LANGUAGE ABILITIES OF LANGUAGE IMPAIRED AND LEARNING DISABLED CHILDREN

A Thesis

by

SYLVIA POPE MOORE

Submitted to the Graduate School

Appalachian State University

in partial fulfillment of the requirements for the degree of

MASTER OF ARTS

July 1983

Major Department: Speech Pathology and Audiology

LANGUAGE ABILITIES OF LANGUAGE IMPAIRED AND LEARNING DISABLED CHILDREN

A Thesis

by

SYLVIA POPE MOORE

July 1983

APPROVED BY:

Chairperson, Thesis Committee

Member, Thesis Committee

Member, Thesis Committee

Chairperson, Department of
Speech, Pathology, and Audiology

Dean of the Graduate School

ABSTRACT

LANGUAGE ABILITIES OF LANGUAGE IMPAIRED
AND LEARNING DISABLED CHILDREN (July 1983)

Sylvia Pope Moore, B.S., East Carolina University
M.A., Appalachian State University
Thesis Chairperson: R. Jane Lieberman

The purpose of this study was to compare the language abilities of language impaired and learning disabled children as measured by the Clinical Evaluation of Language Functions (CELF). More specifically, answers to the following questions were sought: (a) Is there a significant difference in processing ability between language impaired and learning disabled children? (b) Is there a significant difference in production ability between language impaired and learning disabled children? (c) Is there a significant difference in semantic ability between language impaired and learning disabled children? (d) Is there a significant difference in syntactic ability between language impaired and learning disabled children? (e) Is there a significant difference in memory between language impaired and learning disabled children? (f) Is there a significant difference in performance on the individual subtests of the CELF between language impaired and learning disabled children?

The CELF was administered to 28 children in grades one, two, three, and four who comprised two groups: a group of 14 language

impaired children and a group of 14 learning disabled children. The CELF is a comprehensive evaluation instrument which measures processing and production language abilities with 11 different subtests. At the time of testing, all children demonstrated adequate hearing and normal intelligence (IQ=85 or above) on the Slosson Intelligence Test and were receiving services for either language impairment or learning disability. The language impaired children all achieved a language quotient of 85 or below on the Test of Language Development and were matched to learning disabled children on the basis of age (± six months), IQ (± 10 points), and reading achievement (± six percentile points).

The results of 13 two-tailed t-tests showed that the learning disabled scored significantly better on Producing Model Sentences and subtests which measured syntactic abilities. No significant differences were found on any other individual subtests, overall processing scores, overall production scores, semantic skills, or memory. The learning disabled scored better on all subtests except Producing Word Series and Producing Names on Confrontation.

Even though the learning disabled scored significantly better on the syntax subtests, 11 of the 14 learning disabled children were found to have difficulty with syntax when compared to other children their age. These findings suggest that language impaired and learning disabled children have similar processing and production language disabilities, with the language impaired having more severe deficits in syntax.

ACKNOWLEDGEMENTS

I wish to express my sincerest appreciation to my thesis chairperson, Dr. Jane Lieberman, for her guidance throughout this project. Special appreciation also goes to Dr. Edward Hutchinson and Dr. Harry Padgett for their advice and suggestions.

Additionally, I wish to thank the Davidson County School System, especially Ken Drum, Director of Exceptional Children's Programs, and the speech/language pathologists. Without their support and help, this project would have been impossible. Special love and thanks go to two speech/language pathologists, Kim Scarboro and Betsy Shoaf, who went through this project with me. They offered much moral support that helped me continue, even when I felt like quitting.

Finally, my deepest love and appreciation goes to my husband, Glenwood, who was understanding and supportive throughout this lengthy endeavor. Without his love and encouragement, this project would never have been undertaken.

TABLE OF CONTENTS

LIST OF TABLES

Chapter 1

INTRODUCTION

Language is generally considered a uniquely human characteristic. Other creatures communicate, but humans are apparently the only animals who have an elaborate symbol system. Bangs (1968) views language as:

> the act or acts which produce some kind of response between two or more persons. Languages are composed of a system of arbitrary signs that allow for communication through oral language, written language, sign language of the deaf, Morse code, everyday gestures like beckoning and other such forms. (p. 16)

Two major elements of language are processing (understanding) and production (expression). Within each of these aspects are the components of content (semantics), form (syntax and morphology), and use (pragmatics) (Bloom & Lahey, 1978). Problems in any of these components may constitute an impairment in language which would affect a child's ability to communicate effectively and learn in school.

The deleterious effect that language impairment has on academic achievement is widely accepted. In a poll of educators, 66% affirmed that communication disorders adversely influence educational performance (Bennett & Runyan, 1982). Children's ability to attain general information about their environment is influenced by their language abilities. They do not seem to "accrue knowledge

through incidental or formal learning unless the ability to use and understand spoken language is unimpaired" (MaGee & Newcomer, 1978, p. 66).

The ability to read has been linked to auditory-perceptual abilities, linguistic knowledge, and transformations of syntactic, morphological, and semantic information (Hammill & Larsen, 1974; Henderson & Shores, 1982; Wallach & Goldsmith, 1977). The correspondence between written and spoken messages seems to be based more on meaning than merely pairing visual forms with auditory forms of speech (Ryan & Semmell, 1969). Although children's knowledge of the sound system of a language (phonology) is almost always considered by teachers to be important in learning to read, MaGee and Newcomer (1978) found that semantic and syntactic components of language were more important to academic achievement than phonology.

Not only is language important to the reading process, it has also been demonstrated to be an important vehicle for learning the code of mathematics (Andrews & Brabson, 1977). There is evidence that specific deficits in linguistic abilities affect mathematical problem solving (Rosenthal & Resnick, 1974; Semel & Wiig, 1975). Proficiency in mathematics is dependent upon the child's ability to use meaningful linguistic symbols and to understand basic concepts (MaGee & Newcomer, 1978).

Numerous studies have investigated the language processes of language impaired children. In general, their language has been found to resemble that of younger normal children (Leonard, 1979).

These children appear to be functioning at an earlier level of linguistic development than their normal peers in the emergence of semantics, syntax, and pragmatics. Leonard (1972) suggested that the term delayed language has been a "catch-all label for deviant language" (p. 438). This term implies that there is nothing deviant or different about the child's language except that it develops at a slower rate. Deviant language users, according to Leonard (1972), may learn language more slowly, as well as in a qualitatively different manner. He found deviant language users exhibited significantly more later developing structures than younger normal speakers (Leonard, 1972), yet used structures and morphemes in the adult linguistic system less frequently than their normal peers (Leonard, 1979).

Speech and language pathologists in public school systems are generally part of a multi-disciplinary team that makes decisions on placement of children with exceptionalities, including learning disabilities and frequently accompanying speech and language impairment (Bannatyne, 1971; Clements, 1973; Hallahan & Cruickshank, 1973). The prevalence of language impairment in the learning disabled population is reflected in the definition of learning disabilities in Public Law 94-142. It states:

> Specific learning disability means a disorder in one or more of the psychological processes involved in understanding or in using language, spoken or written, which may manifest itself in an imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations. (Federal Register, 1977)

Much research has focused on the ability of learning disabled children to process and produce language (Andolina, 1980; German,

1982; Kavale, 1982). In general, this research has involved the effect of language/learning problems on academic performance and social interactions (Rosenthal, 1970; Vogel, 1974; Wiig, Semel, & Crouse, 1973).

According to Lahey (1978), many clinical syndromes in children have concommitant language problems as one of their components. Some syndromes commonly associated with language impairment include mental retardation, emotional disturbance, severe hearing impairment, deafness, aphasia, and learning disability. There is a need to better refine the definitions of these clinical syndromes by comparing the language of one group to the language of another (Lahey, 1978). With the exception of Cunningham's (1978) comparative study of the language of mentally retarded psychotic and mentally retarded non-psychotic children, few investigations have undertaken this task.

A review of the literature revealed no comparisons of language ability between children identified as language impaired and children identified as learning disabled. Since language ability is known to be important to academic achievement, a study of these two groups may lead to knowledge that would aid educators and speech/language pathologists in teaching both groups. There is a need to identify the significant similarities or differences which exist in the language skills of these two groups. If distinct patterns exist, this knowledge could lead speech/language pathologists to diagnose more effectively the language problems of

learning disabled children and identify students with a suspected but yet unconfirmed learning disability.

Statement of the Problem

The purpose of this study was to determine the patterns of language abilities of language impaired and learning disabled children using the Clinical Evaluation of Language Functions (CELF) (Semel & Wiig, 1980). More specifically answers to the following questions were sought:

1. Is there a significant difference in processing ability between language impaired and learning disabled children as measured by the CELF?

2. Is there a significant difference in production ability between language impaired and learning disabled children as measured by the CELF?

3. Is there a significant difference in semantic ability between language impaired and learning disabled children as measured by the CELF?

4. Is there a significant difference in syntactic ability between language impaired and learning disabled children as measured by the CELF?

5. Is there a significant difference in memory between language impaired and learning disabled children as measured by the CELF?

6. Is there a significant difference in performance on the individual subtests of the CELF between language impaired and learning disabled children?

This study is part of a larger study which compares the auditory processing (Shoaf, 1983) and oral reading abilities (Scarboro, 1983) of language impaired and learning disabled children.

Hypotheses

To give direction to the data analysis, hypotheses were developed in the null form and tested at the 0.05 level of significance.

Null Hypothesis 1

There is no significant difference in overall processing ability between language impaired and learning disabled children as measured by the CELF.

Null subhypothesis 1.1. There is no significant difference in processing of word and sentence structure between language impaired and learning disabled children as measured by the CELF.

Null subhypothesis 1.2. There is no significant difference in processing of word classes between language impaired and learning disabled children as measured by the CELF.

Null subhypothesis 1.3. There is no significant difference in processing of linguistic concepts between language impaired and learning disabled children as measured by the CELF.

Null subhypothesis 1.4. There is no significant difference in processing of relationships and ambiguities between language impaired and learning disabled children as measured by the CELF.

Null subhypothesis 1.5. There is no significant difference in processing of oral directions between language impaired and learning disabled children as measured by the CELF.

Null subhypothesis 1.6. There is no significant difference in processing of spoken paragraphs between language impaired and learning disabled children as measured by the CELF.

Null Hypothesis 2

There is no significant difference in overall production abilities between language impaired and learning disabled children as measured by the CELF.

Null subhypothesis 2.1. There is no significant difference in production of word series between language impaired and learning disabled children as measured by the CELF.

Null subhypothesis 2.2. There is no significant difference in production of confrontation naming between language impaired and learning disabled children as measured by the CELF.

Null subhypothesis 2.3. There is no significant difference in production of word associations between language impaired and learning disabled children as measured by the CELF.

Null subhypothesis 2.4. There is no significant difference in production of model sentences between language impaired and learning disabled children as measured by the CELF.

Null subhypothesis 2.5. There is no significant difference in production of formulated sentences between language impaired and learning disabled children as measured by the CELF.

Null Hypothesis 3

There is no significant difference in semantic ability between language impaired and learning disabled children as measured by the CELF.

Null Hypothesis 4

There is no significant difference in syntactic ability between language impaired and learning disabled children as measured by the CELF.

Null Hypothesis 5

There is no significant difference in memory between language impaired and learning disabled children as measured by the CELF.

Delimitations

1. The study was confined to 14 language impaired and 14 learning disabled children, selected from first, second, third, and fourth grades in the Davidson County, North Carolina, School System. All children were receiving services for either learning disability or language impairment at the time of the study. Inclusion in the study was based on the following criteria:

a. All children demonstrated normal intelligence (IQ=85 or above) on the Slosson Intelligence Test for Children and Adults (Slosson, 1978).

b. Children in the learning disabled group met requirements for placement in the Learning Disability Program as established by the Davidson County School System (see Appendix A). Children in the language impaired group achieved a language quotient of 85 or below on the Test of Language Development (Newcomer & Hammill, 1977).

c. Children were native speakers of English from monolingual homes who did not exhibit any gross peripheral defects of audition or vision.

