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Developmental Sentence Scoring: A Comparative Study Conducted in Portland, Oregon

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Title: Developmental Sentence Scoring: A Comparative Study
         Conducted in Portland, Oregon.

APPROVED BY MEMBERS OF THE THESIS COMMITTEE:

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          Oral language sampling and analysis are tools available
to the speech-language clinician, which are often helpful in
obtaining information regarding the development of expressive
language in children.   In the past, a child's language has
been judged to be mature based upon the length of the utter-
ance and/or the grammatical complexity.

The purpose of this investigation was to replicate the study conducted by Lee and Canter (1971) and Lee (1974a) to determine if a significant difference among the scores in the two studies existed due to geographical location, and to initiate the establishment of norms for the Portland, Oregon geographical area. Forty children, selected on the basis of chronological age (4.0 to 4.11 years), normal receptive vocabulary skills, normal hearing, and a monolingual background, participated as subjects. A language sample of fifty utterances was elicited from each child and analyzed according to the Developmental Sentence Scoring (DSS) procedure.

DSS means, standard deviations, percentiles, range of the average score, mean weighted developmental score for each grammatical category, and mean number of DSS utterances earning a sentence point were compiled. A t-test analysis was conducted to determine if a difference exists between the means of the scores for the two geographical locations.

A significant difference resulted between the mean scores obtained in the Midwest and in Portland, Oregon. The results indicate that a statistically significant difference in the mean DSS score exists (p < .05) and may be attributable to differences in the geographical location in which the scores were obtained. Differences in scores do not appear to be attributable to variables in subject selection, i.e., socio-economic background, receptive language vocabulary scores, etc.

Although slight variation in the examiner's form

of elicitation and use of stimulus materials may possibly explain some of the differences found in the grammatical categories, it appears an unlikely possibility that this variation could account for the statistically significant difference found between the mean DSS scores of the two studies. In addition, the differences do not appear to be the result of stimulus materials or transcription methods used.

The norms compiled by Lee (1974a) in the Midwest, differ significantly from those obtained in this study, conducted in Portland, Oregon. It appears likely that score differences in other geographical areas may exist as well. In order to conduct a thorough and competent evaluation of a child's expressive language abilities, the data from this investigation reflect the need for the speech-language clinician to use the DSS norms cautiously and/or to establish norms specific to a geographical region.

DEVELOPMENTAL SENTENCE SCORING: A COMPARATIVE

STUDY CONDUCTED IN PORTLAND, OREGON

by

KATHRYN MARIE MCCLUSKEY

A thesis submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN SPEECH COMMUNICATION:
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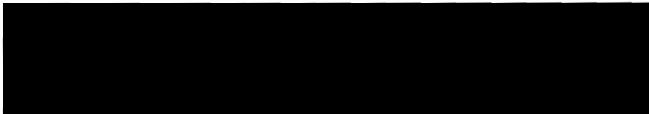
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TO THE OFFICE OF GRADUATE STUDIES AND RESEARCH:

The members of the Committee approve the thesis of Kathryn Marie McCluskey presented February 10, 1984.

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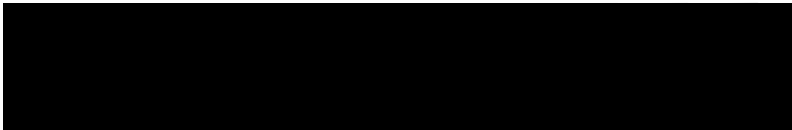
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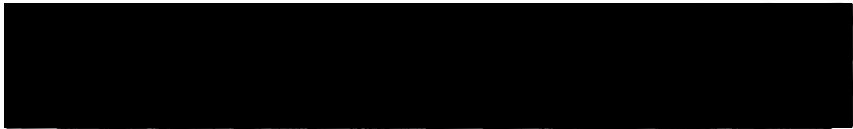
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DEDICATION

This thesis is dedicated to Richard, my husband and "best friend," who, by giving me his love and support, made this study a joy that was shared. This thesis is also dedicated to my sons, Christopher and Andrew, who, by their development of verbal expression, have made the phenomenon of language a wonder to behold.

ACKNOWLEDGMENTS

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CHAPTER I

INTRODUCTION AND STATEMENT OF PURPOSE

Introduction

In the past three decades, research in the field of
speech and communication sciences has focused on the develop-
ment of normal language acquisition. Semantic and syntactic
components of language are the emphasis for investigators
seeking more information regarding language; no longer do
the phonological aspects of language serve to describe lan-
guage development in children.

Elaborate psycholinguistic studies on language devel-
opment of a few children have provided valuable information
on the growth of syntactic structures, utilizing Chomsky's
(1957, 1965) transformational grammar as the basis of analy-
sis (Brown and Fraser, 1964; McNeill, 1966; Bloom, 1970). Ad-
ditionally, based on recorded language samples, many investi-
gators have informally traced the development of a single
grammatical category with children of successive chronolog-
ical ages (Menyuk, 1964; Klima and Bellugi, 1966; Brown, 1968;
Bloom, 1970).

While the methods for syntactic structure analysis in
these investigations have varied, the assumption is that
words which occupy the same position in a series form a

grammatical class and are developmental in nature. Therefore grammatical rules could be written to account for this development (McNeill, 1970). A systematic method was needed to compare these sets of rules and to determine syntactic growth.

In 1971, Lee and Canter provided a systematic tool for assessing children's expressive language: <u>Developmental Sentence Scoring</u> (DSS). A specific scoring system was developed and normative data were collected in order to estimate the grammatical complexity of children's speech. By analyzing a child's spontaneous, tape-recorded speech sample, the speech-language clinician is able to estimate the extent to which grammatical rules have been sufficiently generalized for use in the child's verbal performance. In recent years, the DSS has been used as a comparative measure in speech and language studies and used extensively as an analytical tool in determining expressive language delay (Carrow, 1974b; Longhurst and File, 1977; Kramer, James, and Saxman, 1979).

There appear to be no studies reported in the literature investigating the extent to which descriptive DSS normative data varies dependent upon the geographical area in which it was obtained. The need exists to provide comparative data from a variety of geographical areas in order to support or refute rationale for interpretation of language performance based upon data obtained in the Midwest (Koenigsknecht, 1974).

Statement of Purpose

The purpose of this study was to compare DSS normative data (Koenigsknecht, 1974), with the data obtained in Portland, Oregon, for children ages 4.0 to 4.11 years. A secondary purpose was to initiate the development of norms for the geographical area of Portland using the DSS procedure.

The essential questions this investigation sought to answer were:

1. What are the descriptive statistics of the DSS on language samples obtained in Portland, Oregon, represented by:

   a. the DSS mean and standard deviation of the overall DSS score;
   b. the range and percentiles of the average DSS sentence score;
   c. the mean weighted developmental scores for each of the DSS component grammatical categories; and
   d. the mean number of DSS utterances earning a sentence point for grammatical completeness?

2. Is there a significant difference in the mean DSS score obtained by Lee (1974a) and reported by Koenigsknecht (1974) in the Midwest and that obtained in Portland, Oregon?

CHAPTER II

REVIEW OF THE LITERATURE

Oral language sampling, as a research and clinical technique, is a valuable tool for assessing the level of expressive language development in young children. This review of the literature presents historical information regarding the types of expressive language analyses and the variables that may influence the elicitation and transcription of these systems. Since the DSS is the focus of this research, a description of the procedures, population, and geographical area used in standardizing the DSS system is presented in.order to provide information on the normative data of the original studies (Lee and Canter, 1971; Lee, 1974a). Clinical use and interpretation of these normative data are described. Finally, studies indicating the need for conducting investigations in various geographical areas in oral language sampling are presented.

Types of Oral Language Sampling

The past fifty years have witnessed a variety of language sampling analysis systems. The earliest procedures focused on the length of a child's utterance rather than on grammatical complexity.

