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Learning Disabilities and Remediation

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LEARNING DISABILITIES AND REMEDIATION

Identifying Learning Disabilities Through the Use of Diagnostic Testing and the Implementation of Remediation Procedures

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CONTENTS

LIST OF FIGURES

INTRODUCTION

In a field as diverse as that of learning disabilities, there are many competent professionals who have written on the educational issues and practices confronting the field. There has been considerable material published on the subject of learning disabilities in recent years --- as a result there has been much overlapping among the articles and books published.

The purpose and intent of this paper is to provide the reader with an overview of information relating to learning disabilities, rather than a historical review. This graduate student as a teacher and school consultant for learning disabilities has been confronted with new demands. Often school consultants find it necessary to incorporate new ideas and terminology not included in their preparatory course work. They must deal with parents and teachers who expect a working knowledge not only of learning disabilities but also of diagnosis and remediation.

This paper is designed to acquaint the reader with the following: 1) current learning disabilities definitions and criteria 2) the various terms developed and used to describe learning disabilities 3) the variety of characteristics and typical deficiencies found in children with learning problems 4) a review of five diagnostic tests chosen by this graduate

student to administer in the diagnosis of learning problems 5) functions and diagnostic procedures used with experimental and control testing groups 6) analysis of diagnostic testing 7) methods of remediation used with a sample child from the experimental group.

It has been the intent of this graduate student to become proficient in the diagnostic-prescriptive remediation process. The first step was to be able to identify terms and characteristics of the learning process and to accurately interpret diagnostic test data. Secondly to select a battery of diagnostic tests devised to help in the diagnosis of learning problems. These tests provide data on the learning processes and identifies learning style strengths and weaknesses. The final step in the diagnostic-prescriptive remediation process was the prescription of a remedial program based upon diagnostic test information. The remedial program includes procedures and provides sources for remediation materials.

DEFINITIONS, TERMINOLOGY, AND CHARACTERISTICS OF SPECIFIC LEARNING DISABILITIES

Learning disabled children are found in nearly every classroom in the nation, including those receiving their education in the most advantaged areas. Kephart noted in 1967, between 15 and 20 per cent of the children who enter the nation's first grade classrooms each fall are not yet able to sustain the systematic, demanding effort required to learn the basic skills. (Fass, 1976)

Kirk refers to these children as "educationally exceptional" when it is necessary to alter the educational program to meet their needs. A child is "educationally exceptional" if his learning problem and his inability to perform interfere with his development in the ordinary classroom setting and requires special education, either in conjunction with the regular classroom setting or in a special class or school for his maximum educational development. (Kirk, 1972) The use of the term "exceptional children" in education includes children with learning disabilities. "Exceptional children" refers to any atypical or deviant child. The term has been generally accepted, however, to include both handicapped and the gifted child.

In this section the writer of this paper will acquaint the reader with the current accepted definitions of learning disabilities. This section also contains a brief summary of current terms used to describe learning problems, and the characteristics demonstrated when a learning disability is exhibited.

Many definitions of the term learning disabilities have appeared in the professional literature during recent years. An examination of these definitions reveals the existence of two distinct approaches to learning disabled children. Frierson and Barbe described these approaches in 1967:

> The first approach is cause-oriented. The second is an effect-oriented approach. Those who look at learning disorders from the first perspective attempt to identify the source or etiology of observed behaviors. Those who take the second approach are primarily concerned with analyzing, describing and modifying observed behaviors regardless of underlying causes. (Fass, 1976)

The most widely cited and accepted definition was formulated in 1968 by the National Advisory Committee on Handicapped Children and has been adopted by Congress as part of the Children With Specific Learning Disabilities Act of 1969.

> Children with special learning disabilities exhibit a disorder in one or more of the basic psychological processes involved in understanding or in using spoken or written language. These may be manifested in disorders of listening, thinking, talking, reading, writing, spelling, or

arithmetic. They include conditions which have been referred to as perceptual handicaps, brain injury, minimal brain dysfunction dyslexia, developmental asphasia, etc. They do not include learning problems which are due primarily to visual, hearing, or motor handicaps, to mental retardation, emotional disturbance or to environmental deprivation. (Fass, 1976)

The State Department of Education for the state of Missouri has defined learning disabilities as follows:

> Children with learning disabilities are defined as those children with normal or potentially normal intelligence who, because of some neuropsychological factor, are noted to have learning disabilities of a perceptual, conceptual, or integrative nature. Children with major sensory and motor deficits such as the blind, the deaf, the cerebral palsied, the mentally retarded or children whose learning deficit clearly is of emotional origin without concomitant neuropsychological factors, are excluded from this category as there are already established programs and services to meet their needs. (Section on Special Education, 1974, Note 1)

To some, the term learning disabilities is confusing since mentally retarded children also have difficulty learning. However, a mentally retarded child has difficulty in all areas of learning rather than difficulty in a more limited area. It is noted that in the definition adopted by Congress in 1969 that the term "specific" is used to indicate that the problem is not general but rather the learning problem deals with a specific developmental problem. (Kirk, 1972) The term specific learning disabilities refers to severe handicaps in central processes which inhibit the child's normal development in such specific areas as talking, thinking, perceiving, reading, writing and spelling.