2. Eight speech/language pathologists administered the language test to children at their respective schools.

3. The data on language processing and production were confined to that obtained from the CELF.

Limitations

1. Any findings and implications of this study may be applied only to populations which are similar to the one used since they may not be representative of the total population.

2. Research may be biased in favor of one group or the other due to the researcher's knowledge of subject status.

3. The formal testing employed in this study did not allow for assessment of spontaneous language.

Assumptions

1. That all speech and language pathologists who administered the Test of Language Development (TOLD) (Newcomer & Hammill, 1977) and the Clinical Evaluation of Language Functions (CELF) (Semel & Wiig, 1980) as a part of this study's procedures, were qualified to administer each in the same standardized manner.

2. That the researcher, being a practicing speech/language pathologist, was qualified to score and interpret all test results.

3. That the groups of language impaired and learning disabled children were matched on relevant variables affecting language: age, intellectual ability, and reading achievement.

4. That extraneous variables such as the speech/language pathologist who administered the tests and the school attended had no effects on results.

5. That the CELF did in fact test processing and production abilities of language in the two groups of children.

Chapter 2

RELATED LITERATURE

In this chapter, the nature of language is reviewed and specific language disabilities of the language impaired and learning disabled populations are discussed.

The Nature of Language

Language can be defined in many different ways. Linguists, philosophers, psychologists, educators, and speech/language pathologists all view language from a slightly different vantage point. Bloom and Lahey (1978) define language as "a code whereby ideas about the world are represented through a conventional system of arbitrary signals for communication" (p. 4). They divide language into three major components: content, form, and use. According to these authors, "language consists of some aspect of 'content' or meaning that is coded or represented by linguistic 'form' for some purpose or 'use' in a particular context" (p. 11).

Language content is the broad general "categorization of topics that are encoded in messages" (Bloom & Lahey, 1978, p. 11). Children from all cultures and dialects develop the same content as they talk about objects, people, and actions, yet they explore this content through a variety of individual language topics dependent upon their experiences. To distinguish content from topic, Bloom

and Lahey (1978) offer the example of urban middle class children who talk about their pet fish, cats, or dogs while farm children talk about chickens and cows. In this example, the content is the same, animals, but the topic varies according to the experiences of the children. Topics of language are varied and numerous, while content of language is limited by categorization and classification (Bloom & Lahey, 1978). The content of language involves meaning or semantics. It is "the linguistic representation of what persons know about the world of objects, events, and relations" (Bloom & Lahey, 1978, p. 14).

The semantic representation of content depends upon a code or a system of arbitrary signals, referred to as the 'form' of language (Bloom & Lahey, 1978). Language form encompasses the phonological, morphological, and syntactic systems. Phonology includes the sound system of a language; morphology involves the word formation aspect of language; and syntax deals with the ordering of words in strings to form grammatical utterances. The content and form of language are closely interrelated. According to Bloom and Lahey (1978), "form in language is the means for connecting sounds or signs with meaning" (p. 15).

The purpose and context of utterances, or language use, combines with language content to determine the form of language (Bloom & Lahey, 1978). Language use refers to "the reasons why individuals speak and the ways in which speakers choose among alternative forms of a message according to what they know about the listener and context" (Bloom & Lahey, 1978, p. 23). Children

speak to obtain a goal, such as to express feelings or to learn more about an event. They select different ways to reach this goal according to who they are talking with and the particular situation. A child attempting to get someone to close a window might say any of the following: "Close the window," "Please close the window when you get up," "The window's open," or "I'm awfully cold" (Bloom & Lahey, 1978, p. 20). Which utterance the child selects depends upon the setting in which it is uttered, and the people involved in the communication. This example shows how language use and content affect language form.

It is unrealistic to separate the elements that comprise language, since each element is ultimately dependent on the others. Bloom and Lahey (1978) view language as the necessary integration of content, form, and use. These authors acknowledge this integration as language competence, or the knowledge of language which guides the behaviors of speaking and understanding. Content, form, and use evolve and change together as the child develops language competence. "Children learn language as they use language" (Bloom & Lahey, 1978, p. 23). Figure 1 schematizes Bloom and Lahey's conception of the integration of language content, form, and use.

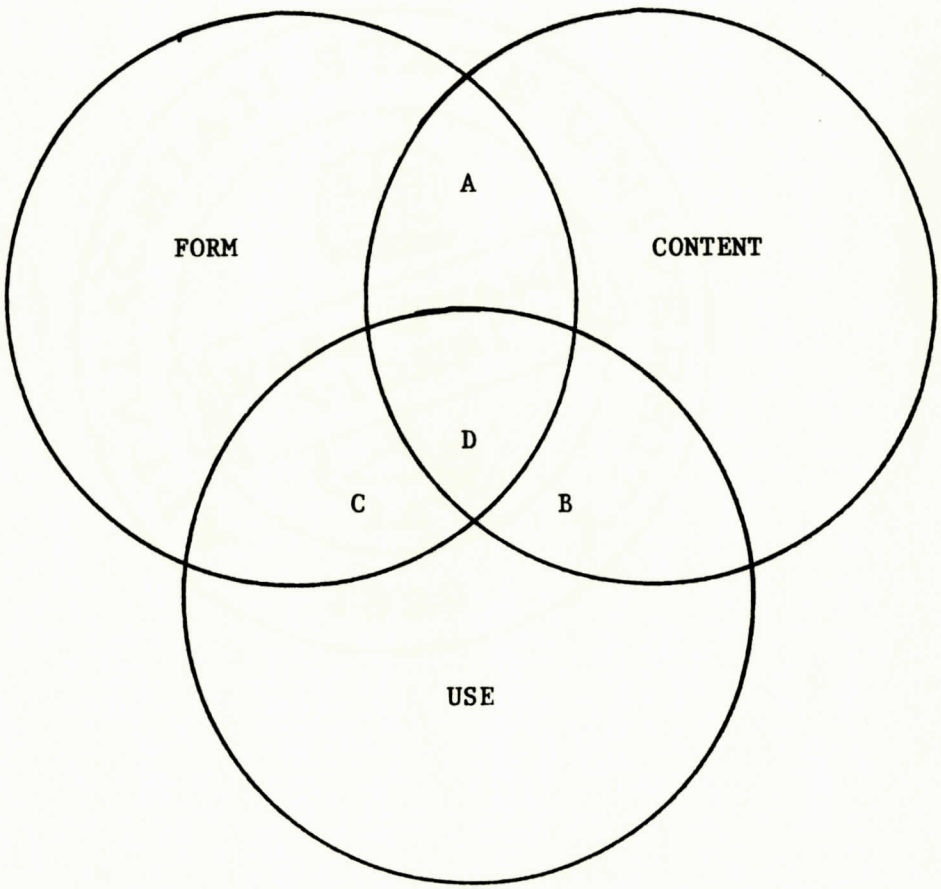
Language Impairment

Deficits in Language Content

Semantic studies of the language impaired have evaluated both relational semantics and lexical semantics. Relational semantics refers to the use of words in combinations to express such ideas as

Figure 1

The Intersection of Content, Form, and Use in Language



From Bloom, L. & Lahey, M. Language development and language disorders. New York: John Wiley & Sons, 1978, p. 22.

attribution, negation, and possession. Lexical semantics involves the study of specific meanings of individual words.

Relational semantics. To determine the number and type of meaning relations encoded in sentences, Leonard, Bolders, and Miller (1976) compared language impaired children with two groups of normally developing children: one matched on the basis of mean length of utterance (MLU), and the other matched on the basis of age. The ages of the children ranged from 2.11 to 5.8. Results showed that the language impaired and normal children matched for age were using the same types of relational meanings, but the language impaired children used fewer relations overall. No differences were found between the groups matched for MLU. The authors concluded that language impaired children used semantic relations that were like those of younger normal children.

A subsequent study by Leonard, Steckol, and Schwartz (In Leonard, 1979) compared the semantic relations of language impaired and normal children matched for MLU. Many similarities and differences were noted. It was found that the early-emerging semantic relations of agent + action ("Daddy throw") and action + object ("throw ball") were used more frequently by the language impaired children than by the normal children. Later emerging relations such as experiencer + experience ("Daddy hurt") were used more frequently by normal children. These findings suggested that the language impaired not only had,

> less mature semantic notion systems than normal children, but their semantic notion development may have lagged further

> behind their development of other aspects of language that have an influence on MLU. (Leonard, 1979, p. 214)

The language impaired used words which added to the utterance length without changing the semantic relation. For example, the child might use "just" as in "He just goes," which adds words without appreciably changing the meaning.

Freedman and Carpenter (1976) compared the semantic relation development of four language impaired and four younger normal children matched for MLU. All children were at Brown's Stage I of linguistic development. Ten basic semantic relations were studied with no significant differences occurring between the two groups. A similar study by Duchan and Erikson (1976) evaluated the comprehension of four semantic relations in normal and language impaired mentally retarded subjects. They, too, found no significant differences between the groups.

In a sentence repetition task, Menyuk and Looney (1972) found that language impaired children matched with normal children on the basis of scores on a standardized vocabulary test rarely deleted basic semantic categories such as agents, actions, locations, objects, or negations but rather deleted articles, plural morphemes, and auxillary verbs. According to Ervin (1964) and Ervin-Tripp (1971), semantic complexity rather than syntactic length was more important to children in the acquistion and use of early sentences. Johnston (1982) reiterated this belief in the following statement: "language disordered children seem to use language to express quite normal relational meaning and to follow

the normal acquisition patterns for certain lexical domains, e.g. wh-question forms and attributive adjectives" (p. 789).

Lexical semantics. Lexical semantics, the meaning of specific words, has been investigated to some degree in normal children (Clark, 1973; Benedict, 1979; Bowerman, 1976; Gentner, 1978). However, few researchers have investigated the lexical semantics of deviant language users with the exception of several studies on the comprehension of vocabulary by the retarded (Harrison, 1958; Taylor, Thurlow, & Turner, 1977), the autistic (Baltaxe & Simmons, 1975), and the hearing impaired (Myklebust, 1964).

A recent study by Leonard, Schwartz, Chapman, Rowan, Prelock, Terrell, Weiss, and Messick (1982) investigated the early lexical acquisition of 14 young language impaired children and 14 younger normal children matched for level of linguistic development. The researchers trained both groups on 16 unfamiliar words and referents during ten sessions. They then post-tested the two groups and found that both had similar gaps in their comprehension and production of lexical items. Results showed no significant difference in the manner in which the two groups acquired the experimental words or in the number of words learned. Both groups comprehended and produced more words referring to objects than words referring to actions. These results seem to support observations by Aram and Nation (1982), who indicated that language impaired children frequently tend to identify nouns correctly on the Peabody Picture Vocabulary Test (Dunn, 1965), Test of Auditory Comprehension of Language (Carrow, 1973), or the Assessment of

Children's Language Comprehension (Foster, Giddan, and Stark, 1972), but fail when other parts of speech are presented.

Previous work had suggested that language impaired children learned language at a slower pace than normals (Johnston & Schery, 1976; Morehead & Ingram, 1973). The findings of Leonard et al. (1982) were in direct contradiction to this long held belief. The researchers offered two explanations for the unusual performance of the language impaired children in this study: 1) that the learning of lexical items through stimulation might not be difficult for language impaired children; or 2) that the language impaired children in their study were not representative of the language impaired in the general population. This latter explanation was considered unlikely since all of the language impaired except one were still enrolled in language therapy one year after the study had been completed.