Response Length

Mean Length of Response

Nice (1925) postulated that the average length of a child's sentence be used as an index of a child's language development. In 1930, McCarthy measured children's language using fifty consecutive, verbatim, verbal utterances as elicited through the use of pictures, books, and toys; the number of words per response was averaged, yielding a Mean Length of Response (MLR).

Mean Length of Utterance

Mean Length of Utterance (MLU) represents the average sentence length as measured in morphemes, rather than words, and has been used by many recent investigators (Brown, 1973; Tyack, 1974).

Other Measures of Length

Minifie, Darley, and Sherman (1963) analyzed children's expressive language based on the Mean of the Five Longest Responses; the Total Number of Words has been employed by Hass and Wepman (1973).

Grammatical Complexity

Investigators discovered the length of a child's utterance did not provide sufficient information regarding the expressive maturity or complexity of a child's language. Measures were thus created to describe a child's language in

terms of structural complexity.

Structural Complexity Scale

The <u>Structural Complexity Scale</u> (SCS) was developed by McCarthy (1930) to measure grammatical complexity and completeness. Utterances were divided into complete and incomplete responses and classified as to sentence type.

Length of Complexity Index

Miner (1969) used the <u>Length of Complexity Index</u> (LCI) as an analysis of sentence complexity and length according to a numeric weighting system in which the final score is the sum of the points assigned for noun-phrases, verb-phrases, and additional points for questions and negatives, divided by the number of sentences.

Developmental Sentence Scoring

Lee and Canter (1971) and Lee (1974a) used the <u>Developmental Sentence Scoring</u> (DSS). This measure was designed to specify the developmental level of a child's grammar by weighted scoring of selected syntactical structures in complete sentences. Based on a corpus of fifty complete, different, consecutive, non-echoic sentences, weighted scores are assigned to the following eight grammatical classifications: indefinite pronouns and/or noun modifiers, personal pronouns, main verbs, secondary verbs, negatives, conjunctions, interrogative reversals, and wh-questions. An additional point is given if the entire sentence is grammatically

and semantically correct according to adult Standard English.

Factors Influencing Elicitation and Transcription of Oral Language Sampling

With the development of a variety of analytical systems for evaluating children's expressive language, the need now exists to control the effects of variables, whenever possible, on clinical oral language sampling. Speech-language clinicians must be aware of the variables affecting elicitation and transcription of oral language in order to manipulate them systematically to derive representative and meaningful results.

There are many factors which influence the "representativeness" of a child's oral language from elicited samples. Studies involving subject variables, such as socio-economic status and sex reflect differences in language performance. For example, lower socio-economic groups use shorter language utterances, fewer morphemes, and less complex grammatical structures (McCarthy, 1930; Jones and McMillan, 1973). Watson (1976) found four-year old males produced more mature language as measured by MLU as compared to females' elicitations.

The literature suggests that the interaction of subject and examiner characteristics can affect the syntactical sophistication of the child's utterance. For example, in most studies reviewed, the examiner was an adult (McCarthy, 1930; Templin, 1957). In several recent studies, however, other

children interacted with the subject (Jones and McMillan, 1973; Welkowitz, Cariffe, and Feldstein, 1976). Differences in verbal length and complexity due to the interaction with other children were not reported by these investigators.

Shatz and Gelman (1973) studied the ability of four-year olds to adjust to a listener and found that all subjects adjusted their oral language on the basis of the listener's age. Language addressed to two year olds was characterized by shorter, less complex utterances than that addressed to adults.

Comparison of samples collected in a variety of settings, e.g., home, clinic, and playroom, have been made (Mueller, 1972; Johnson, 1974; Longhurst and Grubb, 1974). Unfortunately, none of these studies compared samples in which all the variables except the setting variable were held constant. Therefore, it is not possible to determine, from these investigations, the influence of different settings on the quantity and quality of a child's expressive language.

Persons or objects located in the room may have an effect on the language sample obtained. Smith (1970) found a significantly greater amount of speech in terms of total number of words and responses when three other children were present, than when the child was alone with the examiner.

The type of stimulus material may affect the quality as well as the quantity of expressive language. Mintun (1968) presented toys, still pictures, and movies to three groups of educable mentally retarded children and found the film medium

elicited significantly higher LCI scores than pictures. The toy medium resulted in a larger number of different words and a higher MLR score. Ahmed (1973) presented both single object and multi-object pictures to elicit language samples. The study found multi-object pictures yielded higher scores for LCI and MLR.

Few, if any, studies have reported the effects of instructions and/or modeling procedures on oral language, although several investigators have noted the need for such research (Cowan, Weber, Hoddinott, and Klein, 1967; Jones and McMillan, 1973; Longhurst and Grubb, 1974).

It appears, from the literature, that variations in written transcription affect oral language sampling results. Siegel (1962) suggested that the use of longhand recording of MLR increased the inaccuracy of obtaining values. Betts (1934) described a study in which oral language recordings represented only 32 percent of the children's utterances when recorded in longhand. Contextual factors, intelligibility, complexity, and/or response length, and the transcriber's training may influence live and taped transcriptions (Barrie-Blackley, Musselwhite, and Rogister, 1978).

Siegel (1962) also emphasized the importance of designating remarks and questions made by the examiner, especially with regard to sampling language of very young children in non-clinical settings. Noting utterances made by the examiner has provided a context, enabling the clinician to transcribe samples more accurately.

In preparing transcriptions, the segmentation of a child's verbalizations into units is an important issue and many investigators have found it necessary to use specific transcription and segmentation rules. For example, McCarthy (1930) considered a response to be a separate unit "if it was marked off from the preceding and succeeding remarks by pauses." Siegel (1962) defined a vocal unit as being "marked off on either side by a pause or by some change in inflection." With regard to segmenting a sample, Lee (1974a) states, "The transcriber must use intonational cues." Additionally, she provided other segmentation strategies in the form of five rules for segmenting compound sentences (Appendix A).

Failure to control variables and/or report specific methodology has made comparison studies and standardization nearly impossible.

Using Normative Data in the Analysis of Oral Language Sampling

Leonard (1972) noted that the lack of uniform and carefully controlled procedures in oral language sampling might invalidate conclusions or result in misinterpretations and inappropriate management procedures and cautioned clinicians about the use of normative data.

In order to use normative data provided by researchers in the area of expressive language, it is necessary to be cognizant of the nature of the sample, the geographical area

in which it was obtained, and the procedures in which an an-
alysis system has been standardized. Knowledge of specific
normative information must exist prior to clinical evaluation.
The DSS is the focus of this investigation, and, therefore, a
description of the population, procedures, and geographical
area is provided below.

Developmental Sentence Scoring

The DSS procedure was originally conducted by Lee and
Canter (1971) on 160 children who were 3.0 to 6.11 years of
age and who were not enrolled in the Northwestern Speech
Clinic at Northwestern University, Chicago, Illinois. The
subjects were selected to represent a "midline" of as many
variables as could be controlled. All the children were from
monolingual homes where standard English was spoken and all
were judged to be from middle-income families, with the ex-
ception of two, according to the Warner Scale (Warner, Meeker,
and Eells, 1949). All the children obtained IQ scores be-
tween 85 and 115 on the Peabody Picture Vocabulary Test (PPVT)
(Dunn, 1965). Five males and 5 females were selected from
each three-month age group, assuring equal representation by
sex and equal distribution of ages within six-month age
groups.

In a later study conducted in 1974, 40 additional sub-
jects between the ages of 2.0 and 2.11 years were selected to
increase the sample size to 200. The sample of 200 included

"normally developing white children between the ages of two years to six years and eleven months" who resided in Illinois, Michigan, and Maryland (Lee, 1974a). All criteria from the previous study were met, with the exception of 3 subjects, 2 who were judged to be slightly below the middle income group and 1 subject who was not "classifiable" according to the Warner Scale. These subjects were included in the study, however. No children with unusual developmental or social histories, suspected hearing sensitivity problems, or poor speech intelligibility were included.

