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An Investigation of the Vocabulary Recognition and Syntactic Performance of Normally-Developing and Educable Mentally Handicapped Children

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AN INVESTIGATION OF THE VOCABULARY RECOGNITION AND

SYNTACTIC PERFORMANCE OF NORMALLY-DEVELOPING AND

EDUCABLE MENTALLY HANDICAPPED CHILDREN

by
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TABLE OF CONTENTS

LIST OF TABLES

LIST OF ILLUSTRATIONS

Figure

ABSTRACT

This study was designed to investigate the relationship between the performance of normally-developing subjects and educable mentally handicapped (EMH) subjects on standardized measures of vocabulary recognition and syntax.

Nine male and nine female normally-developing subjects, with a mean age of five years seven months, and ten male and seven female educable mentally handicapped subjects, with a mean age of nine years six months, participated in this study. All of the subjects were administered the Full Range Picture Vocabulary Test (FRPVT) (Ammons and Ammons, 1948) and Developmental Sentence Scoring (DSS) (Lee, 1974) in the present study and were administered the Peabody Picture Vocabulary Test (PPVT) (Dunn, 1965) and the Carrow Elicited Language Inventory (CELI) (Carrow, 1974) in a companion study. The data in both the present study and the companion study were combined to provide a broad base for statistical analysis.

Statistical analysis of the performance of the four subject groups (EMH males and females and normally-developing males and females) revealed significant relationships between performance on the FRPVT and the PPVT, and between performance on the CELI and the DSS.

A significant difference was found between EMH and normally-developing subjects on the CELI, while significant differences between subject groups were not found on the other three test measures. A

significant difference was revealed between male performance and female performance on the PPVT, while male performance and female performance on the other three test measures were not significantly different. Interaction was found to be significant on the FRPVT, the PPVT, and the CELI. The DSS did not reveal a significant interaction.

It was concluded from the present study that syntactic performance cannot be meaningfully predicted from performance of vocabulary recognition and performance of vocabulary recognition cannot be meaningfully predicted from syntactic performance. Performance on the FRPVT can be predicted from performance on the PPVT and visa versa, and performance on the DSS can be predicted from performance on the CELI and visa versa. The CELI differentiated between performance by EMH and normally-developing subjects, while the other three test measures did not. The PPVT differentiated between performance by the male subjects and the female subjects, while the other three test measures did not differentiate between these two subject groups.

CHAPTER I

INTRODUCTION AND REVIEW OF THE LITERATURE

Introduction

Theories relative to the nature of language have been devised
by a number of linguists, including Chomsky (1957, 1966), Katz and
Fodor (1964), Halle (1964), and Jakobson, Fant and Halle (1967).
Other investigators (including DeVito, 1970, and Liles, 1972) have
considered these linguistic theories and have provided interpretations
of the theories for students of linguistics. Clinically-oriented
researchers (including Head, 1926; Myklebust, 1954: and Berry, 1969)
have taken another approach to the study of language and have
formulated models of language processing.

Based on the theoretical work of the linguists and on the
models of language processing provided by the applied researchers,
diagnostic tools have been developed for the evaluation of the
linguistic performance of children. Some of these measures (Bzoch
and League, 1971; Lerea, 1958, revised by Wolski, 1962; Ammons and
Ammons, 1948; Dunn, 1965) are based on the model of receptive,
expressive and inner language developed by Head (1926) and Myklebust
(1954). Other measures which possess a loose relationship to
generative grammar evaluate the comprehension of syntactical structures
(Carrow, 1973; Lerea, 1958, revised by Wolski, 1962) and the expression
of syntactical structures (Carrow, 1974; Lee, 1974).

1

Of particular concern in child language assessment is a consideration of a child's syntactic, semantic and phonological performance. This concern has led to studies of structure, vocabulary and sound systems. (This type of research is well exemplified in two books of readings on child language: Bar-Adon, 1971, and Ferguson and Slobin, 1973).

There is a lack of information comparing levels of semantic performance with syntactic performance by specific children and by specific groups of children. Due to this paucity of information, the purpose of the present study was to determine the relationship between the performance of normally-developing subjects and educable mentally handicapped (EMH) subjects on the Full Range Picture Vocabulary Test (FRPVT) (Ammons and Ammons, 1948), a standardized measure of vocabulary recognition, and Developmental Sentence Scoring (DSS) (Lee, 1974), a standardized measure of syntax.

In an investigation (Groth, 1976) that was completed in a companion study to the present study, the Peabody Picture Vocabulary Test (PPVT) (Dunn, 1965) was used as a measure of vocabulary recognition and the Carrow Elicited Language Inventory (CELI) (Carrow, 1974) was used as a measure of syntactical productions to investigate relationships and differences between the performance of normally-developing and EMH subjects. The same subjects were used for both the Groth (1976) study and the present study, which was designed to investigate the same relationships and differences utilizing the FRPVT and the DSS. The present study sought to answer the following questions:

1. What are the relationships among performance on the FRPVT,
    the DSS, the PPVT, and the CELI by a combined group of
    normally-developing and educable mentally handicapped (EMH)
    subjects?

2. Are there significant differences between performance by
    the combined EMH and normally-developing male subjects and
    the combined EMH and normally-developing female subjects
    on the FRPVT, the DSS, the PPVT, and the CELI?

3. Are there significant differences between the performance
    of EMH subjects and that of normally-developing subjects on
    the FRPVT, the DSS, the PPVT, and the CELI?