Similar results were found in studies by Illerbrun (In Johnston, 1982) and Ingram (In Johnston, 1982). Illerbrun found that language impaired and normal children matched for linguistic development showed no differences in their comprehension of comparative forms of spatial adjectives. Likewise, in a study of the acquisition of various question types (yes/no, what, where, etc.), Ingram (1972) found that language impaired children acquired these forms in the same way as normals.

Other researchers (de Villiers & de Villiers, 1973) noted that it is difficult to separate the importance of semantic and grammatical complexity in the acquisition of words. "The order of

acquisition may best be predicted by some combination of grammatical and semantical complexity, frequency and perceptibility in speech" (de Villiers & de Villiers, 1973, p. 277).

To summarize, the literature suggests that language impaired children use relational and lexical semantics similar to that of younger normals matched on the basis of MLU. However, Leonard (1979) noted that language impaired children used a greater MLU than their semantic systems might suggest. Language impaired children used later-emerging semantic relations less frequently and early-emerging semantic relations more frequently than younger normals. Ingram (In Johnston, 1982), Illerbrun (In Johnston, 1982), and Leonard et al. (1982) found that language impaired children acquired lexical semantics in the same way as younger normals.

Deficits in Language Form

Language form consists of two major areas: syntax and morphology. Syntax refers to sentence structure and morphology involves formation of words. Researchers have investigated the comprehension and production of these aspects of language form in language impaired children.

Syntax. Prior to 1964, only a few studies of syntactic disorders in children had been carried out (Ingram, 1959; Morley, Court, Miller & Garside, 1955). Menyuk (1964) was the first to compare the syntax of language impaired children to that of normal children in any systematic manner. She used Chomsky's (1957) work on phrase structure rules, transformations, and morphology as a system of analysis to compare the spontaneous speech of language

impaired and normal children matched on the basis of age. The language impaired children used the most generalized rules or approximations that required the fewest number of operations. They used restricted forms, such as substitutions, redundancies, or omissions of the adult form, while the normal children were constantly changing their rule usage to more complex structures.

Lee (1966) used developmental sentence types to compare the spontaneous speech of one language impaired child with that of a younger normal child. She found that the normal child used a variety of syntactic structures while the language impaired showed no use of designative or predicative constructions. The language impaired child was not only slower in acquiring syntactic structures, but was also different according to Lee (1966).

Leonard (1972) adapted Menyuk's (1964) and Lee's (1971) systems to compare the syntax of nine language impaired and nine normal speaking children of the same chronological age. Using frequency of occurrence as his criterion, he found no differences in the use of a particular structure by the children in both groups, but he did observe differences in the frequency of use of grammatical classes and structures. The language impaired used more restricted forms such as verb phrase omissions that were not typical of normal children's speech. The normal children tended to use phrase structures and morphemes that are present in the adult linguistic system.

Morehead and Ingram (1973) investigated the syntax of 15 normal and 15 language impaired children matched on the basis of

MLU. The results showed that language impaired children's linguistic systems were not qualitatively different. They developed similar linguistic systems, but at a slower rate. The authors concluded that the language impaired did not use their linguistic systems as creatively as normal children. Their sentence structures were less varied and contained more lexical items. This finding that language impaired children use more lexical categories per sentence construction type is similar to Leonard, Steckol, and Schwartz's (In Leonard, 1979) findings on semantic relation use and MLU. Leonard et al. observed that language impaired children had longer MLU's than normal children without changing the semantic notion of an utterance. According to Morehead and Ingram (1973), this may mean that language impaired children have trouble assigning lexical categories to a larger set of syntactic structures. It is easier for the language impaired to use more words and less complex sentence structures.

A study investigating the importance of both length and complexity in the ability of language impaired children to produce sentences revealed that even though sentence length affected their production, the sentence type caused the major problem (Menyuk & Looney, 1972). Negative and interrogative sentences caused more problems than imperative and declarative sentences. In declarative and imperative sentences, the language impaired tended to leave off plural markers, change verb number, and substitute words. Errors in the expansion of the verb phrase into auxillary and modal verbs

or in transformational operations were seen in negative, interrogative, and passive sentences.

The comprehension and judgment of grammaticality of sentences was investigated by Liles, Shulman, and Bartlett (1977). Fifteen language impaired and fifteen normal children were asked to judge sentences as right or wrong and to correct the wrong ones. The sentences presented included ones that violated rules of syntactic agreement, lexical restrictions, and word order. Results showed that the two groups differed significantly in their abilities to recognize errors of syntactic agreement as in "John and Jim is a brother" and word order as in "Song me a sing." However, they did not differ in their ability to recognize errors violating lexical restrictions in sentences such as "The dog writes the food." The language impaired also had more trouble correcting the sentences they judged as wrong. The researchers believed that since comprehension precedes production (Ingram, 1974), the language impaired failed to comprehend the grammatical form and thus did more poorly than normals on the correction task.

Morphology. In a longitudinal study, Trantham and Pedersen (1976) followed the language development of several normally developing children and one language impaired child. Even though the language impaired child was normal in the major milestones of sitting, walking, first word, and two word combinations, the child was found to be slower than normal in developing the rest of the linguistic system. The researchers found that the child had

difficulty mastering some of the grammatical morphemes and that his sequencing of words in sentences was atypical.

Johnston and Schery (1976) found that linguistically impaired children acquired the same morphological rules in much the same order as normals, but were slower in moving from their first use of a morphological rule to its consistent use. They, like others (Leonard, Steckol, & Schwartz, 1978; Morehead & Ingram, 1970), found that the language impaired children exhibited higher MLU's than normals as grammatical morphemes were acquired. A more recent study (Steckol & Leonard, 1979) found that language impaired children exhibited less grammatical morpheme usage than normal children with equivalent MLU. These results substantiated previous research.

This review of the literature revealed that language impaired children tended to develop at a slower rate than normals syntactically and morphologically. The language impaired tended to use restricted forms such as omissions and substitutions in syntactic structures that are atypical of normal children. The research showed that language impaired children developed the same morphological and syntactical rules as normals, but they did not use the rules they knew as frequently as normals matched for MLU.

Language of the Learning Disabled

There has been a great deal of speculation about the specific language difficulties of learning disabled children. It is well established that many learning disabled children exhibit language deficits, even though others have no apparent problems.

Deficits in Language Content

Practically all studies of language problems in the learning disabled population have occurred in the decade of the 1970s. Most studies in the area of semantics and the learning disabled have investigated the lexical aspects of semantics rather than relational semantics.

Wiig and Semel (1975) compared the accuracy and speed with which 32 academically achieving and 32 learning disabled adolescents named verbal opposites, pictures, and members of the classes of foods, animals, and toys, as well as their ability to define words. Results revealed that the learning disabled named fewer foods, produced more ungrammatical sentences, had shorter grammatical sentences, and had longer response lags in producing sentences. Many more of their word definitions were incorrect than were those of the academic achievers. In another investigation of learning disabled children's ability to recall sentences which violated semantic rules of word selection, these children depended upon semantic aspects of sentences in order to process them (Wiig & Roach, 1975).

Research has shown that many learning disabled children have normal vocabularies as measured by receptive vocabulary tests (Wiig & Semel, 1976), yet have problems comprehending dual meaning words and specific word categories (Johnson & Myklebust, 1967). Many have difficulty with items on the Peabody Picture Vocabulary Test (Dunn, 1965) such as "building" (Wiig & Semel, 1980). They insist that there is no picture of a "building," neglecting to recognize

the meaning of a picture which depicts a young child "building" a wagon. Wiig and Semel (1980) suggested from their observations that learning disabled children have difficulty comprehending dual meaning words, verbs, adjectives, adverbs, prepositions, and pronouns.

Kavale (1982) investigated the comprehension of basic concepts by normal and learning disabled children. He found that learning disabled children scored lower and with greater variability in their understanding of basic concepts than normal children. The learning disabled children had particular difficulty with the comprehension of concepts of quantity and space. Wiig and Semel (1980) also reported that learning disabled children had difficulty with prepositions which denote position, direction, and time. Similarly, concept formation for words denoting body parts, body actions, temporal relationships, and kinship terms presented a problem for many learning disabled children (Wiig & Semel, 1980).

Learning disabled children's ability to name or label pictures, objects, and referents has also been investigated. Noel (1980) found learning disabled children have more difficulty than non-learning disabled in labelling and describing referents. Even though learning disabled children could describe events in much detail, the non-learning disabled children produced more concise descriptions. The learning disabled also had more difficulty than normals in producing labels.

Several researchers found that learning disabled children substituted words for correct labels (Denckla & Rudel, 1976; Lewis

& Kass, 1982; Lorsbach, 1982). German (1979) also found that learning disabled children had more difficulty than normals with word-finding. On word-finding tasks, learning disabled children made more errors and had longer response times on less familiar or low frequency words. They made less errors and responded more quickly on familiar or high frequency words. A study on word-finding substitutions in picture naming, open ended sentences, and descriptions revealed that learning disabled children used word substitutions that related to the function of the word (German, 1982). For example, they would substitute a word such as "bookholder" for "shelf."

A study by Andolina (1980) showed that normal children had periods of rapid vocabulary growth, while learning disabled children exhibited a gradual growth. Hessler and Kitchen (1980) showed that learning disabled children had more difficulty than normals on the Test of Language Development (Newcomer & Hammill, 1978). Many had overall language abilities below normal even though some had difficulty only on one subtest. They interpreted their results to indicate that learning disabled children have difficulties in "formulation, retrieval, and subsequent expression of semantic, syntactic, and morphological aspects of language, rather than difficulties in the reception and recognition of verbal information" (Andolina, 1980, p. 38).

Only a few studies have investigated comprehension and use of relational semantics in the learning disabled. Problems have been identified in their ability to comprehend sentences which express

comparative, familial, passive, spatial, and temporal relationships (Wiig & Semel, 1973, 1974a, 1974b). These difficulties are indicative of "subtle linguistic deficits reflecting problems in auditory comprehension, logical processing, and semantic coding of perceptual events" (Wiig & Semel, 1974b, p. 1334).

Hresko (1979) compared learning disabled and normal children on a sentence imitation task. Results showed that the learning disabled had more reformulations and semantically altered sentences. Hresko concluded that the learning disabled had difficulty in processing and retaining the semantic elements of sentences. They also had difficulty with agent-action-object type relationships, often reconstructing one or more of the components and altering the meaning of the sentence. Although the non-learning disabled sometimes modified the sentence components slightly, they still retained the basic meaning.

Research shows that the learning disabled depend on semantic aspects of sentences to process them. They tend to have more difficulty than normals with receptive vocabulary, basic concepts, and production of labels. Specific problems exist in the comprehension of sentences which express comparative, familial, passive, spatial, and temporal relationships.

Deficits in Language Form

There is a great deal of overlap between semantic and syntactic problems of learning disabled children. According to Wiig and Semel (1980), many learning disabled children "have trouble with the semantic distinctions of number, case, tense, aspect, and

comparison" (p. 28-29). Many of these distinctions are made through the use of morphological inflections such as plural -s, past tense -ed, and comparative -er. Wiig and Semel (1980) believe these problems suggest that the learning disabled acquire rules for word formation at a slower rate and with less sophistication than their normal peers. Very few studies have investigated the comprehension and production of morphology and syntax in the learning disabled child.

Learning disabled children characteristically have deficits in the processing and comprehension of sentences. Several researchers have found deficits in the comprehension of structures such as questions, demonstratives, wh-forms, passives, and sentences which expressed relationships between direct and indirect objects (Menyuk & Looney 1972b, Semel & Wiig, 1975). They have also found that learning disabled children have more trouble than normals with critical verbal elements such as prepositions and words in the middle of sequences.