Both studies attempted to keep the recording sessions as systematic as possible in a conversational setting. Interviewers were "speech and language pathologists at the master's degree level." The subjects were first shown three sets of toys: a small barn and farm animals, a doll family and plastic funiture, and a transport truck; they were encouraged to talk about them. Story action pictures from We Read Pictures, We Read More Pictures and Before We Read (Robinson, Monroe, and Artley, 1962 a, b, c) were presented. Children were encouraged to retell the story "The Three Bears" using the pictures from What's Its Name? (Utley, 1950). The recording sessions varied in length from 15 to 30 minutes, depending upon the "talkativeness" of the subject. All sessions were tape recorded. Clinicians used questions which encouraged subjects to use their most highly developed syntactic structures and morphological forms. The last fifty sentences of the session were selected for scoring and analysis.

Clinicians transcribed the corpus, making allowances for articulation errors, grammatical reformations, non-fluencies, and word finding difficulties.

Descriptive data were collected. The score distributions within each age group were fitted to normal curves and percentile values were computed from the normalized distributions for the 90th, 75th, 50th, 25th, and 10th percentiles.

The Use of Developmental Sentence Scoring

There are countless studies appearing in the literature which have reported using DSS as a means of determining a language delay of a given subject or group, as well as establishing criteria for "normal" language development. These studies have been conducted in a variety of geographical areas. In interpreting the results, investigators have assumed that the DSS norms can be generalized to their given geographical area and/or population.

Carrow (1974a), in Houston, Texas, used the DSS normative data as a reference for establishing "normal" language development guidelines, i.e., DSS scores above the 10th percentile, in creating an elicited imitation measurement of expressive language. This measure is a widely used test, designed to assess linguistic structures through repetition of sentences rather than eliciting spontaneous language samples. Carrow reported the DSS and the Carrow Elicited Language Inventory (CELI) (Carrow, 1974b) successfully separated those subjects considered to have normal language and those

considered to be language disordered. The correlation between the DSS and the CELI was .79 ($p < 0.005$), indicating a strong relationship between the two methods of obtaining grammatical data. It appears, from the research, that Carrow has reported good construct validity due to statistically significant agreement between CELI scores and DSS scores.

Other investigators have used the DSS to compare different procedures within a particular study. Longhurst and File (1977) in Manhattan, Kansas, computed DSS scores on language samples under four conditions: single-object picture, toy, multi-object picture, and adult-child conversation. Analysis of the data revealed that less structured elicitation conditions produce the highest DSS score. In St. Louis, Missouri, Geers and Moog (1978) used the DSS and the CELI to compare the syntactic maturity of the spontaneous speech of normal hearing and hearing impaired children. In Syracuse, New York, Kramer, James, and Saxman (1979) compared language samples obtained in the home by mothers with those obtained in the clinic by speech-language clinicians, using the DSS. The investigators found that, although MLU was greater in the home setting, there were no quantitative differences in DSS scores. Seven of the 10 subjects, however, had higher estimated language ages on the DSS for the home sample. In Portland, Oregon, Valenciano (1981) used the DSS to compare scores obtained from 25, 50, and 75 utterance language samples and found that no significant differences resulted among scores for different size samples.

The Need for Geographical Comparison of the DSS

Although the DSS is widely used as an assessment tool of language development in children, a review of the literature reveals little investigation concerning the validity of the DSS in various geographical areas. Many authors, however, have questioned the validity of the use of other language measures in geographical areas in which the norms were originally obtained. Lyman (1965) stated in his summary of the PPVT, "...considerable caution needs to be used in interpreting the norms, especially in communities other than Nashville." Butler (1972) stated in her summary of the Verbal Language Development Scale, that the normative data reflect responses of 120 "normal speaking white children from Central Utah. The use of the scale for inner city, large urban centers, does not seem appropriate." Cazden (1978) reports difficulties in interpreting CELI scores by stating:

> ... while the manual states clearly that the standard-
> ization sample was composed of white middle class
> children from the urban community, it does not discuss
> the problems encountered if the test is used with chil-
> dren outside that category.

There is an exorbitant amount of literature on the subject of oral language sampling analysis; however, the investigations have typically not included comparative studies on the basis of geographical differences. As indicated in several reviews, the need exists to provide normative data in a variety of geographical areas in order to evaluate critically and use the DSS as a measure of a child's syntactic,

expressive language.

CHAPTER III

METHODS AND PROCEDURES

Subjects

Forty normally developing children, ages 4.0 to 4.11
years, with 5 boys and 5 girls in each three-month interval,
from the Portland, Oregon metropolitan area served as sub-
jects for the present investigation. The subjects were sel-
ected from the Helen Gordon Child Development Center, Fruit
and Flower Day Care, Pencil Pals Preschool, and Kinderland
Preschool.

In addition to meeting the age requirements, children
met the following criteria:

1. white, living in monolingual homes where standard
   English of general American dialect is spoken;
2. from middle-class families as represented by edu-
   cation and occupational status (U.S. Dept. of Com-
   merce, 1960);
3. normal hearing sensitivity as defined by audio-
   metric screening at 20 dBHL (unilateral);
4. no demonstrated or suspected physical or social
   delays as observed by the investigator and by
   teacher report; and
5. normal receptive vocabulary age as represented
   by a score for the appropriate chronological age
   according to the Peabody Picture Vocabulary Test
   (Dunn, 1965).

Permission form letters describing the purpose of the
study were sent to parents of potential participants (Appen-
dix B). Children with returned signed permission forms were

screened for inclusion in the study.

Instrumentation

A portable Beltone 10D audiometer ANSI 1969, was used to conduct the audiometric screening of the subjects. A General Electric cassette tape recorder, Model 3-5145B and an Electro-Voice microphone, Model 635A were used to tape record the language samples.

The Peabody Picture Vocabulary Test (Dunn, 1965), Forms A and B, an instrument created to provide an estimate of a child's receptive vocabulary, was used to establish normal receptive vocabulary age, consistent with chronological age. These forms were used in this study because Lee and Canter (1971) and Lee (1974a) utilized these measures in their original study. The Peabody Picture Vocabulary Test, Revised Edition (Dunn, 1981), Forms L and M, were used to provide additional information regarding each child's receptive vocabulary age.

The DSS (Lee, 1974a) provides for analysis of a child's spontaneous tape recorded speech sample. It's development was based upon samples from children ages 2.0 to 6.11 years. The transcription of these samples is based upon the selection of fifty intelligible, complete, consecutive, non-echoic, different sentences. A sentence must contain a noun and verb in a subject-predicate relationship to be considered complete. The DSS yields weighted scores in eight grammatical categories: indefinite pronouns and/or modifiers, main verbs,

personal pronouns, secondary verbs, negatives, conjunctions, interrogative reversals, and wh-questions (Appendix C). Within each classification, specific structures have been grouped in what has been found to be a general developmental order based upon published reports and observations by Lee (1974a). For example, the lowest score (score 1) is given to words which appear so early in children's language that they have often been noted as pivot words; the highest score (score 8) represents the most complex syntactic structures. A sentence point is added to the total response score if the entire sentence is correct in all respects, i.e., syntactically and semantically (Lee and Canter, 1971).

Screening

Hearing screening and administration of the PPVT (Dunn, 1965), Forms A or B, were administered by the investigator upon receiving written parental consent for subject participation. The screening procedure was undertaken in a quiet room at the preschool site. Information regarding any physical social, and/or behavioral deficiencies was obtained by teacher report and investigator observation. Forty children meeting the criteria, within the specific age range, were included in this study.

Language Sample Collection

Each child met with the investigator for 20 to 60 minutes and individual language samples were obtained at the

preschool. Children using complete sentences, 50 or more percent of the time, were considered candidates.