All definitions reviewed by this writer, have a common core even though their emphases on the central nervous system may be different. Kirk (1972) cites the following as common areas of agreement among different authors definitions:

1. The learning problem should be specific and not a correlate of such other primary handicapping conditions as general mental retardation, sensory handicaps, emotional disturbance, and environmental disadvantage.

2. The children must have discrepancies in their own growth with abilities as well as disabilities.

3. The deficits found in a child must be of a behavioral nature such as thinking, conceptualization, memory, speech, language, perception, reading, writing, spelling, arithmetic, and related abilities.

4. The primary focus of identification should be psychoeducational (method of analyzing mental abilities for educational purposes).

The concept of learning disabilities is relatively new. Pioneer authorities such as Cruickshank, Clements, Kephart, Kirk, James McCarthy, Myklebust, Frostig, Jeanne McCarthy, Johnson, and others have made invaluable contributions to our knowledge of learning disabilities.

The earliest identification of problems in learning appears in the writings of medical doctors prior to 1800. Some terminology used by these early writers, include terms like 'loss of reading', 'apoplexy', 'verbal amnesia', and 'perseveration of writing'. After 1800 writers like Broca focused attention on speech disorders, using the term 'motor asphasis'. Later in that century the terms 'word blindness' and 'word deafness' were used by Kussmaul and the term 'sensory asphasis' was used by Wernicke. (Bush & Waugh, 1976)

A review of the literature in education reveals that since 1950 a large number of terms have been developed to describe certain problems in learning. These terms describe certain specific difficulties or conditions, which are now generally accepted and used to describe individuals under the specific learning disability label. Some writers have listed as many as 50 terms, but Lerner, 1971, Bush & Waugh, 1976, have listed the following terms to be the most accepted terms used since the 1950's.

Acalculia: Inability or loss of ability to perform mathematical functions.

Agnosia: Inability to identify objects through use of a specific sense or modality (usually divided into categories, such as auditory agnosia, tactile agnosia, and so on).

Agraphia: Inability to write due to inability to relate word image (how a word looks) to the motor movements required to write the word.

Alexia: A severe reading disability including loss of ability to relate visual language symbols to the real objects, experiences, and so on to which they refer.

Asymbolia: Inability to understand and therefore inability to use symbols (most often refers to symbols in music, mathematics, and so on).

Dyslexia: Inability to read despite normal or near normal mental capability (sometimes subdivided into visual dyslexia and auditory dyslexia, or genetic, experiential, and affective dyslexia); may be partial or total.

Dysnomia: A condition in which an individual knows a word he wants to recall when said for him, but cannot recall it at will.

Idiolalia: "Invented language" caused by the transposition, substitution, distortion or omission of speech sounds.

Perceptual Problems: Inaccurate, abnormal interpretation of information received through the sensory channels; inaccurate mental association of new sensory information to memory of past experiences. Subcategories such as perceptual constancy, figure-ground perception, perception of spatial relationships, and others may be involved.

Perseveration: Repetitive response when such response is no longer appropriate, (such as repetition of a word over and over, or continuing a movement, not for emphasis or by choice, but involuntarily).

Strephosymbolia: Reversal of symbols in the reading or writing process. (Lerner, 1971)

In more recent years these terms have been associated with learning disabilities to describe motor and activity disfunctions. The terms hyperkinetic and hypokinetic are not comprehensive enough to describe the child with a learning disability. Rather they describe characteristics that merely accompany, or in some instances cause, a learning problem.

Hyperkinesia — An abnormally increased mobility, motor function, or activity.

Hypokinesia — Abnormally decreased mobility, motor function, or activity. (Bush & Waugh, 1976)

All of the above terms help identify the problem, but they fail to provide information needed for planning remediation procedures. Learning disabled children demonstrate specific characteristics and during the past decade these characteristics have been identified.

In their early attempts, educators described the characteristics of children with learning problems in vague terms such as "underachiever" or "learning block". The lack of defined characteristics and terminology left educators without a basis for communication until 1947 when Strauss and Lehtinen's book Psychopathology and Education of the Brain-Injured Child described the brain-injured child in terms of observable behaviors. (Fass, 1976) Today these characteristics are used to provide a focus

for remediation. Fass (1976) lists the following as the most frequently mentioned characteristics of the learning disabled child. Obviously, every learning disabled child does not manifest all of these characteristics, but rather a unique combination of these traits. They are as follows:

Ability Level:

> The child exhibits average, near average, or above average academic ability.

Activity Level:

> The child exhibits hyperactive or hypoactive behavior. Hyperactive meaning the child is constantly engaged in motor activity, restless, and skips from task to task. Hypoactive is the opposite of hyperactivity. The child fails to react or seems to do everything in slow motion.

Attention Problems:

> The child displays a short attention span and is distracted easily. He is unable to concentrate on any one task for very long and is easily distracted by irrelevant stimuli.
>
> The child may demonstrate perseveration, which means his attention becomes fixed upon a single task which he repeats over and over. It may be a motor activity or a verbal topic.