Review of the Literature

Part I: Selected Theories and Processes of Language

Selected Theories of Language

A recent linguistic theory that has had a great deal of impact
on prevalent procedures for the evaluation of and intervention with
linguistically impaired children is generative grammar (Chomsky, 1957,
1966). DeVito (1970, p. 47) depicted this type of grammar in the
following schematic outline:
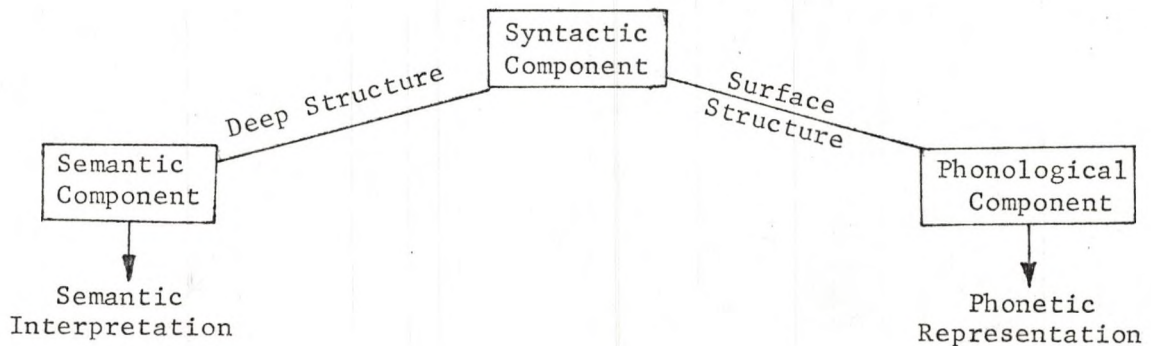
Fig. 1. The Structure of a Generative Grammar.

DeVito described Chomsky's generative theory of grammar as consisting

of the syntactic, semantic and phonological components. The syntactic

component is described as the generative component of language because

it serves to provide input into the semantic and phonological components

of the language. Structural descriptions for the strings of elements

are supplied by this component. The base subcomponent of the syntactical

component contains phrase structure rules, or deep structure. The

latter encompass the underlying meaning of a structure and provide the

input for the semantic component. The second subcomponent is the

transformational subcomponent which produces the surface structure of

a sentence. The transformational subcomponent contains the trans-

formational rules of substitution, addition, deletion and permutation,

which operate on a particular deep structure to produce the surface

structure. Surface structures exist at the level of usage of the

native speaker and provide input to the phonological component. This

latter component provides a phonetic representation which specifies the

features that constitute a phoneme. The semantic component generates

the semantic interpretations, or meanings of words. Katz and Fodor

(1964) theorized that the semantic component consists of a dictionary

and a set of projection rules. According to Katz and Fodor, projection

rules operate on the descriptions of sentences and dictionary entries

to produce semantic interpretations. Projection rules produce a

semantic interpretation for every sentence of a language. The dictionary

consists of every meaning a lexical item can possess in any sentence,

while the projection rules operate on the dictionary to select the

appropriate meaning for each grammatical structure of a sentence. The

dictionary and projection rules, therefore, result in the semantic interpretation.

Liles (1972), in discussing generative grammar (Chomsky, 1957, 1966), described processes in the acquisition and production of language. This transformational grammar begins with an idea which is revised into the deep structures of grammar. Deep structures are similar to semantic or conceptual structures, and are converted into surface structures by processes called transformations. Phonological rules are applied to surface structures to obtain surface phonetic structures. The latter are transformed into sentences of the English language by an individual's style and the performance of the structures by a specific individual. This approach to grammar does not imply that a person produces sentences in the manner presented, but rather that the model provides a means of analyzing a given sentence.

Channels For Processing Language

A clinically-oriented researcher (Berry, 1969) took a different approach to the study of comprehension and production of language, which she called a transactional view. This approach concentrates on neural functioning and psychological parameters of that neural functioning. Berry described neural functioning as a continuous circular process during which time the message is constantly modified and elaborated. According to Berry, "The transaction is completed in the response, i.e., in the act of perception, inner language or explicit expression " (1969, p. 110).

In discussing the psychological parameters of language acquisition, Berry (1969) cited Liberman's (1957) findings regarding

speech perception in the comprehension-use of language. According to Liberman's motor theory, the articulatory movements seem to be more important to speech perception than do the acoustic stimuli. The articulatory movements and the sensory feedback from the neurological processes mediate between the acoustic stimulus and its perception. Perception, therefore, is dominated by the motoric properties of articulation rather than by the acoustic properties. Berry concluded from these findings that taction-kinesthesis is equally important to auditory cues in the child's early speech and that later the child becomes more dependent upon acoustic signals.

Berry described auditory perception as being dependent upon codes involving the differences of speech in terms of frequency, amplitude and duration. Duration seems to be the most important factor in perceiving the sequences of acoustic events because auditory events are analyzed primarily by time patterns.

Another important factor in the perception of the sequences of acoustic events is the order of occurrence of the sound sequences in speech, which is also dependent upon time. Memory, redundancy of cues and the context of the message are other factors which determine auditory perception.

Berry explained the perception and comprehension of normally-developing children as a process of choosing peak cues and disregarding other cues. The peak or critical cues consist of the transitions between phonemes and morphemes. The normally-developing child chooses parts of the message and integrates these parts into a meaningful whole. The language handicapped child is unable to respond to the sequence of sounds by choosing appropriate peak cues. This child

chooses peak cues consisting of each sound in a syllable with no

particular discrimination of important syllables or words. The child

cannot attend to all of the sounds in a message and is not able to

join these isolated sounds together into an integrated sequence of

meaning.

Berry (1969) described inner language as the reduction of

syntax and speech sequences to produce the "sense" of a message. Oral

expression utilizes the central processes involved in perception and

inner language which, according to Berry, include sensory-motor fields

and circuits, and feedback from all modalities.

Comprehension of oral language by the child is accomplished by

the comprehension of the complete units of phrases and sentences.

The comprehension and use of oral language, therefore, requires an

integrated system which relies or many parameters. These parameters

include figure-ground and closure which consist of distinguishing

salient features or cues for speech from the background, categorization

of oral language by the perception of difference, and syntheses which

is the process by which a perceived object or experience becomes related

to a definite category through words.

Myklebust (1954) labeled as expressive, receptive and inner

language three semi-independent language processes described by Head

(1926). Receptive language refers to receiving and decoding the

message, which involves sensory-neural and auditory-perceptual processes.

Inner language refers to the processes involved when a person begins to

"talk to himself": the process by which the organism understands what

has been said. Bzoch and League (1971) described inner language as the

intra-personal linguistic dialogue that the human being is uniquely

capable of carrying on. Myklebust (1954) described expressive language as the process by which the person communicates with others. This involves the skills that are required to encode the meaning of a message into oral language. Myklebust theorized that these three processes develop in the following sequence: receptive language develops to allow the message to be received by the person; development of inner language permits the understanding of the received message; and expressive language permits the encoding of a message.