A variety of sitting positions were utilized appropriate to the age and interests of the children (on the floor and at the table). The tape recorder and microphone were placed two feet away from the child, to ensure quality playback and minimum obtrusiveness. A piece of felt material was placed under the tape recorder to minimize any extraneous sounds resulting from handling of the materials.

Materials used to foster spontaneous speech included a doll family and plastic furniture, a transport truck with small cars in it, and a small barn with farm animals; these toys were presented to the children first. Pictures from the Game Oriented Activities for Learning (GOAL) (Karnes, 1972) were used in description tasks and a number of them were presented throughout the session. Pictures selected from the story, "The Three Bears" (Utley, 1950) were used to encourage retelling of the story.

The investigator used "open-ended" questions and comments, encouraging more than single utterances from the child. Additionally, sophisticated grammatical forms were used in order to provide an opportunity for the child to use them in his responses. Many of the child's responses were repeated in order to avoid confusions for later transcription which may have resulted from articulation errors or extraneous noise.

Language Sample Transcription

Following the collection of language samples, the investigator transcribed the recordings into typed transcripts, adhering to specific instructions recommended by Lee (1974a) for separating and combining sentences (Appendix A) and for selecting the corpus for grammatical analysis (Appendix D). In Appendix E, methods for transcribing the samples were adapted from Mathis (1970).

Following transcription of the samples, a corpus containing fifty complete, consecutive, different, intelligible, non-echoic sentences produced by the child, were selected and recorded into the DSS Record Form (Appendix F). Sentences selected contained a subject and a verb, but were not necessarily grammatically correct and complete.

Scoring

The investigator was the collector and evaluator of all language samples obtained at the preschool site. The examiner viewed the film, "Developmental Sentence Scoring" (Lee, 1974b) and successfully completed "Developmental Sentence Analysis," a course offered at Portland State University, in September, 1982. This course was taught by an associate professor holding a Certificate of Clinical Competence in Speech-Language Pathology.

All rules for scoring the DSS described by Lee (1974a) were followed (Appendix G). Grammatical forms used by the

child were assigned weighted, numerical scores. Credit was
given only when the grammatical form met all the requirements
of adult, standard English (syntactic, morphological, and
semantic). A score of 1 was added for each sentence which
met these stipulations for the whole sentence. An attempt
mark (-) was inserted in place of a numerical score when a
structure was attempted but lacked a feature of standard En-
glish; a sentence point was not received.

After the fifty sentences were scored, the total sen-
tence scores were added and divided by fifty to obtain a DSS
score.

Examiner Reliability

Interjudge reliability was derived between the investi-
gator and a Speech-Language Pathologist with a Certificate of
Clinical Competence issued by the American Speech-Language-
Hearing Association.

A fifty utterance language sample was chosen randomly
and presented independently to the two judges for a DSS anal-
ysis. Interjudge reliability was .90. The two judges con-
ducted a calibration session during which decisions were made
about the analysis of various utterances. The remainder of
the language analyses were then based on these decisions.

The investigator randomly selected twenty-five sentences
from the sample utilized in the inter-judge comparison and
scored this selection one week later, obtaining an intra-
judge reliability of .92.

Data Analysis

DSS scores were computed for each subject's language sample. Descriptive statistics were subsequently applied to determine the mean weighted scores in the grammatical categories, the mean number of sentence points, standard deviations, ranges, and percentiles.

A comparison was then made between the descriptive statistics obtained by this investigation and that obtained in the Lee (1974a) study. Due to incomplete data provided by Lee and by Koenigsknecht (1974), it was necessary to establish a method for determining the variance of the standard deviation obtained by Lee in order to perform a comparative analysis. A pooled sum of squares was computed for both groups. A reconstruction of Lee's sum of squares was accomplished by squaring the S.D. of both groups and multiplying by forty (N). A pooled sum of squares was then obtained by adding the sum of squares of both studies and dividing by the number of degrees of freedom (78). Two-tailed t-tests for independent means were applied to these scores to determine the significance of the differences between the two samples.

CHAPTER IV

RESULTS AND DISCUSSION

Results

This study sought to compare DSS descriptive statistics as reported by Lee (1974a) and Koenigsknecht (1974) with those obtained in the geographical area of Portland, Oregon, for children ages 4.0 through 4.11 years. Individual language samples were elicited from 40 children who met all subject criteria as set by Lee. These language samples were transcribed and analyzed according to the DSS procedure as described.

The first research question posed was: what are the descriptive statistics of the DSS on language samples obtained in Portland, Oregon? The DSS mean and standard deviation of this sample were obtained and are represented in Table I by three-month age groups. The mean for the total sample, aged 4.0 to 4.11 was 7.27 with a standard deviation of 1.40.

Table II shows the ranges and percentiles of the average DSS sentence score for the 40 children. The range of scores was 4.64 to 10.42. The 10th, 25th, 50th, 75th, and 90th percentile values for the overall DSS within each age group were computed (Frederick-Williams, 1979). Children

with DSS scores of 5.52 or below fell into the 10th percen-
tile. Scores of 5.53 to 6.36 were grouped into the 25th per-
centile. The 50th percentile represents scores from 6.37 to
7.08. Score of 7.09 to 8.10 fell in the 75th percentile.
Children with DSS scores of 8.11 to 9.14 were represented in
the 90th percentile.

The mean weighted developmental scores on the DSS com-
ponent grammatical categories are represented in Tables III
and IV. The mean scores, per category are: indefinite pro-
nouns, 42.70 with a mean of 1.45; personal pronouns, 69.40
with a mean of 1.36; main verbs, 101.07 with a mean of 1.87;
secondary verbs, 25.10 with a mean of 3.33; negatives, 23.70
with a mean of 7.00; conjunctions, 37.40 with a mean of 3.88;
interrogative reversals, 1030 with a mean of 3.17; and wh-
quesitons, 12.60 with a mean of 3.86. The mean number of
sentence points for the 40 subjects was 42.10.

Tables I through IV display the descriptive data obtained
and provide the answer to the first research question this
study sought to answer.

The second question posed by this study was: does a
significant difference exist between the original results
compliled by Lee (1974a) and Koenigsknecht (1974) in the Mid-
west and that obtained in Portland, Oregon. In Table V it
can be seen that results of a two-tailed t-test of indepen-
dent means indicate a statistically significant difference
beyond the .05 level of confidence between the means for the
two groups with Lee's sample from the Midwest obtaining a

TABLE I

DSS MEANS AND STANDARD DEVIATIONS OF
FORTY SUBJECTS BY THREE-MONTH
AGE GROUPS (PORTLAND, OREGON)

Age Group	N	Mean DSS	S.D.
4.0-4.2	10	6.83	1.75
4.3-4.5	10	6.82	.84
4.6-4.8	10	7.52	1.02
4.9-4.11	10	7.90	1.64
4.0-4.11	40	7.27	1.40

TABLE II

RANGE AND PERCENTILES OF DSS SCORES
FOR FORTY SUBJECTS BY THREE-
MONTH AGE GROUPS

| Age Group | N | Range | Percentiles | | | | |
			10th	25th	50th	75th	90th
4.0-4.2	10	4.64-9.28	4.64	5.36	5.98	8.74	8.80
4.3-4.5	10	5.58-8.10	5.58	6.34	6.76	7.36	8.10
4.6-4.8	10	6.44-9.30	6.44	6.70	7.08	8.66	8.70
4.9-4.11	10	5.52-10.42	5.52	6.66	7.86	9.14	10.20
4.0-4.11	40	4.64-10.42	5.52	6.36	7.08	8.10	9.14

TABLE III

MEAN WEIGHTED DEVELOPMENTAL SCORE ON THE DSS COMPONENT
GRAMMATICAL CATEGORIES AND MEAN NUMBER OF SENTENCE
POINTS FOR FORTY SUBJECTS

