utterances which are emitted spontaneously and then analyzed according to a given procedure.

Developmental Sentence Scoring (DSS) (Lee, 1974) is a method for making a detailed, readily quantifiable and scored evaluation of a child's use of standard English grammatical rules. In DSS, the sample must have 50 sentences with a noun and verb predicate relationship. Research on the validity of language samples smaller and larger than 50 utterances for DSS analysis is limited.

The purpose of this study was to determine if there is a significant difference among the scores obtained from language samples of 25, 50, and 75 utterances when using the DSS procedure for ages 4.0 through 4.6 years. Twelve children, selected on the basis of chronological age, normal

receptive vocabulary skills, normal hearing, and a monolingual background, participated as subjects.

Three language samples of 25, 50, and 75 utterances were elicited from each child and analyzed according to the DSS procedure. A t-test analysis was conducted to determine the difference among the means of the scores.

No significant difference resulted among the scores for the different-sized samples. The results indicated a speech-language pathologist may utilize the DSS for analyzing 25- and 75-utterance language samples for ages 4.0 to 4.6 years to obtain a valid representation of the child's grammatical skills instead of employing only a 50-utterance language sample. However, it is recommended that one uses a 25-utterance language sample for screening and intervention purposes only. According to Lee (1974), the DSS is better used as a method of tracing a child's progress throughout clinical teaching and to aid in determining when to dismiss the child from remedial teaching. For diagnostic purposes, one should use the 50-utterance sample along with other instruments since Lee (1974) cautioned that a comparison of the child's DSS score with the mean of his chronological age group yields only limited and rather gross information about language development.

Implications

Research

This investigation has demonstrated that a 25- or a 75-utterance language sample can provide a valid representation of a child's grammatical skills when using the Developmental Sentence Scoring analysis. Implementation of the DSS, then, does not need to be restricted to a 50-utterance language sample as required by Lee (1974). These results do not agree with those of Johnson and Tomblin (1975) who indicated the importance of using very large language samples to obtain a reliable measure. This investigation, then, has furthered research on the effect of sample size on validity.

Subjects in this investigation were randomly selected from a "normal" population and from a narrow age range. It may be of interest to apply the DSS to language samples of language delayed children since this population constitutes a major portion of a speech-language pathologist's caseload. Perhaps it is vital to elicit only language samples larger than 50 utterances to obtain a representative sample of the language delayed child's use of grammatical rules because of his limited language skills. The performance of children older than the age group used in this study might also yield different results.

Aside from this study, this investigator informally noted that some sentences which appeared to be complex

on face value were given very few points as compared to a shorter 3-4 word sentence during DSS analysis. For example, the sentence, "I saw a terrible thing yesterday," scored a total of 4 points as opposed to 10 points for the sentence, "I don't know." Often, the scoring procedure did not seem to consider all of the child's grammatical capabilities because of the limited categories. Future research might consider the examination of the possibility of including other categories in a grammatical analysis.

Clinical

Contrary to past research (McCarthy, 1930; Darley and Moll, 1960; Johnson and Tomblin, 1975), the findings of this study indicate that a 25-utterance and a 75-utterance language sample are valuable in assessing a child's grammatical skills when analyzed according to the DSS for ages 4.0 to 4.6 years. For evaluative purposes, the clinician may use the 25-utterance language sample for DSS analysis to gain information needed for remediation of language skills.

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APPENDIX A

PERMISSION FORM

I agree to let my child _____ participate as a subject in the study entitled "Developmental Sentence Scoring Sample Size Comparison." This study is carried out by Marilyn Valenciano under the supervision of Joan McMahon, thesis director, Speech and Hearing Sciences Program, Portland State University.

The purpose of the study is to compare the scores obtained from language samples of 25, 50, and 75 sentences when using the Developmental Sentence Scoring procedure in order to determine which size gives the most useful information.

There are no risks or dangers inherent in the procedures of the study. My child will be given a hearing screening, hearing vocabulary test, and then will simply participate in conversations with Marilyn Valenciano on three separate occasions. Subjects are free to withdraw from the study at any time.

_____
Signature of Parent/Guardian

_____
Date

Birthdate of Child ___-___-___
Mo. Day Yr.