Part II: Selected Diagnostic Measures.

Selected Early Diagnostic Measures

Early studies of vocabulary concentrated on the functional classification of the vocabulary of children (Zyve, 1927), the vocabulary size of children (Hagerty, 1930), and the frequency of occurrence of vocabulary words (Uhrbrock, 1936).

Mean length of response (Nice, 1925) has been used frequently as a measure of language development. This method requires the computation of the average number of words per utterance in a fifty utterance language sample. Many researchers (Day, 1932; Fisher, 1934; Smith, 1935; Hahn, 1948; Templin, 1957) have discredited this method, citing several situations which will cause the length of a child's response to vary.

McCarthy (1930) employed three methods in analyzing child language. Two of these measures consisted of obtaining the length of response and of classifying the structural or grammatical complexity of utterances into the general categories of complete responses and incomplete responses. This method was revised by Davis (1937), and

Templin (1957) reported data from studies of child language which in turn revised the McCarthy-Davis findings. Using the McCarthy-Davis categories, Templin presented a quantitative classification of the structural complexity of sentences. The scoring is described by Templin and can be compared with norms also provided by Templin (1957).

Four Diagnostic Measures Derived From the
Receptive, Inner, and Expressive Model of
Language (Head, 1926; Myklebust, 1954)

The expressive-receptive model of language (Head, 1926; Myklebust, 1954) was used as the basis for the Receptive-Expressive Emergent Language Scale (Bzoch and League, 1971), which measures language skills in infants (ages zero months to 36 months). The interview method is utilized in the administration of this test and language abilities are categorized according to receptive and expressive abilities.

A second test which measures receptive and expressive language abilities is the Michigan Picture Language Inventory (Lerea, 1958, revised by Wolski, 1962). This measure consists of picture stimuli to elicit from a child responses which include pointing and one word utterances.

Two vocabulary tests which measure receptive and inner language abilities are the Peabody Picture Vocabulary Test (Dunn, 1965) and the Full Range Picture Vocabulary Test (Ammons and Ammons, 1948). Intelligence and mental age are estimated by a subject's performance on a listening task. Both tests require a subject to point to the picture which best represents the word spoken by the examiner.

Selected Diagnostic Measures of
Syntactic Performance

The Test for Auditory Comprehension of Language (Carrow, 1973)
utilizes two aspects which are involved in comprehending the meaning of
language: lexicon (vocabulary) and structure (grammar and syntax).
This test indicates to the diagnostician the ability of the child to
comprehend grammatical structures.

The Carrow Elicited Language Inventory (Carrow, 1974) was
devised to measure a child's productive control of grammar. Sentence
imitation is utilized because some research (including: McNeill, 1970;
Ervin, 1964) supports the finding that a child's spontaneous speech and
imitative speech are not different. According to McNeill (1970),
children will not imitate a surface structure which cannot be related
or understood by its deep structure. In other words, a child only
imitates structures using the rules that he has. If a sentence is
modeled that requires rules which are absent in his productive system,
the child will alter the sentence until it contains rules from his
productive system. Because this test provides a standard group of
phrases and sentences, the examiner is insured of sampling sentences
with a wide range of grammatical complexity.

A method which provides an evaluation of the syntax or language
expression of spontaneous speech is Developmental Sentence Scoring (Lee,
1974). This procedure allows for the evaluation of a child's usage of
the grammatical rules of standard English in reference to the
increasing grammatical load of conversational speech. Lee hypothesized
that spontaneous speech involves a grammatical load related to the
grammatical complexity of the message to be communicated, retrieval of

the contentive words and retrieval of the grammatical structure.
Developmental Sentence Scoring evaluates several grammatical categories
according to the developmental level of each structure within the
categories. For a more complete discussion of Developmental Sentence
Scoring refer to Chaper II, Stimulus Materials and Instrumentation.

Sex Differences in Language Performance

Among early studies regarding sex differences in language
performance McCarthy (1930) found consistent results indicating that
girls performed at a more advanced stage than boys of the same age.
Templin (1957) reported data regarding the performance of male and
female children in the age range of three to eight years. Measures of
vocabulary, length of remark, number of words in the five longest
remarks, number of one-word remarks, and complexity score revealed that,
although girls tended to receive higher scores more often than boys,
the differences were infrequently significant and were inconsistent.

Among later investigations, Menyuk (1971) utilized the model of
grammar proposed by Chomsky (1957) to evaluate the grammatical structure
of male and female children. The results of the study pertaining to the
acquisition of syntactic structures revealed no significant differences
between male and female subjects. A study by Gleason (1971) utilized
nonsense syllables to measure the child's performance of morphological
rules. Gleason found that there was no significant difference between
the performance of boys and girls. Gleason theorized that: "Throughout
childhood, girls are perhaps from a maturational point of view slightly
ahead of boys who are their chronological age mate. But the language
differences that have been observed may be culturally induced, and they

may be fairly superficial" (Gleason, 1971, p. 164). Gleason concluded

that, because morphological rules require a cognitive process,

intelligence might be more related to the child's performance than

any other factor, including sex.

Differences Between the Comprehension
and Production of Language

Lerea (1958), in testing the Michigan Picture Language

Inventory for validity, used two groups of normal subjects, a language

retarded group consisting of children diagnosed as aphasoid and a

group of children classified as brain-injured with associated language

retardation. The language retarded groups were matched with the

normals in terms of chronological age and sex. Brain-injured subjects

differed significantly from normal subjects in vocabulary comprehension

and expression, while no significant difference was revealed between

the mean ratios of vocabulary expression to vocabulary comprehension

provided by the two subject groups. The mean scores of structural

comprehension, structural expression and the ratios of structural

expression to structural comprehension for the brain-injured subjects

were significantly lower than the mean scores for the normal subjects.

Statement of Purpose and Questions

Parts I and II of the Review of the Literature revealed a

portion of the numerous models, theories and diagnostic tests dealing

with the general area of language. The present study utilized

Developmental Sentence Scoring (DSS) (Lee, 1974) and the Full Range

Picture Vocabulary Test (FRPVT) (Ammons and Ammons, 1948) to compare

the differences in the performance of educable mentally handicapped (EMH)

and normally-developing subjects. As Lerea (1958) found significant differences when comparing vocabulary comprehension to vocabulary expression and structural comprehension to structural expression in brain-injured and normal subjects, this study sought to investigate the relationship of the EMH and normally-developing subjects' performance in vocabulary recognition and syntactical expression. This study also sought to explore the relationship between the performance of male and female EMH and normally-developing subject groups.