Age Group	Indefinite Pronouns	Personal Pronouns	Main Verbs	Sec. Verbs	Neg.	Conj.	Interr. Revers.	Wh- Ques.	Sentence Points
4.0-4.2	34.70	66.90	103.00	23.50	26.90	24.90	9.80	11.90	40.20
4.3-4.5	44.70	65.40	92.70	32.30	19.70	34.80	2.80	12.40	41.60
4.6-4.8	46.70	73.00	99.10	24.20	24.60	38.10	13.20	13.40	40.90
4.9-4.11	44.60	72.50	109.50	20.40	23.70	42.80	15.50	22.70	45.80
4.0-4.11	42.70	69.40	101.07	25.10	23.70	37.40	10.30	12.60	42.10

TABLE IV

MEAN DEVELOPMENTAL SCORES PER DSS GRAMMATICAL CATEGORY ON
50-UTTERANCE SAMPLES FOR FORTY SUBJECTS

Age Group	Indefinite Pronouns	Personal Pronouns	Main Verbs	Sec. Verbs	Neg.	Conj.	Interr. Revers.	Wh- Ques.
4.0-4.11	1.45	1.36	1.87	3.33	7.00	3.88	3.17	3.85

TABLE V

COMPARISON OF DSS MEANS AND STANDARD DEVIATIONS
OBTAINED IN THE MIDWEST AND PORTLAND, OREGON

Geographical Location	Mean	S.D.	df	$\underline{t}$ test	p
Midwest (1974)	8.04	1.64	78	2.238	<.05
Portland (1984)	7.27	1.40			

higher DSS mean score than the present Portland sample.

Comparative data obtained in the Midwest and in Portland, Oregon are presented below. Tables VI and VII provide information on the mean "weighted" developmental score (the sum of the weighted scores for a given DSS component category) and the mean developmental score per DSS grammatical category for the two studies. Koenigsknecht (1974) did not report the standard deviation per category, so it is not possible to determine if a statistically significant difference exists between mean developmental scores. By visual inspection, however, it would appear that children in the Portland study used higer level negatives, interrogative reversals, and wh-questions than those children in the Midwest; indefinite pronouns and personal pronouns were used more often by children in the Midwest study, with a difference score of 14.1 and 36.1 respectively.

In examining the range and percentiles of DSS scores

TABLE VI

COMPARISON OF MEAN WEIGHTED DEVELOPMENTAL SCORES
ON THE DSS COMPONENT GRAMMATICAL CATEGORIES
AND MEAN NUMBER OF SENTENCE POINTS
FOR FORTY SUBJECTS BY GEOGRAPH-
ICAL LOCATION

Grammatical Category	Mean Midwest (1974)	Portland (1984)	Difference
Indefinite Pronouns	56.80	42.70	-14.1
Personal Pronouns	105.53	69.40	-36.13
Main Verbs	108.90	101.07	- 7.2
Secondary Verbs	25.08	25.01	+ .02
Negatives	17.40	23.70	+ 6.3
Conjunctions	36.25	37.40	+ 1.15
Interrogative Reversals	7.32	10.30	+ 2.98
Wh-Questions	6.40	12.60	+ 6.2
Sentence Point	37.15	42.10	+ 4.95

(Table VIII), the present study reflects a narrower range (4.64-10.42) than the Lee (1974a) study (4.86-12.95). Lower DSS scores at the 10th, 25th, 50th, 75th, and 90th percentiles were obtained as well. Table IX reflects the assignment of the 40 subjects from this study, to a percentile using Lee's "Norms for Developmental Sentence Scoring" (1974). This was done by plotting the position of each subject's score on the DSS norm chart. The same subjects' scores were then assigned a percentile ranking based upon the DSS scores within the sample in the Portland area.

TABLE VII

COMPARISON OF MEAN DEVELOPMENTAL SCORES
PER DSS GRAMMATICAL CATEGORY BY
GEOGRAPHICAL LOCATION

| Grammatical Category | Mean | |
	Midwest (1974)	Portland, Oregon (1984)
Indefinite Pronouns	1.93	1.45
Personal Pronouns	2.07	1.36
Main Verbs	2.02	1.87
Secondary Verbs	3.33	3.33
Negatives	5.14	7.00
Conjunctions	3.77	3.88
Interrogative Reversals	2.26	3.17
Wh-Questions	1.96	3.85

TABLE VIII

COMPARISON OF RANGE AND PERCENTILES OF DSS
SCORES FOR THE MIDWEST AND PORTLAND, OR.
FOR CHILDREN 4.0 THROUGH 4.11 YEARS

| Geographical Location | N | Range | Percentiles | | | | |
			10th	25th	50th	75th	90th
Midwest	40	4.86-12.94	6.01	6.97	8.04	9.10	10.06
Portland	40	4.64-10.42	5.52	6.36	7.08	8.10	9.14

Discussion

The DSS mean obtained in the present study differed

TABLE IX

COMPARISON OF NUMBER OF SUBJECTS PER PERCENTILE
RANK USING MIDWEST NORMS AND
PORTLAND, OREGON NORMS

Geographical Location	Age	N	Percentiles					
			-10th	10th	25th	50th	75th	90th
Midwest (1974)	4.0-4.2	10	2	2	1	2	0	3
Portland (1984)			0	3	2	0	4	1
Midwest	4.3-4.5	10	0	2	4	2	2	0
Portland			0	0	4	3	3	0
Midwest	4.6-4.8	10	0	0	3	5	2	0
Portland			0	0	0	5	4	1
Midwest	4.9-4.11	10	1	1	3	2	1	2
Portland			0	1	0	3	4	2
Combined								
Midwest	4.0-4.11	40	3	5	11	11	5	5
Portland			0	4	6	11	15	4

significantly (p < .05) from that reported by Lee and Koenigs-knecht (1974). The following discussion will begin with a focus on the variables which may account for the differences between the two samples.

One variable that may have accounted for the differences in the results of these two studies is socio-economic level; however, the two samples were drawn from similar

socio-economic backgrounds. In determining "middle-income" eligibility, Lee and Canter (1971) reported the occupation rating as being the "most powerful single status characteristic for assigning social class placement (Warner, Meeker, and Eells, 1949)." The present study used both an occupational and educational rating in assigning placement. All subjects' parents were within the ranges of 45 to 90, with a mean of 76.25 for the occupation scale, and 67 to 98, with a mean of 84.87 for the education scale (U.S. Dept. of Commerce, 1960). Both ratings were within "middle-income" criteria; either the education or occupation rating could have been used solely. Lee chose to include two subjects below the middle income range on the Warner Scale and one who was considered "unclassifiable" in the 1974 study; two subjects in the 1971 study also were included who were not considered within the "middle-income" range.

All subjects demonstrated normal receptive vocabulary knowledge with PPVT scores ranging from 85 to 115. In selecting the subjects for the present study, Forms A and B of the PPVT (Dunn, 1965) were used to establish normal receptive vocabulary age, in order to replicate Lee's procedure. By way of ancilary information, the PPVT-R (Dunn, 1981) also was administered to determine what extent those same subjects would be included or excluded from the study, had the revised edition been used rather than the original. Standard scores for Form L were consistent with those of Form A, i.e., none of the subjects would have been excluded from the study. Six

subjects would have been excluded from the study, using Form M, due to the standard scores exceeding the acceptable range of 85 to 115. Two children scored below 85 while 4 children scored above 115.

Differences in the results of the two studies do not appear to be attributable to the particular stimulus materials used. Materials used in the present study were similar to those used in the Lee (1974a) study, with the exception of the story-action pictures by Robinson, Monroe, and Artley (1962 a, b, c). Due to the unavailability of these pictures, this investigator substituted pictures from the Game Oriented Activities for Learning (GOAL) (Karnes, 1972). It appears unlikely that these materials accounted for differences in the children's utterances; in most cases, the language sample corpus was obtained when the children were playing with the toys and retelling the story "The Three Bears" (Utley, 1950). All materials were presented in the order suggested by Lee, i.e., toys, story-action pictures, and pictures designed to encourage retelling of the story.