Several studies have used sentence repetition tasks to investigate the syntax of learning disabled children. This type of task involves both comprehension and production so that the results of such tasks could indicate either comprehension or production deficits, or both. As Meir (1971) stated, "garbled input to any of the components of the communications network inevitably results in garbled output" (p. 13).

Wiig and Roach (1975) found that the learning disabled had significant problems with the recall of sentences that: were

syntactically correct but violated semantic rules, contained sequences of modifier strings, consisted of random word strings, and used syntactically complex structures. A comparison of the recall ability of 10 learning disabled and 10 non-learning disabled on sentences composed of 5 to 17 morphemes presented at various speeds showed that the non-learning disabled were more accurate than the learning disabled at all rates of presentations (McNutt & Chia-Yen Li, 1980). The normals did equally well at all rates of presentation, while the learning disabled were less accurate at the fastest rate. The degree of accuracy of the learning disabled, however, was the same for both slow and normal rates of presentation. McNutt and Chia-Yen Li concluded that learning disabled children showed a semantic or syntactic deficit in the processing of rapidly presented material.

Learning disabled children's morphological/syntactic production abilities have also been investigated. Wiig, Semel, and Crouse (1973) presented some of the earliest findings on this aspect of language. They found that learning disabled and children who were at high risk for academic difficulties used morpheme rules at varying degrees of accuracy, but some used rules equally as well as younger normals. Areas of greatest weakness were in responses for third person singular verbs, possessives, and adjective inflections. Learning disabled children's patterns of difficulty were less predictable than those of normal children. Vogel (1974) found that learning disabled (dyslexic) children had difficulty inflecting real words and nonsense words, especially when complex

morphological rules were involved. A subsequent study by Vogel (1977) found similar results when learning disabled (dyslexic) children were administered two tests of morphological ability.

Moran and Byrne (1977) studied learning disabled children's use of verb tense markers. They found that learning disabled children made more errors than normal children in the use of past tense markers, but not in the use of present and future tenses. Thirty-six out of 60 learning disabled children expressed the past time concept without using a past tense marker. This is typical of younger normal children under the age of five years, but is not typical of learning disabled children's normal peers. The learning disabled children used "did" and "done" forms rather than the past tense morphemes /t/, /d/, /əd/, and irregular forms. By doing this, they used only one rule instead of learning one for each of the four different past tense morphemes. Moran and Byrne concluded that this is not a simpler rule but a more consistent rule.

A recent study by Donahue, Pearl, and Bryan (1982) found that learning disabled children in grades two, four, six, and eight used significantly shorter sentences and shorter main clauses than their normal age peers. These researchers speculated that the deficits many others (Denckla & Rudel, 1976; Wiig & Semel, 1976, 1980) have called "subtle" may be significant enough to interfere with general conversations.

A study by Wiig, La Pointe, and Semel (1977) found two patterns of language deficits in the learning disabled adolescent. They found a reduction in the use of morphological and syntactic

knowledge in the receptive comprehension of linguistic concepts, and production deficits in the form of word retrieval and verbal paraphrases.

As shown by these studies, great variability exists in the type and degree of language deficits exhibited by learning disabled children (Rosenthal, 1970). No two children exhibit all of the possible characteristics or the same ones, but in general, characteristics such as the ones discussed are common in the learning disabled population.

Memory and Language/Learning Disabilities

Much of the work on language disorders of the learning disabled and the language impaired has led researchers to conclude that memory plays an important role in the ability to process and produce language (Freedman & Carpenter, 1976; Menyuk & Looney, 1972a; Semel & Wiig, 1975; Wiig & Roach, 1975). Both short-term and long-term memory affect the processing and production of language. Short-term memory aids in processing the structure of a sentence, while long-term memory is used to interpret the deep structure or meaning of a sentence (Miller & Chomsky, 1963). According to Slobin (1971), the meaning or deep structure of communication can be remembered longer than the form or surface structure. This may be related to the ability to paraphrase a heard sentence long after the verbatim form is forgotten (Wiig & Semel, 1976).

In 1956, Miller recognized that people are limited in the amount of information they can receive, process, and remember. He

found that short-term memory capacity was about "seven, plus or minus two" units or chunks of information. One can manage to stretch the limit by chunking units of words together. Several studies (Blumenthal, 1967; Blumenthal & Boakes, 1967; Miller & Isard, 1963) have reported that the use of both syntactic and semantic rules affects one's ability to repeat sentences. According to Savin and Perchonock (1965), transformational elements such as negativity and passivity are used to aid in memory. Gerber (1981) noted that "the high level structure of syntax permits memorization of many more words than could be remembered in an unrelated string" (p. 80).

Menyuk (1964) observed memory problems in language impaired children on a sentence recall task. The language impaired had trouble repeating sentences when the length was increased. This was confirmed in a later study by Menyuk and Looney (1972a). In addition, they found that syntactic complexity affected language impaired children's ability to repeat sentences. Language impaired children's difficulties with the syntax of a sentence seemed to prevent them from remembering it. Syntactic elements of sentences normally aid in promoting memory.

Kier (1977) found that children with language/learning disabilities have significant problems in short-term memory. He followed these children for several years and found that their auditory memory problems were resistant to remediation.

Several researchers (Ceci, Ringstrom, & Lea, 1981; Wiig & Semel, 1980) found that memory problems of learning disabled

children are associated with semantic difficulties. Wiig and Semel (1980) noted that learning disabled children often retrieved words incorrectly and substituted words which were related to the intended word by semantic class ("tiger" for "lion"); opposing meanings ("hot" for "cold"); or phonological similarity ("telephone" for "television").

The relationship between language and memory has been viewed as a complementary one (Olson, 1973; Flavell, Beach, & Chinsky, 1966). Flavell, et al. viewed language as a form of recoding information that promotes memory. Olson (1973) interprets increases in children's memory span to be due to increased ability to retain information in verbal form. Regardless of the exact relationship between memory and language, it is evident in the research (Parker, Freston, & Drew, 1975; Semel & Wiig, 1975; Stark, Poppen & May, 1967; Wiig & Roach, 1975) that many language impaired and learning disabled children exhibit memory problems.

Summary

Children communicate their ideas about the world through language, an elaborate code of arbitrary signals. Language impaired and learning disabled children often have varying degrees of difficulty with this system. The literature suggested that the semantic system of language impaired children was similar to that of younger normal children. Morphologically and syntactically, they developed at a slower rate than normals and tended to use restricted forms such as omissions and substitutions which were atypical of both their peers and younger normal children. Learning

disabled children were found to depend on semantic aspects of sentences to process them. Difficulties in areas such as receptive vocabulary, basic concept development, object labelling, word retrieval, and morpheme usage were commonly observed in the learning disabled population.

Chapter 3

DESIGN OF THE STUDY

In this chapter, the subjects of the study are identified, the instruments and data collecting devices are described, and the statistical methods for analyzing the data are explained.

Participants of Study

The subjects were 14 language impaired and 14 learning disabled children matched on the basis of age, intelligence, and reading achievement. Children were selected from first, second, third, and fourth grades in 11 schools in the Davidson County, North Carolina, School System and are described in Tables 1 and 2.

Language Impaired Group

According to Weiner (1974), language impairment is defined as

> a group of conditions characterized by the late appearance or slow development of language in children who do not have sensory, motor, emotional, or general intellectual deficits that might be considered basic to their difficulties. (p. 202)

All subjects included in the impaired group were enrolled in a speech and language program for language therapy and had not been identified as learning disabled. Each subject was identified as language impaired on the basis of a language quotient of 85 or below on the Test of Language Development(TOLD) (Newcomer & Hammill, 1977). The TOLD is a comprehensive screening test which detects receptive and expressive language disabilities in children. The TOLD was standardized on an unselected sample of 1014 children.

Table 1

Characteristics of the Language

Impaired Group

SUBJECT NUMBER	AGE IN MONTHS	SEX	SIT	TOLD	READING ACHIEVEMENT PERCENTILE
1	99	Male	105	79	38
2	112	Male	88	79	03
3	104	Male	98	83	12
4	91	Male	104	63	29
5	94	Male	87	78	15
6	99	Male	91	82	35
7	109	Male	97	81	24
8	113	Female	87	72	01
9	106	Male	90	72	36
10	98	Female	92	83	23
11	124	Male	89	80	34
12	124	Male	85	85	26
13	109	Male	101	82	05
14	94	Male	88	67	10
RANGE	94-124		85-105	63-85	1-38
MEAN	105		93	78	21

SIT - Slosson Intelligence Test for Children and Adults

TOLD - Test of Language Development

Reading Achievement Percentile - from Prescriptive Reading Inventory

Table 2

Characteristics of the Learning

Disabled Group

SUBJECT NUMBER	AGE IN MONTHS	SEX	SIT	READING ACHIEVEMENT PERCENTILE
15	104	Male	104	35
16	118	Male	90	01
17	109	Male	99	11
18	93	Male	113	26
19	96	Male	97	11
20	104	Male	88	26
21	106	Male	101	26
22	113	Male	88	01
23	110	Male	92	34*
24	98	Male	89	29
25	127	Female	89	39*
26	124	Male	87	23
27	113	Male	96	04
28	92	Female	96	06
RANGE	92-127		87-113	1-39
MEAN	108		95	19

SIT - Slosson Intelligence Test for Children and Adults

Reading Achievement Percentile - from Prescriptive Reading Inventory

*Reading Achievement Percentile - from California Achievement Test

Concurrent validity for the TOLD's total score was established with the Test for Auditory Comprehension of Language (Carrow, 1973). The resulting coefficients were .63, .72, and .73 at the four-, six-, and eight-year-old intervals, respectively. Test-retest reliability coefficients exceeded .80 on each subtest of the TOLD, indicating high stability.

All children who met these qualifications were then given the Slosson Intelligence Test for Children and Adults (SIT) (Slosson, 1978) to determine mental ability. The SIT is a short individual screening instrument that yields a score indicating mental ability. It has a high positive correlation coefficient of .92 with the Stanford Binet Intelligence Scale (Terman & Merrill, 1960). A correlation coefficient of .97 was obtained for the SIT on test-retest measures, indicating acceptable reliability. Only children who scored 85 or above on the SIT were included as subjects.

Learning Disabled Group

The North Carolina Department of Public Instruction's Division for Exceptional Children has defined a learning disabled child as one who exhibits

> a severe discrepancy between ability and achievement and has been determined by a multi-disciplinary team not to be achieving commensurate with his/her age and ability levels in one or more of the following areas: oral expression, listening comprehension, written expression, basic reading skill, reading comprehension, mathematical calculation, or mathematical reasoning. The term does not include pupils whose severe discrepancy between ability and achievement is primarily the result of: a visual, hearing, or motor handicap; mental retardation; emotional disturbance; or environmental or economic disadvantage. (1981, p. 3)

Learning disabled children were selected from students currently placed in the learning disabilities program from grades one, two, three, and four. All subjects had IQ's of 85 or above as measured by the SIT. Excluded from the study were those learning disabled students who were receiving language services from the speech/language pathologist.

Procedures

Matching Procedures

Children from the language impaired group were matched with learning disabled children on the basis of three variables: age, IQ, and reading achievement. The ages of each matched pair were within plus or minus six months of each other. Their IQ's were within ten points and their reading achievement as measured by the Prescriptive Reading Inventory (PRI) (CTB/McGraw Hill, 1976) for first, second, and third graders and the California Achievement Test (CAT) (CTB/McGraw Hill, 1978) for fourth graders varied no more than six percentile points. The PRI gives a projected CAT score and was used in place of the CAT in grades one and two.

After matching procedures were completed, parents were mailed a letter (see Appendix B) requesting their permission to include their child in the study. They were asked to return the form giving their permission (see Appendix C).

All subjects from both the language impaired and learning disabled groups were then screened audiometrically on the date of testing for the study. Only those children who showed normal

hearing bilaterally for pure tones of 500, 1000, 2000, 4000, and 6000 Hertz at 20 decibels were included in the study.