In an investigation (Groth, 1976) that was completed in a companion study to the present study, the Peabody Picture Vocabulary Test (PPVT) (Dunn, 1965) was used as a measure of vocabulary recognition and the Carrow Elicited Language Inventory (CELI) (Carrow, 1974) was used as a measure of syntactical productions to investigate relation-ships and differences between the performance of normally-developing and EMH subjects. The same subjects were used for both the Groth (1976) study and the present study which was designed to investigate the same relationships and differences utilizing the FRPVT and the DSS.

The present study was designed to answer the following questions:

1. What are the relationships among performance on the FRPVT, the DSS, the PPVT, and the CELI by a combined group of normally-developing and educable mentally handicapped (EMH) subjects?

2. Are there significant differences between performance by the combined EMH and normally-developing male subjects and

the combined EMH and normally-developing female subjects
on the FRPVT, the DSS, the PPVT, and the CELI?

3. Are there significant differences between the performance
   of EMH subjects and that of normally-developing subjects
   on the FRPVT, the DSS, the PPVT, and the CELI?

CHAPTER II

It was the purpose of this study to investigate the relationship between the performance of normally-developing subjects and educable mentally handicapped subjects on standardized measures of vocabulary recognition and syntax.

PROCEDURE

Subjects

Eighteen normally-developing children and seventeen educable mentally handicapped (EMH) children from elementary schools and a university day care center in Grand Forks, North Dakota, served as subjects for this study.

The normally-developing subjects ranged in age from four years seven months to six years nine months with a mean age of five years seven months and met the following criteria:

1. The subjects were reported by their teachers to be exhibiting normal linguistic, academic and social development.

2. The subjects had never received any remedial instruction.

3. The subjects' hearing levels were found to be within normal limits bilaterally, as ascertained by the administration of hearing screening tests at 25dB ANSI for the frequencies 500, 1000, 2000 and 4000 Hz.

15

4. Three male and three female subjects were randomly
   selected from among the children of the same sex in
   each of three age groups: four years zero months to
   four years eleven months, five years zero months to
   five years eleven months, and six years zero months
   to six years eleven months.

5. The school age children were chosen from among the enrollees
   in the kindergarten and first grade classrooms of a school
   located in a middle class neighborhood in Grand Forks,
   North Dakota.

The ten male and seven female educable mentally handicapped (EMH)
subjects ranged in age from six years six months to twelve years seven
months with a mean age of nine years six months. The seventeen EMH
subjects who met the following criteria participated in the present
study:

1. All subjects were enrolled in an EMH classroom in one of
   three elementary schools located in Grand Forks, North
   Dakota.

2. The subjects were diagnosed as mentally handicapped by
   members of the school system.

3. The auditory sensitivity of all the subjects was found
   to be within normal limits bilaterally as ascertained
   by a hearing screening test at 25dB ANSI for the frequencies
   500, 1000, 2000 and 4000 Hz.

Instrumentation and Stimulus Materials

Equipment and Procedures

A Telex 88 portable pure-tone audiometer, checked and found to be in calibration, was used to screen the auditory thresholds of the subjects.

A Panasonic tape recorder, Model RQ-309AS with a built-in microphone, was used to record the spontaneous language samples. Recordings were made using high quality tapes and were good reproductions of the speakers' performance.

Full Range Picture Vocabulary Test (FRPVT)

All of the EMH and normally-developing subjects were individually administered the FRPVT, Form A (Ammons and Ammons, 1948). Form A was chosen because "Form A is better suited to the purpose of word-identification" (Berry, 1969, p. 266). This test consists of sixteen plates with four line-drawings on each plate. The FRPVT provides a total of 85 stimulus words of increasing difficulty.

The subjects were instructed to point to the best picture of the four to show the meaning of a word spoken by the examiner. The subjects were told not to guess on any items and to signal if the meanings of any of the words were not known. If the subject was judged by the examiner to be guessing on a specific test item, the item was readministered to the subject at a later time. Point levels are in parentheses on the record form. Words on a card were presented until three of the point levels were passed and three were failed. When three point levels were failed, the examiner proceeded to the next plate.

A raw score was obtained for each subject by counting the number of items recognized correctly on each card and totaling these numbers.

Developmental Sentence Scoring (DSS)

The reweighted DSS procedure (Lee, 1974) was used to analyze the syntactic structures of all the subjects' spontaneous oral language. A sample of each subject's language was tape recorded for later evaluation.

According to instructions by Lee (1974), the following rules were established for each spontaneous language sample:

1. The language sample for analysis contained 50 complete sentences. A complete sentence consisted of a noun and a verb in subject-predicate relationship.

2. The corpus consisted of consecutive, complete, intelligible utterances. Choosing consecutive utterances ruled out the possibility of choosing only high scoring sentences. Other utterances with a subject or a verb absent or unintelligible utterance were omitted from the sample.

3. Only one occurrence of an utterance was allowed so that overused stereotypes were counted only once.

4. Only sentences produced spontaneously were included in the corpus.

5. Sentences beginning with a conjunction were included in the sample, but the conjunction was not scored.

6. Coordinating conjunctions were recorded, but scored only once when the conjunctions connected independent clauses.

7. Question markers and imperative interjections were used to
    aid the clinician in evaluating the type of sentence spoken.

Scores

Scoring of the eight categories consisted of recording the
appropriate score for a grammatical structure in the corresponding
column. Scores were awarded only when a structure was syntactically,
semantically and morphologically correct, thus meeting the requirements
of adult standard English.

The Sentence Point

One additional point was added to the total sentence points for
each sentence which met all the requirements of the standard adult rules
of the English language. This additional point allows a small
consideration for the structures, such as nouns and prepositions, which
are not considered by the scoring procedures.

DSS evaluates eight categories of grammatical forms. Lee (1974)
found these categories to show the most significant developmental
progression. Therefore, these categories were assigned points according
to developmental order.