Smith (1970) has reported that the presence of other objects in the room may have an effect on a child's verbal utterances. Thirty percent of the language samples were collected in a room that did not contain other toys or materials. Examination of the data for these subjects revealed a mean DSS score of 7.44, slightly above the mean (see Table I). Thus, it appears that the presence of other toys and materials in the playroom did not negatively affect the DSS scores

in this study.

It is unlikely that variation in the elicitation of the
utterances was responsible for the differences in the scores
between the two studies. In eliciting the language sample, a
warm conversational climate conducive to eliciting complete
sentences, fulfilling the subject-verb requirements was estab-
lished. The investigator adhered to guidelines provided by
Lee in eliciting responses. The examiner interacted with the
toys, talked about the pictures, and used high level gramma-
tical forms, thus encouraging the subjects to use these forms
in response.

Variation in the transcription of the samples is not a
likely variable affecting the results of the study. In tran-
scribing the language samples, great care was taken in fol-
lowing directions adapted from Mathis (1970) (Appendix E) and
Lee (1974a) (Appendices A and D). Remarks and questions used
by the examiner were designated as recommended by Siegel
(1962) in order to avoid any confusion with utterances. The
quality of the taped language sample presented no difficulty
in analysis. Lee recommended using the last fifty utterances
of the language sample for analysis in order to consider the
effects of "warm up" and general adjustment to the conversa-
tional setting; this was accomplished in 26 of the 40 cases.
Samples from the remaining 14 children included only fifty to
sixty utterances, so those utterances were the only ones
available for analysis. In examining the data, those lan-
guage samples in which the last fifty utterances were used did

not favor better grammatical usage than the more limited samples.

Description of the scores in the specific grammatical areas can contribute to the discussion of the differences found in the two studies. The scores in the grammatical categories in the two studies varied considerably (see Table VI and VII). The question forms used as models by the examiner may have had an effect on the high scores in the negative, interrogative reversal, and wh-question categories. For example, the interviewer's questions such as, "Why won't the car go?" and "Is the farmer driving?" may have provided sufficient models for the children to use these forms, as well. Data in Table VI also reveal a greater mean developmental score for the "sentence point" category in the Portland study. The examiner's use of open-ended questions, such as "What happened?" or "What next?" may account for the differences in scores.

Examination of the scores for the indefinite pronoun category indicate a lower mean score for the present study when compared to the mean score obtained in the Midwest. Pivot words such as, "it," "this," and "that" were most often used (score of 1) as well as quantity words, such as, "some" and "more" (score of 3). Negative pronouns (score of 4) and later developing pronouns, such as, "everything," "each," and "several" (score of 7) were used by only 17 children. The examiner modeled high level indefinite pronouns, such as, "The boy likes to play with each block by himself." This,

however, did not always elicit the use of later developing pronouns.

In examining the low developmental score in the personal pronoun category, the first and second person pronouns were used most often, i.e., "me" and "you," receiving a score of 1. Plural pronouns (score of 3) require a consideration of person, number, and case and were used by 93 percent of the children. Reflexive and wh-pronouns (score of 5 and 6) were used by 4 children. The limited use of more developmentally mature expression using pronouns accounts for the lower developmental score for this category. It is interesting to note that, had the personal pronoun category not been included in the comparison of mean weighted developmental scores in the grammatical categories, the differences in results would have been much less. Although it is not possible to determine this difference statistically, by inspection of Table VI, it can be seen that the lower score obtained in Portland probably contributed substantially to the lower overall mean (7.27). The depressed score in the personal pronoun category may have resulted from slight variations in stimulus materials and/or elicitation of responses. The examiner, however, did provide modeling of higher level use of personal pronouns and utilized all procedural guidelines as suggested by Lee (1974a) in obtaining the samples.

The mean weighted developmental score in the negative category was greater than that obtained by Lee (1974a). A score of 4 was given to the negative forms "can't" and

"don't," these forms were used by 87 percent of the children. A score of 7 was applied to all other negatives and was used in 31 of the 40 samples.

Children in the present study also used highly sophisticated forms of the interrogative reversal. Not only did 80 percent of the children use the earliest form of the interrogative reversal with the copula "is," but, 55 percent also used the reversal of the obligatory "-do," "-does," or "-did" (score of 6). The examiner modeled the interrogative reversal with such questions as "Couldn't the man get in the truck?" which may, in part, account for the higher score in this category.

Forty-eight percent of the children (19) in this study used the wh- words "when" and "how" (score of 5), accounting for a mean weighted developmental score of 12.60 as compared to a score of 6.40 reported by Lee (1974a). This is surprising, since the concepts of time and manner are often slower to develop than the concepts of person, thing, action, place, quantity, etc. Eleven of the 40 children (28 percent) used wh-questions implying purpose or causality, i.e., "why" (score of 7).

Comparison of percentile ranking also may be used in discussing differences between the two studies. Inspection of Table IX reveals that 3 subjects from the present study, would have been considered below the 10th percentile based upon Lee's norms. These subjects, however, would have been judged to be at the 10th percentile based upon norms for

their given population. Using Lee's norms, a child below the 10th percentile would be considered a candidate for further evaluation or possible remedial training. Using the norms obtained in this specific geographical area, however, that same child might be judged to be at the 10th percentile and the speech-language clinician's concern for intervention might be lessened. Further inspection reveals a spread of percentile scores for the Lee study due to the larger sum of squares and standard deviation for that study. In the present investigation, there appears to be more of a "clustering" of percentile scores towards the 25th and 50th percentiles.

In providing ancillary information, visual inspection reveals that the mean developmental scores on the DSS component grammatical categories do not reflect a developmental trend, i.e., the 4.9 to 4.11 age group did not necessarily use more mature language or receive a higher weighted mean score than the younger age groups. The grammatical categories which did display a quantifiable and progressive increase in syntactic development were: conjunctions, interrogative reversals, wh-questions and the sentence point.

By way of summary, the mean DSS score for this investigation, using Developmental Sentence Scoring, differs significantly from the mean DSS score reported by Lee (1974a) and Koenigsknecht (1974) for four-year olds. Although it is not possible to determine the statistical differences of the ranges, percentiles, and mean developmental scores per grammatical

category of the two studies, quantifiable as well as qualifiable differences can be observed by means of visual inspection of the data. The differences in scores do not appear to be attributable to the variables described in the literature, i.e., subject selection or variations in the elicitation or transcription of language samples. Due to the differences exhibited in the scores per grammatical category, it would appear feasible that the examiner's method of modeling and/or prompting may have been a contributory factor in explaining the differences obtained in the two studies. Geographical location, however, was the only factor systematically manipulated in replicating the Lee study and it appears that this variable could feasibly account for the difference in the data. If this is true, it is essential for the speech-language clinician to use the DSS norms with caution if practicing in an area other than the Midwest. It also is imperative that the speech-language practitioner establish his or her own norms for the specific geographical area prior to further evaluation or diagnosis.

CHAPTER V

SUMMARY AND IMPLICATIONS

Summary

Oral language sampling and analysis are tools available
to the speech-language clinician, which are often helpful in
obtaining information regarding the development of expressive
language in children. In the past, a child's language has
been judged to be mature based upon the length of the utter-
ance (MLR, MLU) and/or the grammatical complexity (SCS, LCI,
DSS).

The purpose of this investigation was to replicate the
study conducted by Lee and Canter (1971) and Lee (1974a) to
determine if a significant difference among the scores in the
two studies existed due to geographical location, and to ini-
tiate the establishment of norms for the Portland, Oregon
geographical area. Forty children, selected on the basis of
chronological age (4.0 to 4.11 years), normal receptive vo-
cabulary skills, normal hearing, and a monolingual background,
participated as subjects. A language sample of fifty utter-
ances was elicited from each child and analyzed according to
the DSS procedure.