Administration of CELF

The CELF was administered individually to each subject to determine processing and production language abilities. Administration to all subjects took place within a two-week period.

Each administration took approximately one hour to complete all processing and production subtests. Administration and scoring procedures followed those outlined in the examiner's manual. Each of the eight examiners had been using the CELF for a period of one year prior to the study.

Instrument

Description of CELF

The CELF is a comprehensive battery of tests that measures selected language functions in the areas of phonology (sound system), syntax (sentence structure), semantics (meaning), and recall and retrieval (memory). It was designed to provide a differential diagnosis of language disabilities of children in grades kindergarten through twelve. It does not provide indepth assessment of phonology or pragmatics (functional use of language).

The diagnostic battery consists of six subtests to identify processing difficulties and five subtests to identify production difficulties. There are also supplementary subtests to evaluate phonology which were not included in this study. For a description of each processing and production subtest, see Appendix D.

Standardization of CELF

The CELF was standardized on 1378 children who had "patterns of normal development and absence of any known hearing or uncorrected visual problems, physical handicaps, speech or language disorders, learning disabilities, mental retardation, or emotional disorders" (Semel & Wiig, 1980, p. 33). In order to achieve a representative sample, examiners and teachers were asked to select students in the average range: low, middle, and high. A stratified sample was used based on the 1980 census information, which was ethnically and geographically representative of children in grades kindergarten through twelve in the United States.

Validity and Reliability of CELF

Concurrent validity of the CELF was established with appropriate subtests of the Illinois Test of Psycholinguistic Abilities (Kirk, McCarthy, & Kirk, 1968), Detroit Test of Learning Aptitude (Baker & Leland, 1967), Weschler Intelligence Scale for Children-Revised (Weschler, 1974), Northwestern Syntax Screening Test (Lee, 1971), Spache Reading Passage (Spache, 1972), and the Token Test (Disimoni, 1978). The CELF was found to have acceptable concurrent validity, with all correlation coefficients exceeding .40 and ranging between .40 and .94.

The internal-consistency coefficients for the individual subtests and the Processing and Production Totals of the CELF showed that items or groups of items in the subtests measured the same ability with correlation coefficients ranging from .85 to .97 at the .001 level of significance.

Test-retest reliability was established on 30 randomly selected academically achieving children with normal language development. The children were from middle and upper-middle class socioeconomic backgrounds, were English-speaking and were all born within a three-month period of each other. Each child was tested by two different trained examiners with a six-week time interval between the two tests. All test-retest reliability coefficients were significant at the .01 level, ranging from .56 to .98. A test-retest reliability coefficient of .93 was obtained for the Processing subtests and a coefficient of .89 was obtained for the Production subtests, showing adequate stability of performance over the six-week time period. When all subtests of the CELF were combined, an excellent test-retest reliability correlation coefficient of .96 was achieved.

Data Analysis

To determine significant differences in language processing and production between the matched pairs of language impaired and learning disabled children, a series of 13 individual *t*-tests were employed. The .05 level of significance was used as a standard for rejecting the null hypothesis.

Summary

A total of 28 children, 14 language impaired and 14 learning disabled, were subjects of this study. The language impaired children were matched with learning disabled children on the basis of age, IQ, and reading achievement. Each child was individually administered the CELF (Semel & Wiig, 1980) to determine if there

were any significant differences in the language abilities of the two groups.

Chapter 4

RESULTS AND ANALYSIS OF THE DATA

The means, standard deviations, and ranges for each subtest of the CELF are reported for the language impaired and learning disabled subjects in Tables 3-6. Total processing and production scores, as well as scores on subtests that comprise semantics, syntax, and memory are also reported.

Results

The mean for all of the processing subtests on the CELF for the language impaired group was 182, with a range of 146 to 205, and a SD of 22.25. The mean for the processing subtests for the learning disabled group was 191.36. Scores on the processing subtests for the learning disabled group ranged from 162 to 238, with a SD of 19.36.

The mean for processing word and sentence structure for the language impaired group was 37.71, with a range of 28 to 44 and a SD of 4.50. For the learning disabled group, the mean was 40.14, with a range of 32-46 and a SD of 3.51.

The mean for processing word classes for the language impaired group was 26.07, with a range of 17 to 34 and a SD of 5.21. For the learning disabled group on this subtest, the mean was 27.07, the range was 16 to 36 and the SD was 5.68.

Table 3

Raw Scores on the Processing Subtests of the CELF

Achieved by the Language Impaired Group

Subjects	WSS	WC	LC	RA	OD	SP	Total
1	28	32	30	44	35	20	189
2	38	22	32	34	30	8	164
3	40	27	20	41	35	4	167
4	34	28	34	35	28	8	167
5	38	19	33	26	24	6	146
6	36	23	34	28	23	12	156
7	34	32	40	48	46	18	218
8	42	23	40	32	34	12	183
9	44	30	40	42	37	12	205
10	44	34	30	42	34	10	194
11	34	26	40	40	42	18	200
12	38	30	36	44	42	11	201
13	36	22	40	54	36	13	201
14	42	17	35	32	25	6	157
Range	28-44	17-34	20-40	26-54	23-46	4-20	146-205
Mean	37.71	26.07	34.57	38.71	33.64	11.29	182.00
SD	4.50	5.21	5.64	7.88	7.01	4.83	22.25

WSS - Word and Sentence Structure

WC - Word Classes

LC - Linguistic Concepts

RA - Relationships and Ambiguities

OD - Oral Directions

SP - Spoken Paragraphs

Table 4

Raw Scores on the Processing Subtests of the CELF

Achieved by the Learning Disabled Groups

Subjects	WSS	WC	LC	RA	OD	SP	Total
15	41	31	37	28	42	10	189
16	44	30	37	41	46	12	210
17	43	36	35	41	33	4	192
18	38	26	38	44	38	16	200
19	40	22	35	38	24	4	163
20	40	24	38	46	38	18	204
21	42	31	36	35	36	13	193
22	32	16	39	40	29	6	162
23	38	34	42	54	44	26	238
24	46	30	36	43	31	6	192
25	36	18	32	38	30	18	172
26	41	28	36	43	30	6	184
27	39	26	42	36	37	12	192
28	42	27	36	37	36	10	188
Range	32-46	16-36	32-42	28-54	24-46	4-26	162-238
Mean	40.14	27.07	37.07	40.29	35.29	11.50	191.36
SD	3.51	5.68	2.67	6.01	6.21	6.36	19.36

WSS - Word and Sentence Structure

WC - Word Classes

LC - Linguistic Concepts

RA - Relationships and Ambiguities

OD - Oral Directions

SP - Spoken Paragraphs

Table 5

Raw Scores on the Production Subtests of the CELF

Achieved by the Language Impaired Group

Subjects	WS	CN	WA	MS	FS	Total*
1	14	0	31	14	37	82
2	10	1	20	24	20	65
3	8	34	21	31	44	130
4	7	0	13	27	17	57
5	4	33	25	10	21	89
6	2	1	19	34	28	82
7	16	29	24	32	37	122
8	11	25	27	18	12	82
9	19	55	33	30	29	147
10	17	7	22	20	32	81
11	19	54	29	29	26	138
12	19	53	19	25	28	125
13	16	0	26	16	25	67
14	7	0	19	30	22	71
Range	2-19	0-55	13-33	10-34	12-44	57-138
Mean	12.07	20.86	23.43	24.29	27.00	95.57
SD	5.84	22.23	5.47	7.50	8.59	30.19

WS - Word Series

CN - Confrontation Naming

WA - Word Associations

MS - Model Sentences

FS - Formulated Sentences

Total* - all subtests except WS

Table 6

Raw Scores on the Production Subtests of the CELF

Achieved by the Learning Disabled Group

Subjects	WS	CN	WA	MS	FS	Total*
15	11	0	36	28	38	112
16	14	0	39	22	55	116
17	8	45	33	36	18	132
18	11	1	29	30	42	102
19	3	0	18	24	11	53
20	11	0	18	42	38	98
21	11	13	18	45	47	123
22	8	27	28	46	29	130
23	19	60	50	52	43	205
24	7	40	25	34	25	124
25	13	0	27	36	37	115
26	8	1	20	36	36	93
27	2	0	38	33	33	104
28	3	0	25	34	19	78
Range	2-19	0-60	18-50	22-52	11-55	53-205
Mean	9.21	13.36	28.86	35.57	33.64	111.43
SD	4.68	20.81	9.48	8.45	12.14	34.25

WS - Word Series

CN - Confrontation Naming

WA - Word Associations

MS - Model Sentences

FS - Formulated Sentences

Total* - all subtests except WS

The language impaired group's mean on processing linguistic concepts was 34.57. Their scores ranged from 20 to 40, with a SD of 5.64. The mean for the learning disabled group was 37.07, with a range of 32 to 42 and a SD of 2.67.

The mean for processing relationships and ambiguities for the language impaired group was 38.71. Their scores ranged from 26 to 54, with a SD of 7.88. For the learning disabled group on this subtest, the mean was 40.29, the range 28 to 54, and the SD, 6.01.

On processing of oral directions the language impaired had a mean of 33.64, a range of 23 to 46, and a SD of 7.01. The mean for the learning disabled was 35.29, with a range of 24 to 46 and a SD of 6.21.

The mean for processing spoken paragraphs for the language impaired group was 11.29. Their scores ranged from 4 to 20, with a SD of 4.83. The mean for the learning disabled group on this subtest was 11.50, with a range of 4 to 26 and a SD of 6.36.

The production subtests yielded a mean of 95.57 for the language impaired group. The range was 57 to 138, with a SD of 30.19. The mean for all production subtests for the learning disabled group was 111.43, with a range of 53 to 205 and a SD of 34.25.

The mean for production of word series for the language impaired group was 12.07, with a range of 2 to 19 and a SD of 5.84. For the learning disabled group, the mean was 9.21, the range was 2 to 19 and the SD was 4.68.

The mean for production of confrontation naming for the language impaired group was 20.86. Their scores ranged from 0 to 55, with a SD of 22.23. For the learning disabled group, the mean was 13.36, with a range of 0 to 60 and a SD of 20.81.

On the production of word associations, the language impaired group's mean was 23.43. Their scores ranged from 13 to 33, with a SD of 5.47. The mean for the learning disabled group was 28.86, with a range of 18 to 50 and a SD of 9.48.

The mean for production of model sentences for the language impaired group was 24.29. The scores ranged from 10 to 34, with a SD of 7.50. The learning disabled group's scores yielded a mean of 35.57, with a range of 22 to 52 and a SD of 8.45.

The mean for production of formulated sentences for the language impaired group was 27.00. The range of scores was 12 to 44, with a SD of 8.59. The mean on this subtest for the learning disabled group was 33.64. Their scores ranged from 11 to 55, with a SD of 12.14.

Eight subtests on the CELF measured various aspects of semantics. To obtain information for the comparison of semantic ability between the two groups, these subtest scores were used: Processing Word Classes, Processing Linguistic Concepts, Processing Relationships and Ambiguities, Processing Oral Directions, Processing Spoken Paragraphs, Producing Word Series, Producing Word Associations, and Producing Formulated Sentences. The mean for the language impaired group on semantics was 206.79. Scores ranged from 163 to 261, with a SD of 35.35. For the learning disabled

group, the mean was 222.93. The range was 145 to 312, with a SD of 37.66. See Tables 7 and 8 for a summary of these results.

Syntax was measured with these four CELF subtests: Processing Word and Sentence Structure, Processing Relationships and Ambiguities, Producing Model Sentences, and Producing Formulated Sentences. The mean for the language impaired group on syntax was 127.71. The range was 95 to 156, with a SD of 17.16. For the learning disabled group, the mean was 149.64. Scores ranged from 113 to 187, with a SD of 18.28. See Tables 7 and 8 for a summary of this information.