The following is a discussion of the eight categories scored by
DSS and the possible points assigned to each category. (See Appendix
for the complete delineation of scores.)

Indefinite Pronoun-Noun Modifier

Possible Points: 1, 3, 4, 7. The same score is received for
a word used as an indefinite pronoun or as a noun modifier.

Personal Pronouns

Possible Points: 1, 2, 3, 5, 6, 7. Personal pronouns are grouped according to person, number, gender, case and type.

Main Verbs

Possible Points: 1, 2, 4, 6, 7, 8. It is necessary to refer to the context when deciding whether the verb form used is appropriate. If a verb was syntactically correct, but contextually incorrect, the verb form is not scored.

Secondary Verbs

Possible Points: 2, 3, 4, 5, 7, 8. Secondary verbs are classified as infinitives, participles and gerunds. These structures are used to join two basic sentences together. Structures in this category develop later than many of the structures in other categories, and, therefore, are given somewhat higher scores.

Negatives

Possible Points: 1, 4, 5, 7. In this category only negatives with verbs are scored, while negative pronouns are scored in the category of indefinite pronouns-noun modifiers.

Conjunctions

Possible Points: 3, 5, 6, 8. The first developing conjunctions received higher scores than early developing items in other categories because the latter have developed before conjunctions are in general use.

Interrogative Reversals

Possible Points: 1, 4, 6, 8. Sentences scored in this category require the transposition of the subject with the first auxiliary verb. Early development of questions consists of an upward intonation on a word or a sentence, followed later by the addition of a question morpheme, such as _mine?_ or _right?_ These are not awarded points and the sentence point is withheld. This category contains two general types of questions: questions requiring a yes or no response and wh-questions which function to seek information.

Wh-Questions

Possible Points: 2, 5, 7, 8. A score in this category requires the correct choice of a wh-word and the placement of this word in the initial position of the sentence. A sentence requiring a wh-word and an interrogative reversal would be scored for each in the two appropriate columns. For example, in the sentence "Why are you painting?", a score would be placed in the wh-question column for _why_ and an additional score would be placed in the interrogative reversal column for the reversal of _you are_.

The Developmental Sentence Score

To obtain this score, the 50 sentences are scored, the total points are tallied, and this total is divided by 50.

Test Administration

The screening of each subject's hearing was administered individually and immediately prior to the administration of the experimental tasks. The language sample was obtained and the _Full_

Range Picture Vocabulary Test (FRPVT) was administered to the seventeen educable mentally handicapped (EMH) and eighteen normally-developing subjects individually in a relatively quite room. The two evaluative measures were administered according to standardized procedures provided by Ammons and Ammons (1948) and Lee (1974). Raw scores were obtained for both measures in a standard procedure as specified by instructions accompanying each of the measures.

Each of the subjects was shown toys, pictures and storybooks to elicit the spontaneous language sample. Each language sample was tape recorded and transcribed on a DSS record form by the examiner on the same day as the testing. Fifty utterances of each of the EMH and normally-developing subjects were analyzed according to DSS procedures.

Because of the disproportionate cell frequencies, a regression solution was necessary for the analysis of variance. The hierarchical model was used in the present study. One of the distinctions of this model is that the first main effect (EMH - normally-developing) is measured directly; the second main effect (sex) is adjusted for the first main effect and the interaction is adjusted for the first two main effects, so that the hierarchical model is additive.

CHAPTER III

RESULTS AND DISCUSSION

The purpose of the present study was to investigate the
relationship between the performance of normally-developing subjects
and educable mentally handicapped (EMH) subjects on standardized
measures of vocabulary recognition and syntax.

The eighteen normally-developing subjects were reported by
their teachers to be exhibiting normal linguistic, academic and social
development. The subjects had never received any remedial instruction.
Each subject's hearing sensitivity was within normal limits bilaterally.
The normally-developing subjects ranged in age from four years seven
months to six years nine months with a mean age of five years seven
months.

The seventeen EMH subjects had been diagnosed as mentally
handicapped by members of the school system in which they were enrolled
in EMH classrooms. Each subject's auditory sensitivity was within
normal limits bilaterally. The EMH subjects ranged in age from six
years six months to twelve years seven months with a mean age of nine
years six months.

In the present study, the Full Range Picture Vocabulary Test
(FRPVT) (Ammons and Ammons, 1948), a test of vocabulary recognition,
and Developmental Sentence Scoring (DSS) (Lee, 1974), a procedure for

evaluating syntactic performance, were administered to all subjects.
In an investigation (Groth, 1976) that was completed in a companion
study to the present study, the Peabody Picture Vocabulary Test (PPVT)
(Dunn, 1965), a test of vocabulary recognition, and the Carrow Elicited
Language Inventory (CELI) (Carrow, 1974), a test of syntactic
performance, were administered to the same subjects. The data of the
Groth study and the present study were combined in order to provide a
broad base for statistical analysis. The results of the analysis of
that data are presented below.

Performance of the four subject groups (EMH males, EMH females,
normally-developing males, and normally-developing females) on the
FRPVT, DSS, PPVT, and CELI was analyzed using Pearson product-moment
correlation coefficients. The number of subjects used in the present
study was not sufficient to determine the significance of the relation-
ships between vocabulary recognition and syntax of normally-developing
subjects and between vocabulary recognition and syntax of EMH subjects.
It is recommended that further research in this area be conducted
using a larger population. Table 1 presents the correlation
coefficients for all four subject groups combined on each of the four
linguistic measures.

The correlations between the FRPVT and the PPVT ($r = .75$) and
between the DSS and the CELI ($r = -.47$) exceed the value required for
significance at the one percent level. These correlations indicate the
extent to which the FRPVT and the PPVT and the extent to which the DSS
and the CELI test the same performance. The correlation between
subject performance on the FRPVT and performance on the PPVT was
interpreted as a "high correlation; marked relationship" (Guilford,

1942, p. 219), while the correlation between subject performance on the DSS and performance on the CELI was interpreted as a "moderate correlation; substantial relationship" (Guilford, 1942, p. 219). The correlation between the DSS and the CELI is negative because the DSS scores consist of the total number of correct productions while the CELI scores consist of the total number of error responses.