DSS means, standard deviations, percentiles, range of
the average score, mean weighted developmental score for each

grammatical category, and mean number of DSS utterances earning a sentence point were compiled. A t-test analysis was conducted to determine if a difference exists between the means of the scores for the two geographical locations.

A significant difference resulted between the mean scores obtained in the Midwest and in Portland, Oregon. The results indicate that a statisitically significant difference in the mean DSS score exists (p < .05) and may be attributable to differences in the geographical location in which the scores were obtained. Differences in scores do not appear to be attributable to variables in subject selection, i.e., socio-economic background, receptive language vocabulary scores, etc. Although slight variation in the examiner's form of elicitation and use of stimulus materials may possibly explain some of the differences found in the grammatical categories, it appears an unlikely possibility that this variation could account for the statistically significant difference found between the mean DSS scores of the two studies. In addition, the differences do not appear to be the result of stimulus materials or transcription methods used.

The norms compiled by Lee (1974a) in the Midwest, differ significantly from those obtained in this study, conducted in Portland, Oregon. It appears likely that score differences in other geographical areas may exist as well. In order to conduct a thorough and competent evaluation of a child's expressive language abilities, the data from this investigation reflect the need for the speech-language

clinician to use the DSS norms cautiously and/or to establish norms specific to a geographical region.

Clinical Implications

This investigation has demonstrated that geographical location is a plausible variable accounting for the statistically significant difference between obtained DSS scores. The results indicate that the norms established by Lee (1974a) in the Midwest are higher than those of the Portland, Oregon area. Therefore, in using Lee's normative data, a child in Portland may be evaluated as functioning within a lower percentile in expressive language; in some cases, a child may be assessed as "language delayed," using the norms developed in the Midwest, when, in fact, he may be functioning at the 10th or 25th percentile in a different locale. This investigation substantiates other authors who caution speech-language practitioners in interpreting assessment norms compiled in communities other than their own (Lyman, 1965; Butler, 1972; Cazden 1978).

This investigation also addresses the role of the speech-language clinician as one of a researcher. The results of this study, particularly the percentile tables, address the discrepancy in normative data and the need for each clinician to be aware of these differences in his/her particular geographical area. If norms are unavailable, it would appear to be the responsibility of the speech-language

clinician to establish them for the specific geographical region.

Clinically, the DSS norms compiled by Lee (1974a) may be used to judge a child's progress throughout the period of clinical teaching and also to aid in determining when to dismiss him from remedial teaching. For diagnostic purposes, however, the DSS could be used as part of an assessment battery; Lee has cautioned that a DSS score when compared with the mean of a child's chronological age group, yields only limited and gross information about language development.

Research Implications

Further investigations in a variety of geographical areas, using the DSS procedure is indicated. Additional studies conducted on the East coast, the northern part of the United States and the southern regions, would assist in determining the extent to which geographical location affects DSS results and/or to what extent other variables are influential.

A study conducted in Portland, using the same age group would aid in determining if other variables influenced the results, i.e., subject-examiner interaction, the form or use of modeling and prompting, variations in transcription, etc.

Replication of this study in the Portland, Oregon area, with different age groups is also indicated. The present investigation obtained and analyzed results for 4.0 through 4.11 year old children. The performance of children, ages

2.0 through 6.11 would contribute enormously to the validity of this study as well as establish more complete normative data for the Portland area, using Developmental Sentence Scoring.

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APPENDIX A

RULES FOR SEPARATING AND COMBINING
SENTENCES

1. Interjections and nouns in direct address do not carry a DSS score, so they do not have to be separated out.

2. Question markers must be noted because questions receive a DSS score.

3. Imperative interjections, "look," "lookit," and "see" and sentence tags, "you know," "I think," "I guess," etc. are separated out and given sentence status.

Concerning Conjunctions:

1. Sentences which begin with conjunctions are counted as complete sentences, but the initial conjunction is not scored.

2. Only one "and" conjunction per sentence is allowed when the "and" connects two independent clauses.

3. The conjunction "and" used in a series, a compound subject, or a compound predicate does not require the sentence to be broken up.

4. Internal conjunctions other than "and" do not require a sentence to be broken up.

5. At the clinician's discretion, the rules for "and" may be applied to any other over-used conjunction.

If a child's sample contains both a pre-sentence structure and a complete sentence, a separation is made if the sentence is an independent clause; the fragment and the conjunction would be deleted and only the independent clause would be scored. For example, "Over there but it's too far." "...it's too far." would be scored.

(from Lee, _Developmental Sentence Analysis_, 1974).

APPENDIX B

PERMISSION FORM

        I agree to let my child_____
participate as a subject in the study entitled "A Comparative
Study of Developmental Sentence Scoring Normative Data."
This study is carried out by Kathie McCluskey under the su-
pervision of Mary Gordon, thesis director, Speech and Hearing
Sciences Program, Portland State University.

        The purpose of the study is to compare scores obtained
from language samples in the Portland area to scores used as
normative data collected in the Midwest.

        There are no risks or dangers inherent in the proce-
dures of the study. My child will be given a hearing screen-
ing, hearing vocabulary test, and then will simply partici-
pate in conversations with Kathie McCluskey at the preschool
site. I am free to withdraw my child from the study at any
time.

                         _____
                         Signature of Parent/Guardian

                         _____
                         Date

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

The following information will be helpful in describing the
sample:

OCCUPATION OF PRIMARY WAGE EARNER:_____

YEARS OF EDUCATION OF PRIMARY WAGE EARNER:_____

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

                         Kathie McCluskey

APPENDIX C

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

(Laura L. Lee, Northwestern University Press, 1974a.)

APPENDIX D

SELECTING THE CORPUS FOR GRAMMATICAL
ANALYSIS

1. The corpus should contain fifty complete sentences for
    analysis. A sentence is judged complete if it has a
    noun and verb in a subject-predicate relationship. A
    sentence need not be correct to be included in the DSS
    corpus; it need have only the basic subject-verb re-
    quirement.
    The following would be included as complete sentences:

        Doggie no want.
        Mommy bring inside.

2. The speech sample must be a block of consecutive utter-
    ances. The clinician should try to include the child's
    "best" performance in the sample and should scan his
    transcript to find the section where the block of con-
    secutive utterances would include his "best" utterances.

3. All utterances in a language sample must be different.
    No repetitions of sentences are to be included.

4. Unintelligible utterances should be excluded from the
    corpus. If the clinician is in doubt about any part
    of the utterance that affects the grammatical structure,
    then he should discard it as unintelligible.

5. Echoed utterances should be excluded from the corpus.

(from Lee, Developmental Sentence Analysis, 1974).

APPENDIX E

TRANSCRIPTION OF TAPE

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 tak-
ing 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
    utterances made by the child.

2. Any response or part of response, i.e., epi-
    sode, which you cannot comprehend after dili-
    gent 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.

3. The speech response need not be a complete
    thought; but, if all words are intelligible,
    include the response as one speech episode.

4. At times, you will find both the adult and
    child talking at the same time. First type the
    complete response of the person being inter-
    rupted and, then, type the other speaker's ut-
    terance.

5. Certain utterances are not meaningful words,
    but are vocal pauses, such as er, ah, andah,
    um, etc. Do not type vocal pauses.

6. Some words acoustically similar to meaningless
    interjections are considered as real words and

should be typed, such as <u>huh-uh</u>, <u>uh-huh</u>, <u>hm</u>, or animal sounds which are used in lieu of the name of the animal in a thought. An example would be, "The <u>grr</u> is after the boy." Another example of a noise being an integral part of the response would be, "The cat goes <u>meow</u>."

7. 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 <u>he</u> <u>he</u> went home." The underlined words in <u>this</u> 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, <u>uh-huh</u>, if it is an affirmation, <u>huh-uh</u> for negation, <u>huh</u> for interrogation or <u>oh</u> 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."