Please return this form indicating your approval (or disapproval) with your child tomorrow. If you have any questions, leave a message with the director at the preschool and I will return your call. (M. Valenciano)

APPENDIX B

DEVELOPMENTAL SENTENCE SCORING CATEGORIES AND REWEIGHTED SCORES

	INDEFINITE PRONOUNS OR NOUN MODIFIERS	PERSONAL PRONOUNS	MAIN VERBS	SECONDARY VERBS
1	it, this, that	1st and 2nd person: I, me, my, mine, you, your(s)	A. Uninflected verb: I see you. B. Copula, is or 's: It's red. C. is + verb + ing: He is coming.	
2		3rd person: he, him, his she, her, hers	A. -s and -ed: plays, played B. Irregular past: ate, saw C. Copula: am, are, was, were D. Auxiliary am, are, was, were	Five early-developing infinitival complements: I wanna see (want to see) I'm gonna see (going to see) I gotta see (got to see) Lemme [to] see (let me [to] see) Let's [to] play (let [us to] play)
3	A. no, some, more, all, lot(s), one(s), two (etc.), other(s), another B. something, somebody, someone	A. Plurals: we, us, our(s) they, them, their B. these, those		Non-complementing infinitives: I stopped to play. I'm afraid to look. It's hard to do that.
4	nothing, nobody, none, no one		A. can, will, may + verb: may go B. Obligatory do + verb: don't go C. Emphatic do + verb: I do see.	Participle, present or past: I see a boy running. I found the toy broken.
5		Reflexives: myself, yourself, himself, herself, itself, themselves		A. Early infinitival complements with differing subjects in kernels: I want you to come. Let him [to] see. B. Later infinitival complements: I had to go. I told him to go I tried to go. He ought to go. C. Obligatory deletions: Make it [to] go. I'd better [to] go. D. Infinitive with wh-word: I know what to get. I know how to do it.
6		A. Wh-pronouns: who, which, whose, whom, what, that, how many, how much I know who came. That's what I said. B. Wh-word + infinitive: I know what to do. I know who(m) to take.	A. could, would, should, might + verb: might come, could be B. Obligatory does, did + verb C. Emphatic does, did + verb	
7	A. any, anything, anybody, anyone B. every, everything, everybody, everyone C. both, few, many, each, several, most, least, much, next, first, last, second (etc.)	(his) own, one, oneself, whichever, whoever, whatever Take whatever you like.	A. Passive with get, any tense Passive with be, any tense B. must, shall + verb: must come C. have + verb + en: I've eaten D. have got: I've got it.	Passive infinitival complement: With get: I have to get dressed. I don't want to get hurt. With be: I want to be pulled. It's going to be locked.
8			A. have been + verb + ing had been + verb + ing B. modal + have + verb + en may have eaten C. modal + be + verb + ing could be playing D. Other auxiliary combinations: should have been sleeping	Gerund: Swinging is fun. I like fishing. He started laughing.

NEGATIVES	CONJUNCTIONS	INTERROGATIVE REVERSALS	WH-QUESTIONS
it, this, that + copula or auxiliary is, 's, + not: It's not mine. This is not a dog. That is not moving.		Reversal of copula: Isn't it red? Were they there?	
			A. who, what, what + noun: Who am I? What is he eating? What book are you reading? B. where, how many, how much, what...do, what...for Where did it go? How much do you want? What is he doing? What is a hammer for?
	and		
can't, don't		Reversal of auxiliary be: Is he coming? Isn't he coming? Was he going? Wasn't he going?	
isn't, won't	A. but B. so, and so, so that C. or, if		when, how, how + adjective When shall I come? How do you do it? How big is it?
	because	A. Obligatory do, does, did: Do they run? Does it bite? Didn't it hurt? B. Reversal of modal: Can you play? Won't it hurt? Shall I sit down? C. Tag question: It's fun, isn't it? It isn't fun, is it?	
All other negatives: A. Uncontracted negatives: I can not go He has not gone. B. Pronoun-auxiliary or pronoun-copula contraction: I'm not coming. He's not here C. Auxiliary-negative or copula-negative contraction: He wasn't going. He hasn't been seen. It couldn't be mine. They aren't big.			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?
	A. where, when, how while, whether (or not), till, until, unless, since, before, after, for, as, as + adjective + as, as if, like, that, than I know where you are. Don't come till I call. B. Obligatory deletions: I run faster than you (run) I'm as big as a man (is big) It looks like a dog (looks) C. Elliptical deletions (score 0) That's why (I took it) I know how (I can do it) D. Wh-words + infinitive: I know how to do it. I know where to go.	A. Reversal of auxiliary have: Has he seen you? B. Reversal with two or three auxiliaries: Has he been eating? Couldn't he have waited? Could he have been crying? Wouldn't he have been going?	whose, which, which + noun Whose car is that? Which book do you want?