TABLE 1

THE PEARSON PRODUCT-MOMENT CORRELATION COEFFICIENTS
RELATING THE PERFORMANCE OF THE COMBINED EDUCABLE
MENTALLY HANDICAPPED AND NORMALLY-DEVELOPING
SUBJECT GROUPS ON THE FOUR
LINGUISTIC MEASURES

	FRPVT to DSS	FRPVT to PPVT	FRPVT to CELI	DSS to PPVT	DSS to CELI	PPVT to CELI
All Subjects Combined	.32	.75[a]	-.23	.24	-.47[a]	-.19

[a]Significant at the .01 level.

No significant correlations were found between measures of vocabulary recognition and measures of syntactic performance. These findings indicate that syntactic performance as measured by the DSS or the CELI cannot be predicted from performance on the FRPVT or the PPVT, two measures of receptive vocabulary.

The means and standard deviations for the raw scores from performance on the FRPVT, DSS, PPVT, and CELI are presented in Table 2.

An analysis of variance procedure was used to analyze the performance of the combined EMH and normally-developing subjects on each

of the four test measures. The results are reported in Tables 3, 4, 5, and 6.

TABLE 2

THE MEANS AND STANDARD DEVIATIONS OF THE RAW
SCORES OBTAINED BY THE FOUR SUBJECT GROUPS
ON THE FOUR LINGUISTIC MEASURES

	FRPVT		DSS		PPVT		CELI	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
EMH-Male	29.0	3.8	9.1	2.5	68.0	7.5	18.2	12.5
EMH-Female	20.7	4.0	8.1	2.7	50.9	7.5	43.1	45.0
Normally-Developing-Male	26.9	4.1	8.8	1.8	62.6	4.8	15.3	11.3
Normally-Developing-Female	29.8	5.1	9.1	1.6	60.1	6.9	9.2	5.5

The only significant difference among the performance of the four subject groups on the FRPVT was due to the interaction as shown in Table 3. The results in Table 3 reveal that the normally-developing subjects (mean age = five years seven months) did not perform significantly differently from the EMH subjects (mean age = nine years six months) on the FRPVT and that performance by the combined EMH and normally-developing male subjects was not significantly different from performance by the combined female subjects. However, the interaction was found to be significant (F = 14.61; dF = 1; p < .01). Inspecting Table 2 is helpful in explaining this interaction. It can be seen that,

of the EMH subjects, males had higher scores; the reverse is true for the normally-developing subjects.

TABLE 3

THE ANALYSIS OF VARIANCE OF THE
PERFORMANCE OF THE SUBJECT
GROUPS ON THE FRPVT

	df	SS	MS	F
EMH-Normally-Developing	1	65.88	65.88	3.58
Sex	1	51.75	51.75	2.82
Interaction	1	268.50	268.50	14.61[a]
Within	31	596.87	18.38	
Total	34	956.00		

[a]Significant at the .01 level.

No significant difference was found among the performance by the four subject groups on the DSS, as shown in Table 4. The results reveal that the normal subjects did not perform significantly better than the EMH subjects on the DSS. Table 4 also reveals that the performance of the combined EMH and normally-developing male subjects was not significantly different from the performance of the combined female subjects and that the interaction was not significant.

It can be seen from Table 5 that the normally-developing subjects did not perform significantly better than the EMH subjects on the PPVT. The performance of the combined EMH and normally-developing male subjects on the PPVT was significantly better than the performance of the combined female subjects on the PPVT (F = 17.02;

df = 1; p < .01). The interaction was found to be significant

(F = 10.33; df = 1; p < .01). Inspection of Table 2 reveals that

performance by the EMH male and female subjects was quite different

from performance by the normally-developing male and female subjects.

The EMH males performed better than (mean = 68) the normal subjects

(mean of males = 62.6; mean of females = 60.1) whereas the EMH females

performed more poorly than any of the other subject groups (mean = 50.9).

TABLE 4

THE ANALYSIS OF VARIANCE OF THE
PERFORMANCE OF THE SUBJECT
GROUPS ON THE DSS

	df	SS	MS	F
EMH-Normally-Developing	1	.43	.43	.09
Sex	1	1.11	1.11	.24
Interaction	1	3.28	3.28	.70
Within	31	144.33	4.66	
Total	34	149.15		

A significant difference (F = 4.80; df = 1; p < .05) was found

among the performance of the EMH subjects and the normally-developing

subjects on the CELI, as shown in Table 6. These results reveal that

normally-developing subjects performed significantly better than did

the EMH subjects on this measure of syntactic performance, which is an

imitative task. Table 6 also indicates that the performance of the

combined EMH and normally-developing male subjects was not significantly

different from performance by the combined female subjects. The

interaction was found to be significant (F = 4.34; df = 1; p < .05). An inspection of Table 2 reveals that the EMH female subjects had the highest (poorest) scores of any of the subject groups; the reverse is true for the normally-developing subjects. A review of the performance of individual subjects revealed that one EMH female subject's raw score of 139 was not characteristic of the other EMH subjects', whose raw scores ranged from four to 46 with a mean score of 21.6. The performance of this subject also contributed to the extremely large standard deviation of 45.

TABLE 5

THE ANALYSIS OF VARIANCE OF THE
PERFORMANCE OF THE SUBJECT
GROUPS ON THE PPVT

	df	SS	MS	F
EMH-Normally-Developing	1	1.34	1.34	.03
Sex	1	773.45	773.45	17.02[a]
Interaction	1	464.53	464.53	10.33[a]
Within	31	1393.97	44.97	
Total	34	2632.29		

[a]Significant at the .01 level.

TABLE 6

THE ANALYSIS OF VARIANCE OF THE
PERFORMANCE OF THE SUBJECT
GROUPS ON THE CELI

	df	SS	MS	F
EMH-Normally-Developing	1	2292.43	2292.43	4.80[a]
Sex	1	656.32	656.32	1.38
Interaction	1	2073.52	2073.52	4.34[a]
Within	31	14795.99	477.29	
Total	34	19818.26		

[a]Significant at the .05 level.