Memory was measured by these seven subtests: Processing Relationships, Producing Word Series, Producing Names on Confrontation, Producing Word Associations, and Producing Model Sentences. The mean for the memory subtests for the language impaired group was 164.29, with a range of 118 to 245 and a SD of 41.63. For the learning disabled group, the mean was 174.07, with a range of 111 to 305 and a SD of 43.49.

Data Analysis

In order to test the hypotheses developed for this study, the data were submitted to 13 two-tailed t-tests. Tables 9 and 10 contain a summary of these analyses.

As shown in Table 9, the data revealed no significant difference between the language impaired and learning disabled groups on total processing score of the CELF (t=1.19, df=26, p=0.246), processing of word and sentence structures (t=1.59, df=26, p=0.123), processing of word classes (t=0.49, df=26,

Table 7

Raw Scores for the Language Impaired Group on CELF Subtests Which Measure Semantics, Syntax, and Memory

Subject Number	Semantic Subtests	Syntax Subtests	Memory Subtests
1	243	123	158
2	176	116	127
3	200	156	174
4	170	113	118
5	158	95	128
6	169	126	119
7	261	151	245
8	191	104	159
9	242	145	228
10	221	138	152
11	240	129	231
12	229	135	213
13	232	131	161
14	163	126	119
Range	163-261	95-156	118-245
Mean	206.79	127.71	164.29
SD	35.35	17.16	41.63

Table 8

Raw Scores for the Learning Disabled Group on CELF Subtests Which Measure Semantics, Syntax, and Memory

Subject Number	Semantic Subtests	Syntax Subtests	Memory Subtests
15	233	135	155
16	274	162	174
17	208	138	200
18	244	154	169
19	145	113	111
20	231	166	173
21	227	169	171
22	195	147	184
23	312	187	305
24	203	148	186
25	213	147	162
26	207	156	144
27	226	141	158
28	193	132	145
Range	145-312	113-187	111-305
Mean	222.93	149.64	174.07
SD	37.66	18.28	43.49

Table 9

A Comparison of CELF Processing Scores of Language Impaired and Learning Disabled Groups

Subtest	Language Impaired Mean	SD	Learning Disabled Mean	SD	df	t-value	Two-tail Probability
Word and Sentence Structure	37.71	4.50	40.14	3.51	26	1.59	0.123
Word Classes	26.07	5.21	27.07	5.68	26	0.49	0.631
Linguistic Concepts	34.57	5.64	37.07	2.67	18.56	1.50	0.150
Relationships and Ambiguities	38.71	7.88	40.29	6.01	26	0.59	0.558
Oral Directions	33.64	7.01	35.29	6.21	26	0.66	0.517
Spoken Paragraphs	11.29	4.83	11.50	6.36	26	0.10	0.921
Total Processing Score	182.00	22.25	191.36	19.36	26	1.19	0.246

Table 10

A Comparison of CELF Production Scores of Language Impaired and Learning Disabled Groups

Subtest	Language Impaired Mean	SD	Learning Disabled Mean	SD	df	t-value	Two-tail Probability
Word Series	12.07	5.84	9.21	4.68	26	1.43	0.165
Confrontation Naming	20.86	5.94	13.36	5.56	26	0.92	0.365
Word Associations	23.43	5.47	28.86	9.48	26	1.86	0.075
Model Sentences	24.29	7.50	35.57	8.45	26	3.74	0.001
Formulated Sentences	27.00	8.59	33.64	12.14	26	1.67	0.107
Total Production Score	95.57	30.19	111.43	34.25	26	1.30	0.205

p=0.631), processing of linguistic concepts (t=1.50, df=18.56, p=0.150), processing of relationships and ambiguities (t=0.59, df=26, p=0.558), processing of oral directions (t=.0.66, df=26, p=-.517), and processing of spoken paragraphs (t=0.10, df=26, p=0.921). Even though the results were not significant, the learning disabled scored better than the language impaired on all processing subtests. On the basis of these data, hypothesis 1 and subhypotheses 1.1, 1.2, 1.3, 1.4, 1.5, and 1.6 were accepted.

As shown in Table 10, the data revealed no significant differences between the language impaired and learning disabled children on total production score of the CELF (t=1.30, df=26, p=0.205), production of word series (t=1.43, df=26, p=0.165), production of names on confrontation (t=0.92, df=26, p=0.365), production of word associations (t=1.86, df=26, p=0.075), and production of formulated sentences (t=1.67, df=26, p=0.107). The learning disabled scored better than the language impaired children, even though not significantly, on production of word associations and formulated sentences, while the language impaired children scored better on production of word series and names on confrontation. One subtest, production of word series, approached significance. On the basis of these results, hypothesis 2 and subhypotheses 2.1, 2.2, 2.3, and 2.5 were accepted.

The data revealed a significant difference between language impaired and learning disabled children in their ability to produce model sentences (t=3.74, df=26, p=0.001). The learning disabled scored significantly better than the language impaired children. Therefore, subhypothesis 2.4 was rejected.

In order to analyze the data on semantic, syntactic, and memory abilities, the scores from specific subtests measuring these aspects of language were regrouped as previously mentioned. Table 11 shows a summary of results on this information. The data revealed no significant difference between language impaired and learning disabled children in their semantic ability (t=1.17, df=26, p=0.253) or in their memory ability (t=0.61, df=26, p=0.548). Even though the results were not significant, the learning disabled scored better than the language impaired children. On the basis of these results, hypotheses 3 and 5 were accepted. However, a significant difference was observed between the two groups in syntactic abilities (t=3.27, df=26, p=0.003), with the learning disabled scoring significantly better than the language impaired children. Therefore, hypothesis 4 was rejected.

In summary, no significant differences were found between language impaired and learning disabled children on any subtests of the CELF, except Production of Model Sentences. A significant difference was found between the two groups in syntactic abilities, while no significant differences were found in semantic and memory abilities.

Table 11

A Summary of Results on Semantic, Syntactic, and Memory Aspects of the CELF

	Language Impaired		Learning Disabled				
	Mean	SD	Mean	SD	df	t-value	Two-tail Probability
Semantics	206.7857	35.351	222.9286	37.663	26	1.17	0.253
Syntax	127.7143	17.157	149.6429	18.282	26	3.27	0.003
Memory	164.2857	41.631	174.0714	43.489	26	0.61	0.548

Chapter 5

SUMMARY, DISCUSSION, AND RECOMMENDATIONS

Summary

The purpose of this study was to determine if language impaired and learning disabled children exhibited similar language abilities as measured by the CELF (Semel & Wigg, 1980). More specifically, answers to the following questions were sought:

1. Is there a significant difference in processing ability between language impaired and learning disabled children?

2. Is there a significant difference in production ability between language and learning disabled children?

3. Is there a significant difference in semantic ability between language impaired and learning disabled children?

4. Is there a significant difference in syntactic ability between language impaired and learning disabled children?

5. Is there a significant difference in memory between language impaired and learning disabled children?

6. Is there a significant difference in performance on the individual subtests of the CELF between language impaired and learning disabled children?

The subjects were 28 children in grades one, two, three, and four who comprised two groups: a group of 14 language impaired children and a group of 14 learning disabled children. At the time

of testing, all children were receiving services for either language impairment or learning disability and demonstrated adequate hearing and normal intelligence (IQ=85 or above) on the SIT (Slosson, 1978). In addition, the language impaired all achieved a language quotient of 85 or below on the Test of Language Development (Newcomer & Hammill, 1977) and were matched with learning disabled subjects on the basis of age (± six months), IQ (± 10 points), and reading achievement (± six percentile). All children were administered the CELF to determine their processing and production language abilities.

To test the hypotheses developed for this study, the data were submitted to 13 individual two-tailed t-tests. Results of the data analysis revealed that the learning disabled scored significantly better on Producing Model Sentences and syntax. No significant differences were found on any other individual subtests, overall processing scores, overall production scores, semantics, or memory. The learning disabled scored better than the language impaired on all subtests except: Producing Word Series and Confrontation Naming.

Discussion

The results of the data analysis showed no significant differences between language impaired and learning disabled children on semantics, memory, overall processing abilities and overall productions abilities on the CELF. These results indicated that the language impaired and learning disabled children in this study were similar in language ability. The learning disabled scored

significantly better only on Producing Model Sentences and subtests which indicate overall syntactic ability. Even though the learning disabled scored significantly better than the language impaired on the syntax subtests, several learning disabled children scored at or below the criterion referenced comparison for one or more of these subtests, indicating problems in syntax. See Tables 12 and 13 for a summary of the language impaired and learning disabled children's performance on syntax subtests. The results obtained for the learning disabled group were similar to other studies that indicate learning disabled children have problems with language (Hresko, 1979; Moran & Byrne, 1977; Wiig & Semel, 1975).

Semel-Mintz and Wiig (1982) recommended that the twentieth percentile be used as a pass/fail criterion on the CELF. According to this criterion, nine of the language impaired subjects were found to be deficient in both processing and production areas. Three were deficient in only one area (either processing or production) and two exhibited language abilities within normal limits as measured by the CELF. Of the learning disabled subjects, six were deficient in one of the two areas. Only three were found to have language abilities within normal limits. This indicates the need to better diagnose language impairment in the learning disabled population and to serve these students in the language impaired program. The CELF may possibly be a better diagnostic tool than others previously used, since it was developed specifically for use with the learning disabled population. Table 14 shows a summary of the percentile ranks for all subjects.

Table 12
Performance on the Syntax Subtests of the CELF
for the Language Impaired Group

Language Impaired Subject Number	Processing		Production	
	WSS	RA	MS	FS
1	-	-	-	+
2	-	-	-	-
3	+	+	+	+
4	-	+	+	-
5	+	-	-	-
6	+	-	+	-
7	-	+	+	+
8	+	+	-	-
9	+	+	-	-
10	+	+	-	+
11	-	-	-	-
12	-	-	-	-
13	-	+	-	-
14	+	-	+	-

WSS - Word and Sentence Structure

RA - Relationships and Ambiguities

MS - Model Sentences

FS - Formulated Sentences

\- - at or below criterion referenced comparison

\+ - above criterion referenced comparison

Table 13

Performance on the Syntax Subtests of the CELF for the Learning Disabled Group

Learning Disabled Subject Number	Processing		Production	
	WSS	RA	MS	FS
15	+	-	-	+
16	+	-	-	+
17	+	+	+	-
18	+	+	+	+
19	+	+	+	-
20	+	+	+	+
21	+	-	+	+
22	-	-	+	-
23	-	+	+	+
24	+	+	+	-
25	-	-	-	-
26	-	-	-	-
27	-	-	-	-
28	+	+	+	+

WSS - Word and Sentence Structure

RA - Relationships and Ambiguities

MS - Model Sentences

FS - Formulated Sentences

\- - at or below criterion referenced comparison

\+ - above criterion referenced comparison

Table 14

Percentile Ranks for Subjects on the CELF

Language Impaired Subject Number	Processing Percentile	Production Percentile	Learning Disabled Subject Number	Processing Percentile	Production Percentile
1	20	5	15	20	20
2	5	<5	16	25	10
3	5	35	17	20	35
4	20	5	18	55	30
5	10	20	19	20	<5
6	5	5	20	35	10
7	60	25	21	20	30
8	5	<5	22	<5	20
9	35	45	23	70	90
10	45	15	24	45	50
11	10	20	25	<5	10
12	10	15	26	5	5
13	30	<5	27	10	5
14	15	10	28	40	15

Results of a related study on the short-term memory skills of these language impaired and learning disabled children (Shoaf, 1983) revealed significant differences on four tests of short-term memory: Detroit Tests of Learning Aptitude-Unrelated Words, Detroit Tests of Learning Aptitude-Related Syllables (Baker & Leland, 1967), Illinois Test of Psycholinguistic Abilities-Digit Span (Kirk & McCarthy, 1968), and Phonemic Synthesis (Katz & Harmon, 1981). No significant differences between the two groups were found on the Token Test for Children (Disimoni, 1978) and Processing Spoken Paragraphs from the CELF. The language impaired scored lower than the learning disabled on all tests.