   Remarks which appear to be clearly enumerative, separated by pauses, are considered separate response units.

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

APPENDIX F

DEVELOPMENTAL SENTENCE SCORING RECORD FORM

NAME:

BIRTHDATE:

SENTENCE SAMPLE	Ind Pro / Noun Mod	Per Pro	Main Verb	Sec Verb	Neg	Conj	Int Rev	Wh-?	Sent Point	Total
1. What is it?	1		1					2	1	5
2. Is that horse trucker?	1		1				-		0	2
3. This doen't stand up very good.	1		6		7				1	15
4. I don't need that.	1	1	4		4				1	11
5. (After lunchtime), he needs to go to the truck.		2	2	5					1	10
6. The farmer will try.			4						1	5
7. He did try.		2	6						1	9
8. Other farmer did.	3		inc						0	3
9. I'm gonna play with this.	1	1	2	2					1	7
10. (The) baby is sleeping on the couch.			1						0	1
11. This truck takes to the doctor.	1		2						0	3
12. How (do you) open the truck?			-					5	0	5
13. (But) how does he drive them there?		2,3	6					5	1	17
14. Here's the doctor.			1						1	2
15. Get the farmer out.			1						1	2
16. The farmer needs to be at the doctor first.	7		2	7					1	17
17. He tried on the thing but it didn't work.	1	2	2,6		7	5			1	24

	Ind Pro Noun Mod	Per Pro	Main Verb	Sec Verb	Neg	Conj	Int Rev	Wh-?	Sent Point	Total
18. He falled off.		2	-						0	2
19. (The) Doctor's fixing him.		2	1						0	3
20. Here we go.		3	1						1	5
21. She'll be all right.		2	4						1	7
22. (The) baby needs to go in beddie.			2	5					0	7
23. The other dad is all right.	3		1						1	5
24. There's another dad.	3		1						1	5
25. (The hospital said that) the mommy and the dad are all right now.			2			3			1	6
26. (Yeah) I got them.		1,3	2						1	7
27. Mommy needs to get into the truck.			2	5					1	8
28. Mommy has to walk.			1	3					1	5
29. (Yeah) she can take home.		2	4						0	6
30. This daddy can.	1		inc						1	2
31. She's gonna hold her little baby.		2,2	1	2					1	8
32. She has to take a bath.		2	1	3					1	7
33. (Ah) she can't get in the bath thing.		2	4		4				1	11
34. There she is.		2	1						1	4
35. She's all clean.	3	2	1						1	7
36. Where's the towel?			1					2	1	4
37. What's this?	1		1					2	1	5
38. (I bet) she can't sit on the couch.		2	4		4				1	11
39. (I bet) dad can.			inc						1	1
40. There's two dads.	3		-						0	3

		Ind Pro Noun Mod	Per Pro	Main Verb	Sec Verb	Neg	Conj	Int Rev	Wh-?	Sent Point	Total
41.	The other dad needs to get out.	3		2	5					1	11
42.	Could you put dad out there?		1	6				6		1	14
43.	Who wants to ride this horsie?	1		2	3				2	1	9
44.	(If she falls off) she has to go to the doctor.		2	1	5					1	9
45.	The baby hurt herself on the horsie.		5	1						1	7
46.	She's gonna be all right.		2	1	2					1	6
47.	The trucks go into the hospital.			1						1	2
48.	The doctor says.			2						1	3
49.	How can the baby get out?			4					5	1	10
50.	There she is.		2	1						1	4

TOTAL   342
Divide by 50   6.84

THE SCORING SYSTEM

1. If a structure is attempted but lacks some feature of standard English, then a "attempt" mark, a line, is inserted in place of the numerical score.

2. A score of 1 is added in the column labeled "sentence point" for every sentence which meets all adult standard rules. Any attempt mark within the sentence will automatically require withholding of the sentence point. The sentence point could also be withheld for any attempt on a grammatical structure not included in the eight categories under consideration (e.g. the omission of articles or prepositions). The sentence point would also be withheld for semantic irregularities.

3. Indefinite Pronouns: the same score is given whether a word is used as a pronoun or a noun modifier.

4. Personal Pronouns: grouped according to person:
    Score 1 1st and 2nd person: I, me
          2 3rd person: he, she
          3 Plurals: we, us, they
          4
          5 Reflexives: myself, herself, etc.
          6 Wh- pronouns: who, which
          7 (his) own, one, oneself: One hopes for peace.

5. Main Verbs:
    Score 1 a. uninflected verb: I see you.
            b. copula, is or 's: It's red.
            c. is +verb+ing: He is coming.
          2 a. -s and -ed: plays, played
            b. irregular past: ate, saw
            c. copula: am, are, was, were
          3
          4 a. can, will, may+verb: may go
            b. obligatory do+verb: don't go
            c. emphatic do+verb: I do see.
          5
          6 a. could, would, should, might+verb: might come
            b. obligatory does, did+verb
            c. emphatic does, did+verb
          7 a. passive with get, any tense
                passive with be, any tense
            b. must, shall+verb+en: I've eaten

```
        c.  have+verb+en:  I've eaten
        d.  have got:  I've got it.
```

Occasional deletions in verb forms are part of adult
standard English and should not be regarded as immaturi-
ties in children's language. For example, if the clini-
cian asks, "Does your mother work?" the child may answer,
"No, she doesn't." Such elliptical verb forms are not
given a score on the DSS; the abbreviation for "incom-
plete," "inc" is inserted on the record sheet in place of
either a score or an attempt mark. Since adult grammati-
cal rules contain elliptical verb forms, the sentence
point is allowed.

6. Secondary Verbs
    Score 1
        2 Five early developing infinitives:
               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 Noncomplimenting infinitives
               I stopped to play.
               I'm afraid to look.
               I's hard to do that.
        4 Participle, present or past:
               I see a boy running.
               I found the toy broken.
        5 a. Early infinitives with differing subjects in
                   basic sentences:
                   I want you to come.
                   Let him (to) see.
           b. Later infinitval 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
        7 Passive infinitive:
               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 Gerund:
               Swinging is fun.
               I like fishing.
               He started laughing.
```

7. Negative
   Score 1   it, this, that+copula or auxilliary is, 's, +
             not:
                 It's not mine.
                 This is not a dog.
                 That is not moving.
         2
         3
         4   can't, don't
         5   isn't, won't
         6
         7   All other negatives:
             a.  Uncontracted negatives:
                     I can not go.
                     He has not gone.
             b.  Pronoun-auxilliary or pronoun-copula con-
                 traction:
                     I'm not coming.
                     He's not here.
             c.  Auxilliary-negative or copula-negative
                 contraction:
                     He wasn't going.
                     He hasn't been seen.
                     It couldn't be mine.
                     They aren't big.

8. Conjunction
   Score 1
         2
         3   and
         4
         5   a.  but
             b.  so, and so, so that
             c.  or, if
         6   because
         7
         8   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.

9.  Interrogative Reversal
    Score 1   Reversal of copula:
                Isn't it red?  Were they there?
          2
          3
          4   Reversal of auxilliary be:
                Is he coming?  Isn't he coming?
                Was he going?  Wasn't he going?
          5
          6   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?
          7
          8   a.  Reversal of auxilliary have:
                    Has he seen you?
              b.  Reversal with two or three auxilliaries:
                    Has he been eating?
                    Couldn't he have waited?
                    Could he have been crying?
                    Wouldn't he have been going?

10. Wh-questions
    Score 1
          2   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?
          3
          4
          5   when, how, how+adjective
                When shall I come?
                How do you do it?
                How big is it?
          6
          7   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?

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

Deriving the Developmental Sentence Score:

When all fifty sentences in the language sample have
been individually scored, the mean sentence score is derived
by adding the total sentence scores and dividing by fifty.
This is known as the child's DSS.

(from Lee, <u>Developmental Sentence Analysis</u>, 1974)