Discussion of Results

None of the correlations between the tests of vocabulary
recognition and the tests of syntactic performance were significant
($p > .05$). This finding indicates that syntactic performance as
measured by the DSS or the CELI cannot be meaningfully predicted from
performance on the PPVT or the FRPVT, two measures of vocabulary
recognition, and that performance on these measures of vocabulary
recognition cannot be meaningfully predicted from the selected
measures of syntactic performance. Several ambiguities in portions
of the FRPVT, Form A, may explain why the correlation coefficient
between the two measures of vocabulary recogntion was not higher. Four
pictures that exemplify the type of confusion that might exist for
subjects due to poor depictions are:

1. Stimulus word: 'Horse'

    Two stimulus pictures: A horse pulling a wagon

    A large, long-eared dog (which

    resembled a horse)

2. Stimulus word: 'Hot'

    Two stimulus pictures: A hot, sweating man

    An obese man eating food (which

    appeared to be a 'hot' meal of

    meat and potatoes)

3. Stimulus word: 'Farm'

    Stimulus pictures: An 'abstract' sketch of a farm

    A skyscraper

    A factory district

    A five dollar bill

4. Stimulus word: 'Numbers'

    Two stimulus pictures: A clock with numerals

    A circle (which could have been

    mistaken for a zero)

The FRPVT is not structured according to increased difficulty. Each

plate is presented starting with the lowest age level for that plate

and then vocabulary levels of increasing difficulty are tested.

Twenty-five percent of the plates start with words that are above age

seven years six months in difficulty. This test structure may have

increased a subject's tendency to guess.

A significant difference was found between performance by the

EMH subjects and performance by the normally-developing subjects on the

CELI, while significant differences were not found between performance

by these subject groups on the DSS, the PPVT, or the FRPVT. The

difference between the two measures of syntactic performance in their

ability to discriminate between normally-developing and EMH subjects

might be explained by the fact that the CELI and the DSS use different

methods to measure the syntax of oral language. While these two measures

seem to test the same aspect of language ($r = .47$; $p < .01$), the CELI,

which requires subjects to imitate various syntactic structures, did

differentiate ($F = 4.80$; $df = 1$; $p < .05$) between the performance of the

EMH subjects and the normally-developing subjects, whereas the DSS did

not distinguish between the syntactic performance of the two subject

groups. The DSS scores the syntax of spontaneous language production.

Therefore, the CELI imposes specific syntactic performance on the

subjects; whereas the DSS procedure uses the spontaneous syntactic

performance of the subjects. The significant difference found between

normally-developing and EMH subjects on the CELI might possibly be

related to the processing of peak cues (Berry, 1969). Berry reported

that in perception and comprehension the normally-developing child

chooses "peak cues" and disregards other cues. These peak cues are

then integrated into a meaningful whole. In contrast to the normally-

developing child, the language handicapped child is unable to choose

the appropriate peak cues. The language handicapped child may be

attempting to attend to all of the sounds in a message rather than

attending to those sounds that constitute peak cues. As a result, the

child may not combine these sounds meaningfully into words. Further, he

may not combine words meaningfully because he is unable to differentiate

the contentive words (peak cues) from the functional words.

Since the CELI requires perception, and possibly comprehension, of the structure to be repeated, inadequate processing of peak cues might explain the poorer performance of the language handicapped group (EMH subjects).

A significant difference was found between performance by the combined male subjects and the combined female subjects on the PPVT while no significant differences were found between performance by the combined female subjects on the FRPVT, the DSS, or the CELI.

CHAPTER IV

SUMMARY AND CONCLUSIONS

There is a lack of information comparing levels of semantic performance with syntactic performance of specific groups of children. The purpose of this study was to determine the relationship between performance of normally-developing subjects and of educable mentally handicapped (EMH) subjects on two standardized measures of syntax.

The Full Range Picture Vocabulary Test (FRPVT) and the Peabody Picture Vocabulary Test (PPVT), measures of vocabulary recognition, and Developmental Sentence Scoring (DSS) and the Carrow Elicited Language Inventory (CELI), measures of syntax, were administered in two companion studies to eighteen normally-developing subjects and seventeen EMH subjects.

Based on an analysis of the data obtained, the following conclusions were drawn:

1. The high correlation between the FRPVT and the PPVT tends to indicate a marked relationship between these two measures of vocabulary recognition. The moderate correlation between the CELI and the DSS tends to indicate a substantial relationship between these two measures of syntactic performance. These results tend to indicate that performance on the FRPVT can be predicted from performance

on the PPVT and visa versa, and that performance on the DSS
can be predicted from performance on the CELI and visa
versa.

2. The low to slight relationships between the syntactic
   measures and the measures of vocabulary recognition indicate
   that syntactic performance cannot be meaningfully predicted
   from performance of vocabulary recognition and that
   performance of vocabulary recognition cannot be meaningfully
   predicted from syntactic performance.

3. No significant differences were found between performance by
   the combined EMH and normally-developing male subjects and
   the combined female subjects on the FRPVT, DSS, and the
   CELI. The combined EMH and normally-developing male
   subjects performed significantly better than the combined
   female subjects on the PPVT.

4. A significant difference was not found between performance
   by the EMH subjects and the normally-developing subjects
   on the FRPVT, the DSS, and the PPVT. These results indicate
   that the FRPVT, the DSS, and the PPVT did not differentiate
   between performance by the EMH subjects, ranging in age
   from six years six months to twelve years seven months and
   the normally-developing subjects, ranging in age from four
   years seven months to six years nine months. The normally-
   developing subjects performed significantly better on the
   CELI than did the EMH subjects. This significant difference
   between the EMH and normally-developing subjects on the CELI

indicates that the CELI differentiates between performances by these two subject groups.

Recommendations for Further Research

Research is needed to determine the developmental sequence of the semantic, syntactic, and phonological components of language from the earliest child models through the adult model. Such information is of significance in the distinction between normal linguistic performance and pathological performance. Once pathological performance has been identified, such research information is also useful in determining the steps of intervention with pathological performance.

Further research is needed to determine the developmental relationship between semantics and syntax. This information is necessary to determine effective procedures for intervention with children exhibiting deficits in both semantics and syntax. This research will also aid in the determination of effective intervention programs with children who are developing differentially in semantics and syntax.

Further research is needed to determine the difference between the performance of such subject groups as normally-developing, trainable mentally handicapped, educable mentally handicapped, and learning disabled children, and to define the common response patterns among the subject groups. Research should also be designed to investigate the presence and nature of peak cues as a variable in the comprehension and production of language.