These same students were also subjects of a study on reading ability (Scarboro, 1983) that revealed a significant difference between the language impaired and learning disabled children on one category of the Reading Miscue Inventory (Burke & Goodman, 1972). Language impaired children scored significantly better than learning disabled children when errors of reading involved no meaning change within the passage. There were no significant differences between the two groups on 32 other categories of analysis. On 18 of the categories, the learning disabled had more errors, while the language impaired had more errors on 13 of the categories.

Recommendations for Further Research

As a result of this study, the following recommendations for further research are made:

1. This study should be replicated on a larger sample of subjects to corroborate the present findings.

2. The language impaired group should be classified according to specific language deficit (i.e., semantics, syntax, memory) rather than overall language ability in order to obtain more homogeneous grouping of subjects.

3. Other measures of receptive and expressive language ability should be employed to corroborate the present findings.

4. The learning disabled subjects should be included on the basis of specific disability (i.e., auditory processing, mathematics, reading) in order to obtain more homogeneous grouping.

REFERENCES

REFERENCES

Andolina, C. Syntactic maturity and vocabulary richness of learning disabled children at four age levels. Journal of Learning Disabilities, 1980, 7, 372-377.

Andrews, M., & Brabson, C. Preparing the language impaired child for classroom mathematics: Suggestions for the speech pathologist. Language, Speech, and Hearing Services in Schools, 1977, 8, 46-53.

Aram, D.M., & Nation, J.E. Child language disorders. St. Louis: C.V. Mosby Co., 1982.

Baker, H. & Leland, B. Detroit tests of learning aptitude. Indianapolis: Bobbs-Merrill, 1967.

Baltaxe, C.A., & Simmons, J.Q. Language in childhood psychosis: A review. Journal of Speech and Hearing Disorders, 1975, 40, 439-458.

Bangs, T.E. Language and learning disorders of the preacademic child. New York: Appleton-Century-Crofts, 1968.

Bannatyne, A. Language, reading and learning disabilities. Springfield: Charles C. Thomas, 1971.

Benedict, H. Early lexical development: Comprehension and production. Journal of Child Language, 1979, 6, 183-200.

Bennett, C.W., & Runyan, C.M. Educators perceptions of the effect of communication disorders upon educational performance. Language, Speech, and Hearing Services in Schools, 1982, 13, 260-263.

Bloom, L., & Lahey, M. Language development and language disorders. New York: John Wiley & Sons, 1978.

Blumenthal, A.L. Prompted recall of sentences. Journal of Verbal Learning and Verbal Behavior, 1967, 6, 203-206.

Blumenthal, A.L., & Boakes, R. Prompted recall of sentences. Journal of Verbal Learning and Verbal Behavior, 1967, 6, 674-676.

Bowerman, M. Semantic factors in the acquisition of rules for word use and sentence construction. In D. Morehead & A. Morehead (Eds.), Directions in normal and deficient child language. Baltimore: University Park Press, 1976.

Burke, C., & Goodman, Y. Reading miscue inventory. New York: Macmillan Publishing Co., 1972.

California Achievenent Test. Monterey: CTB/McGraw Hill, 1978.

Carrow, E. Test of auditory comprehension of language. Austin: Urban Research Group, 1973.

Ceci, S.J., Ringstrom, M., & Lea, S.E.G. Do language-learning disabled children (L/LDs) have impaired memories? In search of underlying processes. Journal of Learning Disabilities, 14, 1981, 159-162.

Chomsky, N. Syntactic structures. The Hague: Mouton, 1957.

Clark, E.V. What's in a word: On the child's acquisition of semantics in his first language. In T. Moore (Ed.), Cognitive development and the acquisition of language. New York: Academic Press, 1973.

Clements, S.D. Minimal brain dysfunction in children. In S.G. Sapir & A.C. Nitzburg (Eds.), Children with learning problems. New York: Brunner/Mazel, 1973.

Cunningham, M.A. A comparison of the language of psychotic and non-psychotic children who are mentally retarded. In M. Lahey (Ed.), Readings in childhood language disorders. New York: John Wiley & Sons, 1978.

Denckla, M., & Rudel, R. Naming of object drawings by dyslexic and other learning disabled children. Brain and Language, 1976, 3, 1-16.

de Villiers, J., & de Villiers, P. A cross-sectional study of the acquisition of grammatical morphemes in child speech. Journal of Psycholinguistic Research, 1973, 2, 267-278.

Disimoni, F.G. The token test for children. Boston: Teaching Resources Corp., 1978.

Donahue, M., Pearl, R., & Bryan, T. Learning disabled children's syntactic proficiency on a communication task. Journal of Speech and Hearing Disorders, 1982, 42, 397-403.

Duchan, J., & Erikson, J.G. Normal and retarded children's understanding of semantic relations in different verbal contexts. Journal of Speech and Hearing Research, 1976, 19, 767-777.

Dunn, L.M. Peabody picture vocabulary test. Minneapolis: American Guidance Service, 1965.

Ervin, S.M. Imitation and structure in children's language. In E.H. Lenneberg (Ed.), New directions in the study of language. Cambridge, Mass.: MIT Press, 1964.

Ervin-Tripp, S.M. An overview of grammatical development. In E.I. Slobin (Ed.), The ontogenesis of grammar. New York: Academic Press, 1971.

Federal Register. Implementation of part b of the education of the handicapped act (pl-94-142), 42, August 23, 1977.

Flavell, J.H., Beach, D.R., & Chinsky, J.M. Spontaneous verbal rehearsal in a memory task as a function of age. Child Development, 1966, 37, 283-299.

Freedman, P., & Carpenter, R. Semantic relations used by normal and language-impaired children at stage I. Journal of Speech and Hearing Research, 1976, 19, 784-795.

Foster, C.R., Giddan, J.J., & Stark, J. ACLC: assessment of children's language comprehension. Palo Alto: Consulting Psychologists Press, 1972.

Gentner, D. On relational meaning: The acquisition of verb meaning. Child Development, 1978, 48, 988-999.

Gerber, A. Problems in the processing and use of language in education. In A. Gerber & D.N. Bryen (Eds.), Language and learning disabilities. Baltimore: University Park Press, 1981.

German, D.J. Word finding skills in children with learning disabilities. Journal of Learning Disabilities, 1979, 12, 176-181.

German, D.J. Word finding substitutions in children with learning disabilities. Language, Speech, and Hearing Services in Schools, 1982, 13, 223-230.

Hallahan, D.P., & Cruickshank, W.M. Psychoeducational foundations of learning disabilities. Englewood Cliffs, N.J.: Prentice-Hall, 1973.

Hammill, D., & Larsen, S. The effectiveness of psycholinguistic training. Exceptional Child, 1974, 9, 5-13.

Harrison, S. A review of research in speech and language development of the mentally retarded child. American Journal of Mental Deficiency, 1958, 63, 236-240.

Henderson, A.J., & Shores, R.E. How learning disabled students failure to attend to suffixes affects their oral reading. Journal of Learning Disabilities, 1982, 15, 178-182.

Hessler, G.L., & Kitchen, D.W. Language characteristics of a purposive sample of early elementary learning disabled students. Learning Disability Quarterly, 1980, 3 (3), 36-41.

Hresko, W.R. Elicited imitation ability of children from learning disabled and regular classes. Journal of Learning Disabilities, 1979, 12, 456-461.

Ingram, D. The relationship between comprehension and production. In R.L. Schiefelbusch & L.L. Loyd (Eds.), Language perspectives-acquisition, retardation, and intervention. Baltimore: University Park Press, 1974.

Ingram, T. Specific developmental disorders of speech in childhood. Brain, 1959, 82, 450-467.

Johnson, D., & Myklebust, H. Learning disabilities: Educational principles and practices. New York: Grune & Stratton, 1967.

Johnston, J.R. The language disordered child. In N.J. Lass, L.V. McReynolds, J.L. Northern, & D.E. Yoder (Eds), Speech, language, and hearing: Pathologies of speech and language (Vol. 2). Philadelphia: W.B. Saunders Co., 1982.

Johnston, J.R., & Schery, T.K. The use of grammatical morphemes by children with communication disorders. In D. Morehead & A. Morehead (Eds.), Normal and deficient child language. Baltimore: University Park Press, 1976.

Katz, J., & Harmon, C.H. The phonemic synthesis test. In Phonemic synthesis: Blending sounds into words. Allen, Texas: Developmental Learning Materials, 1981.

Kavale, K. A comparison of learning disabled and normal children on the Boehm test of basic concepts. Journal of Learning Disabilities, 1982, 15, 160-161.

Kier, E.H. Auditory information processing and learning disabilities. In L. Tarnopol & M. Tarnopol (Eds.), Brain function and reading disability. Baltimore: University Park Press, 1977.

Kirk, S.A., McCarthy, J.J., & Kirk, W.D. Illinois test of psycholinguistic ability: revised edition. Urbana: University of Illinois Press, 1968.

Lahey, M. Readings in childhood language disorders. New York: John Wiley & Sons, 1978.

Lee, L. Developmental sentence types: A method for comparing normal and deviant syntactic development. Journal of Speech and Hearing Disorders, 1966, 31, 311-330.

Lee, L.L. Northwestern syntax screening test. Evantston, Ill.: Northwestern University Press, 1971.

Leonard, L.B. What is deviant language? Journal of Speech and Hearing Disorders, 1972, 37, 427-446.

Leonard, L.B. Language impairment in children. Merrill-Palmer Quarterly, 1979, 25, 205-232.

Leonard, L., Bolders, J., & Miller, J. An examination of the semantic relations reflected in the language usage of normal and language disordered children. Journal of Speech and Hearing Research, 1976, 19, 371-392.

Leonard, L.B., Schwartz, R.G., Chapman, K., Rowan, L.E., Prelock, P.A., Terrell, B., Weiss, A.L., & Messick, C. Early lexical acquisition in children with specific language impairment. Journal of Speech and Hearing Research, 1982, 25, 555-564.

Lewis, R.B., & Kass, C.E. Labelling and recall in learning disabled students. Journal of Learning Disabilities, 1982, 15, 238-241.

Liles, B., Shulman, M., & Bartlett, S. Judgment of grammaticality by normal and language disordered children. Journal of Speech and Hearing Disorders, 1977, 42, 199-209.

Lorsback, T.C. Individual differences in semantic encoding processes. Journal of Learning Disabilities, 1982, 15, 476-480.

MaGee, P., & Newcomer, P. The relationship between oral skills and academic achievement of learning disabled children. Learning Disability Quarterly, 1978, 1, 63-67.

McNutt, J.C., & Chia-Yen Li, J. Repetition of time-altered sentences by normal and learning disabled children. Journal of Learning Disabilities, 1980, 13, 25-29.

Menyuk, P. Comparison of grammar of children with functionally deviant and normal speech. Journal of Speech and Hearing Research, 1964, 7, 109-12.

Menyuk, P., & Looney, P. A problem of language disorder: Length versus structure. Journal of Speech and Hearing Research, 1972a, 15, 264-279.

Menyuk, P., & Looney, P. Relationships between components of the grammar in language disorders. Journal of Speech and Hearing Research, 1972b, 15, 395-406.

Mier, J.H. Prevalence and characteristics of learning disabilities in second grade children. Journal of Learning Disabilities, 1971, 4, 1-16.