APPENDIX C

QUESTIONS FOR TEACHERS

1. Has this child ever had ear or hearing problems? Please explain.
2. Has this child ever been taken to a doctor for an ear problem?
3. Has he/she ever had draining or running ears?
4. Would you say this child has had the problem: once; more than once; many times?
5. At what age did the parents of this child first discover the problem? At what age did it seem to go away?
6. What language is spoken in this child's home?

(from Schnabel, "Central Auditory Processing in Children with a History of Chronic Middle Ear Problems," 1979)

APPENDIX D

TRANSCRIPT TYPIST INSTRUCTION

In a speech situation between an adult and a child, tape recordings have been made. These tape recordings are the only information we have regarding the conversation taking place between these two people; so, for this reason, it is critical that the typing be accurate. There are certain general and specific instructions that you need to adhere to at all times in transcribing these tape recordings.

A. General Instructions

1. Use the letter A to designate utterances by the adult and use the letter C to designate a response by the child.
2. Do not use standard punctuation, other than apostrophes, which are to be used to indicate the possessive case or contractions.
3. Any response or part of response, i.e., episode, which you cannot comprehend after diligent effort to determine what is being said, omit that entire episode from the transcript, even one word in an otherwise intelligible response. Since the language of children is not predictable by adult standards, one should not over rely on context clues for unclear or missing words. Many factors may contribute to the utterance being unintelligible: too low an intensity of utterance, environmental noise, speech defect, two people talking at once or the recorder is misfunctioning. Do note that an unintelligible episode has occurred.
4. The speech response need not be a complete thought; but, if all words are intelligible, include the response as one speech episode.
5. At times, you will find both the adult and child talking at the same time. First type the complete response of the person being interrupted and, then, type the other speaker's utterance.
6. Certain utterances are not meaningful words, but are vocal pauses, such as <u>er</u>, <u>ah</u>, <u>andah</u>, <u>um</u>, etc. Do not type vocal pauses.

7. Some words acoustically similar to meaningless interjections are considered as real words and should be typed, such as huh-uh, uh-huh, hm, or animal sounds which are used in lieu of the name of the animal in a thought. An example would be, "The grr is after the boy." Another example of a noise being an integral part of the response would be, "The cat goes meow."
8. Word and phrasal repetitions are excluded if they represent natural non-fluencies as opposed to repeating for stress or elaboration. An example would be, "He he he went home." The underlined words in this example would not be typed.

B. Determining and Designating a Vocal Response Unit
1. Usually, a vocal response unit is ended by a complete stop for breath.
2. At times, it is indicated by a falling inflection.
3. At other times, it is indicated by a rising inflection, such as in a question or exclamation.
4. At times, you may be able to recognize that one speech episode is complete when one person stops talking and the other person begins.
5. A vocal response unit may be the utterance of a single word, such as, uh-huh, if it is an affirmation, huh-uh for negation, huh for interrogation or oh for exclamation.
6. A single word response that is not recognizable as a word or a word approximation is considered not to be a vocal response unit and should not be transcribed. As an example, if the response to the phrase, "The flag is red, white, and ..." was "dom," this would not be considered a vocal response; however, if the response was "boo," it is conceivable that this is a verbal approximation of "blue."
7. When one simple sentence is followed immediately by another simple sentence with no pause for breath, the two are considered to comprise one sentence if the second statement is clearly subordinate to the first. Examples: "I have a sister she's in fourth grade" and "I see a car it's a Ford."
8. Remarks which appear to be clearly enumerative, separated by pauses, are considered separate response units.

C. How to Mark the Transcript
   1. Indicate the beginning word of any speech episode by underlining it; and make the appropriate ending response which is a single slash (/) for a statement and a double slash (//) for a question.
   2. It is important that, even if the episode is composed of only one word, it must be underlined and followed by the appropriate slash mark.
   3. It is important to remember that each speaker must be designated appropriately and accurately.