APPENDIX

THE DEVELOPMENTAL SENTENCE SCORING (DSS)

REWEIGHTED SCORES

Chart 8. The Developmental Sentence Scoring (DSS) Reweighted Scores

SCORE	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 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	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 him 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 + 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.

SCORE	NEGATIVES	CONJUNCTIONS	INTERROGATIVE REVERSALS	WH-QUESTIONS
1	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?	
2				A. who, what, what + noun: Who am I? What is he eating? What book are you reading? B. where, how, 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		and		
4	can't, don't		Reversal of auxiliary be: Is he coming? Isn't he coming? Was he going? Wasn't he going?	
5	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?
6		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?	
7	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?
8		A. where, when, how, while, whether (or not), till, until, unless, since, before, after, for, 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?

38

SELECTED REFERENCES

Ammons, R., and Ammons, H., The Full Range Picture Vocabulary Test. New Orleans: Southern Universities Press (1948).

Bar-Adon, A., and Leopold, W. (Eds.), Child Language: A Book of Readings. Englewood Cliffs: Prentice-Hall, Inc., (1971).

Berry, M., Language Disorders of Children: The Bases and Diagnosis. New York: Meredith Corporation (1969).

Bzoch, K., and League, R., Assessing Language Skills in Infancy. Gainesville: The Tree of Life Press, Inc. (1971).

Carrow, E., Test for Auditory Comprehension of Language. Austin: Learning Concepts (1973).

_____. Carrow Elicited Language Inventory. Austin: Learning Concepts (1974).

Chomsky, N., Syntactic Structures. The Hague: Mouton and Co. (1957).

_____. Topics in the Theory of Generative Grammar. The Hague: Mouton and Co. (1966).

Davis, E., The development of linguistic skill in twins, singletons with siblings, and only children from age five to ten years. University of Minnesota Institute of Child Welfare Monograph, 14, University of Minnesota Press, Minneapolis (1937).

Day, E., The development of language in twins: I. A comparison of twins and single children. Child Development, 3, 179-199 (1932).

DeVito, J., The Psychology of Speech and Language. New York: Random House (1970).

Dunn, L., Peabody Picture Vocabulary Test. Circle Pines: American Guidance Services, Inc. (1965).

Ervin, S., Imitation and structural change in children's language. In E. Lenneberg (Ed.), New Directions in the Study of Language. Cambridge: M.I.T. Press 163-189 (1964).

Ferguson, C., and Slobin, D. (Eds.), Studies of Child Language. Chicago: Holt, Rinehart and Winston (1973).

Fisher, M., Language patterns of pre-school children. Child Development Monographs. New York: Teachers College, Columbia University (1934).

Gleason, J., The child's learning of English morphology. In A. Bar-Adon and W. Leopold (Eds.), Child Language: A Book of Readings. Englewood Cliffs: Prentice-Hall, Inc., 153-167 (1971).

Groth, S., An investigation of the receptive vocabulary and syntactic performance of normally-developing and educable mentally handicapped children. Unpubished M.S. thesis, University of North Dakota (1976).

Guilford, J., Fundamental Statistics in Psychology and Education. New York: McGraw-Hill Book Company (1942).

Hagerty, L., What a two and one-half year old child said in one day. Journal of Genetic Psychology, 37, 75-101 (1930).

Hahn, F., Analysis of the content and form of the speech of first grade children. Quarterly Journal of Speech, 34, 361-366 (1948).

Halle, M., Phonology in a generative grammar. In J. Fodor and J. Katz (Eds.), The Structure of Language: Readings in the Philosophy of Language. Englewood Cliffs: Prentice-Hall, Inc., 334-354 (1964).

Head, H., Aphasia and Kindred Disorders of Speech. Vol. I. London: Cambridge University Press, 1926, reprint ed., New York: Hafner Publishing Co., Inc. (1963).

Jakobson, R.; Fant, C.; and Halle, M., Preliminaries to Speech Analysis: The Distinctive Features and Their Correlates. Cambridge: M.I.T. Press (1967).

Katz, J., and Fodor, J., The structure of a semantic theory. In J. Fodor and J. Katz (Eds.), The Structure of Language: Readings in the Philosophy of Language, Englewood Cliffs: Prentice-Hall, Inc., 479-518 (1964).

Lee, L., Developmental Sentence Analysis. Evanston: Northwestern University Press (1974).

Lerea, L., Assessing language development. Journal of Speech and Hearing Research, 1, 75-85 (1958).

Liberman, A., Some results of research on speech perception. Journal of the Acoustical Society of America, 29, 117-123 (1957).

Liles, B., Linguistics and the English Language. Pacific Palisades: Goodyear Publishing Co., Inc. (1972).

McCarthy, D., The language development of the pre-school child. University of Minnesota Institute of Child Welfare Monograph, 4, University of Minnesota Press, Minneapolis (1930).

McNeill, D., The Acquisition of Language: The Study of Developmental Psycholinguistics. New York: Harper and Row (1970).

Menyuk, P., Syntactic structures in the language of children. In A. Bar-Adon and W. Leopold (Eds.), Child Language: A Book of Readings. Englewood Cliffs: Prentice-Hall, Inc., 290-299 (1971).

Myklebust, H., Auditory Disorders in Children. New York: Grune and Stratton, Inc. (1954).

Nice, M., Length of sentences as a criterion of a child's progress in speech. Journal of Educational Psychology, 16, 370-379 (1925).

Smith, M., A study of some factors influencing the development of the sentence in preschool children. Journal of Genetic Psychology, 46, 182-212 (1935).

Templin, M., Certain language skills in children. University of Minnesota Institute of Child Welfare Monograph, 26, University of Minnesota Press, Minneapolis (1957).

Uhrbrock, R., Words most frequently used by a five year old girl. Journal of Educational Psychology, 27, 155-158 (1936).

Williams, J., Regression Analysis in Educational Research. New York: M.S.S. Publishing Co. (1974).

Wolski, W., Language development of normal children four, five and six years of age as measured by the Michigan Picture Language Inventory. Ph.D. dissertation, University of Michigan (1962).

Zyve, C., Conversation among children. Teachers College Record, 29, 46-61 (1927).