Miller, G.A. The magical number seven, plus or minus two, or, some limits to our capacity for processing information. Psychological Review, 1956, 63, 81-96.

Miller, G.A., & Chomsky, N. Finitary models of language users. In R.D. Luce, R.R. Bush, & E. Galanter (Eds.), Handbook of mathematical psychology, (Vol. 2). New York: Wiley, 1963.

Miller, G.A., & Isard, S. Some perceptual consequences of linguistic rules. Journal of Verbal Learning and Verbal Behavior, 1963, 2, 217-228.

Moran, M.R., & Byrne, M.C. Mastery of verb tense markers by normal and learning disabled children. Journal of Speech and Hearing Research, 1977, 20, 529-542.

Morehead, D.M., & Ingram, D. The development of base syntax in normal and linguistically deviant children. Journal of Speech and Hearing Research, 1973, 16, 330-352.

Morley, M., Court, D., Miller, H., & Garside, R. Delayed speech and developmental aphasia. British Medical Journal, 1955, 2, 463-467.

Myklebust, H.R. The psychology of deafness. New York: Grune & Stratton, Inc., 1964.

Newcomer, P.L., & Hammill, D.D. The test of language development. Austin, Tex.: Empiric Press, 1977.

Noel, M.M. Referential communication abilities of learning disabled children. Learning Disability Quarterly, 1980, 3(3), 70-75.

North Carolina Department of Public Instruction. Rules governing children with special needs. Raleigh, September, 1981.

Olson, G.M. Developmental changes in memory and the acquisition of language. In T.E. Moore (Ed.), Cognitive development and the acquisition of language. New York: Academic Press, 1973.

Parker, T.B., Freston, C.W., & Drew, C.J. Comparison of verbal performance of normal and learning disabled children as a function of input organization. Journal of Learning Disabilities, 1975, 8, 386-392.

Prescriptive reading inventory. Monterey: CTB/McGraw Hill, 1976.

Rosenthal, J.H. A preliminary psycholinguistic study of children with learning disabilities. Journal of Learning Disabilities, 1970, 3, 11-15.

Rosenthal, D.J., & Resnick, L.B. Children's solution processes in arithmetic word problems. Journal of Educational Psychology, 1974, 66, 817-825.

Ryan, E.B., & Semmell, M.I. Reading as a constructive language process. Reading Research Quarterly, 1969, 5(1), 59-83.

Savin, H., & Perchonock, E. Grammatical structure and the immediate recall of sentences. Journal of Verbal Learning and Verbal Behavior, 1965, 4, 348-353.

Scarboro, K.S. The reading ability of language impaired and learning disabled children. Unpublished Master's Thesis, Appalachian State University, 1983.

Semel, E.M., & Wiig, E.H. Clinical evaluation of language functions. Columbus: Charles E. Merrill, 1980.

Semel, E.M., & Wiig, E.H. Comprehension of syntactic structures and critical verbal elements by children with learning disabilities. Journal of Learning Disabilities, 1975, 8, 46-51.

Semel-Mintz, E., & Wiig, E.H. Clinical evaluation of language functions: Update II. Colombus: Charles E. Merrill, 1982.

Shoaf, B.B. Short-term memory abilities of learning disabled and language impaired children. Unpublished Master's Thesis, Appalachian State University, 1983.

Slobin, D.I. Psycholinguistics, Glenview, Ill.: Scott Foresman, 1971.

Slosson, R.L. Slosson intelligence test for children and adults. New York: Slosson Educational Publications, Inc., 1978.

Spache, G.D. Spache reading passage. Monterey: CTB/McGraw Hill, 1972.

Stark, J., Poppen, R., & May, M.Z. Effects of alterations of prosodic features on the sequencing performance of aphasic children. Journal of Speech and Hearing Research, 1967, 10, 849-855.

Steckol, K., & Leonard, L. The use of grammatical morphemes by normal and language impaired children. Journal of Communication Disorders, 1979, 12, 291-302.

Taylor, A.M., Thurlow, M.L., & Turner, J.E. Vocabulary development of educable retarded children. Exceptional Children, 1977, 43, 444-450.

Terman, L.M., & Merrill, M.A. Stanford-Binet intelligence scale. Boston: Houghton Mifflin Co., 1960.

Trantham, C., & Pedersen, J. Normal language development. Baltimore: Williams & Wilkins, 1976.

Vogel, S.A. Morphological ability in normal and dyslexic children. Journal of Learning Disabilities, 1977, 10, 35-43.

Vogel, S.A. Syntactic abilities in normal and dyslexic children. Journal of Learning Disabilities, 1974, 7, 47-53.

Wallach, G.P., & Goldsmith, S.C. Language based learning disabilities: Reading is language too! Journal of Learning Disabilities, 1977, 10, 178-183.

Weiner, P.A. A language-delayed child at adolescence. Journal of Speech and Hearing Disorders, 1974, 39, 202-212.

Weschler, D. Weschler intelligence scale for children-revised. New York: Psychological Corp., 1974.

Wiig, E.H., LaPointe, C., & Semel, E.M. Relationships among language processing and production abilities of learning disabled adolescents. Journal of Learning Disabilities, 1977, 10, 292.

Wiig, E.H., & Roach, M.A. Immediate recall of semantically varied "sentences" by learning disabled adolescents. Perceptual Motor Skills, 1975, 40, 119-125.

Wiig, E.H., & Semel, E.M. Comprehension of linguistic concepts requiring logical operations by learning disabled children. Journal of Speech and Hearing Research. 1973, 16, 627-636.

Wiig, E.H., & Semel, E.M. Development of comprehension of logico-grammatical sentences by grade school children. Perceptual Motor Skills, 1974a, 38, 171-176.

Wiig, E.H., & Semel, E.M. Logico-grammatical sentence comprehension by adolescents with learning disabilities. Perceptual Motor Skills, 1974b, 38, 1331-1334.

Wiig, E.H., & Semel, E.M. Production language abilities in learning disabled adolescents. Journal of Learning Disabilities, 1975, 8, 578-586.

Wiig, E.H., & Semel, E.M. Language disabilities in children and adolescents. Columbus: Charles E. Merrill, 1976.

Wiig, E.H., & Semel, E.M. Language assessment and intervention for the learning disabled. Columbus: Charles E. Merrill, 1980.

Wiig, E.H., Semel, E.M., & Crouse, M.A. The use of morphology by high-risk and learning disabled children. Journal of Learning Disabilities, 1973, 6, 457-465.

APPENDIX A

Formula for Placement in the Learning Disabilities Program

Appendix A

Formula for Placement in the Learning Disabilities Program

The following procedure is used in calculating an expected grade level functioning based upon the results of an intelligence test:

(a) Obtain the intelligence test score (IQ).

(b) Obtain the student's chronological age (CA).

(c) Convert the CA to months (i.e. 8-9 = 105 months).

(d) Convert 5.5 to 66 months (5.5 = 5½ years).

(e) Substitute that information in the following formula:

$$\frac{IQ}{100} \text{ X (C.A. - 5.5) = Expected Grade Achievement}$$

(f) Example: If the obtained IQ is 110 and the student's CA is 12-0:

$$\frac{110}{110} \text{ X (144-66) = Expected Grade Achievement}$$

$$\frac{110}{100} \text{ X (78) = Expected Grade Achievement}$$

1.1 X 78 = Expected Grade Achievement

85.8 months = Expected Grade Achievement

85.8 divided by 12 = 7 years 1.8 months

7-2 = Expected Grade Achievement

Determine the amount of discrepancy from the expected academic performance and current academic performance.

(a) Obtain current achievement test scores in any of the achievement areas under consideration.

(b) Subtract the Expected Grade Achievement Score from the Current Grade Achievement Score.

(c) Compare that difference score to the Degree of Severity Index.

(d) Define the pupil's achievement level as falling within the Mild, Moderate, or Severe level of discrepancy.

APPENDIX B

Parent Permission Letter

Appendix B

Parent Permission Letter

April 6, 1983

Dear _____,

We are currently conducting a comparative study of Language Impaired and Learning Disabled children enrolled in the Davidson County School System. With your permission, we would like for your child, _____, to participate in this study.

Your child and others selected will be evaluated in language, short-term memory and reading by our Speech/Language therapists. The results will enable us to:

- better understand the relationship between language and learning disabilities
- develop a more effective individualized educational plan (IEP) for your child
- plan more effective ways to utilize Speech/Language and LD personnel

Please indicate your willingness for your child to participate in this study by completing the attached form and returning it to me in the enclosed envelope by Friday, April 15, 1983. Call me if you have questions concerning this matter.

Thank you for your cooperation.

Cordially,

Kenneth C. Drum
Director of Programs for
Exceptional Children

APPENDIX C

Parent Permission Form

Appendix C

Parent Permission Form

To: Ken Drum
Director of Programs for
Exceptional Children

You have my permission to include my child, _____,
in the study regarding Language and Learning Disabled children. I understand that I can call Ken Drum at (704) 249-8182 for additional information and that I can receive results of the testing and study by making a written request.

Signed _____

Date _____

APPENDIX D

Clinical Evaluation of Language Functions

Appendix D

Clinical Evaluation of Language Functions

I. Processing subtests. These subtests are grouped by primary response mode. They require recognition, interpretation and/or recall. Pointing, yes/no responses or wh-questions/answers are used.

1. Processing word and sentence structures. This subtest probes the child's ability to process and interpret the following word and sentence structures: prepositional phrases, pronouns, verb tenses, regular noun plurals, noun possessives, noun phrases with modifiers, explict negations, passive transformations, wh-interrogatives, indirect object transformations, and relative clause transformations with embedding.

2. Processing word classes. This subtest evaluates the child's ability to perceive relationships between verbal concepts and to identify word pairs which are associated by class membership, antonymy, agent-action, or superordinate-subordinate relationships.

3. Processing linguistic concepts. This subtest evaluates the child's ability to process and interpret oral directions which contain linguistic concepts requiring logical operations such as "and, either, or."

4. Processing relationships and ambiguities. This subtest evaluates the child's ability to process and interpret logico-grammatical and ambiguous sentences which contain: analogous relationships, idioms, metaphors and proverbs.
5. Processing oral directions. This subtest evaluates the child's ability to interpret, recall and execute oral commands of increasing length and complexity.
6. Processing spoken paragraphs. This subtest evaluates the ability to process and interpret spoken paragraphs and recall information presented.

II. Production subtests. These subtests require active naming, word or sentence recall, or sentence formulation and production.

1. Producing word series. This subtest evaluates the child's accuracy, fluency and speed in recalling and producing selected automatic-sequential word series.
2. Producing names on confrontation. This subtest evaluates the accuracy, fluency, and speed in naming colors, forms, and color-form combinations in a sustained confrontation-naming task.
3. Producing word associations. This subtest evaluates the quantity and quality of the retrieval of semantically related word series from long-term memory.
4. Producing model sentences. This subtest evaluates the child's productive control of sentence structure in a sentence repetition task.

5. Producing formulated sentences. This subtest evaluates the child's ability to formulate and produce sentences when word and sentence form choices are limited and when semantic and syntactic constraints are introduced by a word which must be included.

(Semel & Wiig, 1980)

VITA

Sylvia Pope Moore was born in Wadesboro, North Carolina on January 15, 1955 to Mr. and Mrs. William K. Pope. She attended Polkton Elementary School and graduated from Bowman Senior High School in 1973. In March, 1977 she graduated from East Carolina University with a B.S. degree in Speech, Language, and Auditory Pathology. She has worked as a public school speech/language pathologist since that time, attending Appalachian State University on a part-time basis. In August 1983, she completed the requirements for a Master of Arts degree in Speech Pathology from Appalachian State University.

Mrs. Moore is married to Glenwood V. Moore and they currently reside in Denton, North Carolina.