(from Mathis, "Comparison of Amounts of Verbal Response Elicited from a Speech Pathologist in the Clinic and a Mother in the Home," 1970)

APPENDIX E

DEVELOPMENTAL SENTENCE SCORING RECORD FORM

Name:

Birthdate:

Sentence Sample	Indef Pro	Pers Pro	Main Verb	Sec Verb	Neg.	Conf	Intr Rev.	Wh-Q	Sent. Point	Total
1. What are those?		3	2				1	2	1	9
2. It's my mom's.	1	1	1						1	4
3. It was a school day?	1		2				-			3
4. I was sick.		1	2						1	4
5. It didn't hurt me.	1	1	6		7				1	16
6. I don't know.		1	4		4				1	10
7. I didn't.		1	inc		7				1	9
8. I played.		1	2						1	4
9. I don't have puppets but I got cars.		1,1	4,-		4	5				15
10. How come they're winding?		3	2					7	1	13
11. A big jeep car is about that big.			1						1	2
12. It's my old toy.	1	1	1						1	4
13. I'm not sick today.		1	2		7				1	11
14. Did you tell the teacher where I was?		1,1	6,2			8	6		1	25
15. I didn't care.		1	6		7				1	15
16. (And) I came back tomorrow.		1	-							1
17. I've got hearts at home.		1	7						1	9
18. I got a big heart.		1	2						1	4
19. I wrote my mom's name.		1,1	2						1	5
20. Stuff's made out of paper.			2							2
21. Know when it's my birthday?	1	1	-,1			8	-			11
22. I want to do.		1	1	-						2
23. (Because) you'll miss your birthday cake.		1,1	4						1	7
24. Know what?			-				-			0

Sentence Sample	Indef Pro	Pers Pro	Main Verb	Sec Verb	Neg.	Conf	Intr Rev.	Wh-Q	Sent. Point	Total
25. When my grandma was at a friend's house she made popcorn balls.		1,2	2,2			8			1	16
26. That's good.	1		1						1	3
27. They're so round.		3	2						1	6
28. You can't even see through them.		1,3	4		4				1	13
29. I love popcorn.		1	1						1	3
30. They cooked them.		3,3	2						1	9
31. They put 'em in.		3,3	1						1	8
32. Then they put 'em in the popcorn can.		3,3	1						1	8
33. They popped so high.		3	2						1	6
34. They even popped the lid off.		3	2						1	6
35. Have you seen a monster?		1	7				8		1	17
36. I think they eat mud.		1,3	1,1						1	7
37. (Cause) they're monsters.		3	2						1	6
38. It's not going to even rain.	1		1	3	1				1	7
39. I play basketball and football.		1	1			3			1	6
40. I play soccer.		1	1						1	3
41. It's fun.	1		1						1	3
42. When the ball comes.			2							2
43. I kick it so high.	1	1	1						1	4
44. It goes over the wall.	1		2						1	4
45. (And) the teachers go get it.	1		1	5					1	8
46. My friend's Reuben.		1	1						1	3
47. He's five.	3	2	1						1	7
48. How come you got that soccer ball in here?	1	1	-					7		9
49. Watch (Command)			1						1	2
50. Look what I found.		6,1	1,2						1	11
						TOTAL				362
						Divide by 50				7.2
						Refer to Figure 1				

APPENDIX F

TOTAL POINTS AND DSS SCORES FOR EACH CHILD'S DIFFERENT-SIZED SAMPLES FOR ANALYSIS I

	25 utterances		50 utterances		75 utterances	
Subject #	Total Points	DSS Score	Total Points	DSS Score	Total Points	DSS Score
1	230	9.2	510	10.2	605	8.06
2	211	8.44	371	7.42	544	7.25
3	154	6.16	306	6.12	579	7.72
4	250	10	467	9.34	751	10.01
5	383	15.32	385	7.7	710	9.46
6	264	10.56	394	7.88	651	8.68
7	193	7.72	394	7.88	672	8.96
8	152	6.08	363	7.26	515	6.86
9	239	9.56	346	6.92	739	9.85
10	149	5.96	417	8.34	552	7.36
11	202	8.08	511	10.22	729	9.72
12	209	8.36	440	8.8	713	9.50

APPENDIX G

TOTAL POINTS AND DSS SCORES FOR EACH CHILD'S DIFFERENT-SIZED SAMPLES FOR ANALYSIS II

	25 utterances		50 utterances		75 utterances	
Subject #	Total Points	DSS Score	Total Points	DSS Score	Total Points	DSS Score
1	220	8.8	409	8.18	605	8.06
2	171	6.84	380	7.6	544	7.25
3	205	8.2	427	8.54	579	7.72
4	229	9.16	526	10.52	751	10.01
5	232	9.28	434	8.68	710	9.46
6	162	6.48	419	8.38	651	8.68
7	209	8.36	397	7.94	672	8.96
8	230	9.2	363	7.26	515	6.86
9	279	11.16	539	10.78	739	9.85
10	184	7.36	364	7.28	552	7.36
11	274	10.96	546	10.92	729	9.72
12	273	10.92	466	9.32	713	9.50