Motor Problems:

> The child displays poor coordination. He is generally clumsy or awkward in his control of fine motor or gross motor muscle coordination.
>
> The child displays poor tactile discrimination. He exhibits an excessive need to touch, or his writing and drawing performance is poor.

Visual Perceptual Problems: (The identification, organization, and interpretation of sensory data received by the individual through the eyes.)

Visual Discrimination - The child is unable to distinguish between visual stimuli.

Visual figure-ground - The child is unable to perceive a foreground figure against a background.

Visual closure - The child cannot fill in missing parts when only part of the word or object is seen.

Visual memory - The child has difficulty remembering and revisualizing images or sequences.

Auditory Perceptual Problems: (The ability to receive sounds accurately and to understand what they mean.)

Auditory discrimination - The child is unable to distinguish between sounds.

Auditory comprehension - The child fails to get meaning from the spoken word and/or environmental sounds.

Auditory figure-ground - The child is unable to attend to important auditory stimuli by pushing all other auditory stimuli into the background.

Auditory closure - The child cannot fill in missing sounds when only part of the word is heard.

Auditory memory - The child experiences difficulty remembering and reauditorizing auditory stimuli or sequences.

Language Problems:

The child displays delayed or slow development of speech articulation.

The child displays poor formulation and syntax. He is unable to organize words to form phrases, clauses, or sentences which follow standard English grammar.

Work Habits:

The child may organize his work poorly, work slowly, frequently confuse directions, or rush through work carelessly.

Social-Emotional Behavior Problems:

Impulsive - The child fails to stop to think about the consequences of his behavior.

Explosive - The child displays rage reaction or throws tantrums when he feels he is being treated unfairly.

Social Competence - The child is often below average in social maturity for age and ability.

The child adjusts more slowly than others to change.

The child's mood varies from hour to hour.

Orientation Problems:

Spatial organization - The child has a poorly developed concept of space, distorted body image, trouble in judging distance and size, and difficulty in discriminating figure from ground, parts from the whole, and left from right.

Temporal concepts - The child is disoriented in time. He experiences trouble relating to concepts like before and after, now and then, and today and tomorrow.

Academic Disabilities:

The child has a problem in one or more of the following areas: reading, arithmetic, writing, and spelling.

It would be simple if there were only one kind of specific learning disability. Then the task of identifying, determining the extent of the disability, and applying an effective remedial program would be simple. Unfortunately, this is not the case. There are diverse problems, variables, and remedial methods.

To help the classroom teacher be more aware of specific learning disabilities characteristics, the writer of this paper has developed a "Behavior Rating Scale for Classroom Use". This rating scale is to be used as a screening technique for early identification and prevention of learning problems. The rating scale lists deviations in behavior which will assist the teacher in recognizing developing problems. This checklist can be of help to the teacher in selecting the child who warrants further study. It is imperative that no assumption be made on the basis of the checklist alone. The checklist was adapted from the following sources which are simular in format: (Cheves, 1971; Mann & Suiter, 1973; Schleichkorn, 1972) See Figure 1

FIGURE 1

A BEHAVIORAL RATING SCALE FOR CLASSROOM USE

A Screening Technique for Early Identification and Prevention of Learning Problems

Name_____ Age_____ Grade_____
Teacher_____ Date_____

f the child exhibits a behavior below, please check in the appropriate pace. If he does not exhibit the behavior, leave it blank.

	Generally	Sometimes
Language - Speech		
1. Inability to use complete sentences		
2. Inability to express thoughts or ideas		
3. Inability to use parts of speech correctly		
4. Inability to monitor his own responses		
5. Inability to express ideas in proper sequence		
6. Inability to produce sounds in correct sequence in words (reversals of sounds)		
7. Delay in development of speech		
8. Delay in development of speech patterns		
9. Inability to make proper verbal associations with visual stimuli		
0. Inability to speak or respond orally within a reasonable amount of time		
1. Inability to blend sounds		
Visual Perceptual - Motor		
2. Has difficulty tying shoes, buttoning buttons, and working with zippers and snaps		
3. Has difficulty cutting with and handling scissors		
4. Has difficulty putting puzzles together		
5. Has difficulty building with blocks or other kinds of manipulative toys		
6. Has difficulty staying within lines when coloring		
7. Has difficulty holding a pencil and crayon		
8. Has difficulty writing or copying letters, numbers, designs or figures		
9. Has difficulty staying within lines when writing		
0. Has difficulty remembering the configuration of an object or written or printed symbol		
1. Has difficulty with manipulating clay and other art materials		

FIGURE 1 (cont.)

Arithmetic	Generally	Sometimes
5. Reverses numbers (Γ for 7)		
6. Reverses a sequence of numbers (36 for 63)		
7. Has difficulty with order of numbers (1,2,3....)		
8. Has difficulty with number patterns (10,20,30....)		
9. Has difficulty relating concrete objects to numeral representation		
10. Has difficulty recognizing and remembering numbers, signs, and symbols		
11. Has difficulty remembering combinations		
12. Has difficulty with temporal relationships (week, month, year)		
13. Has difficulty with concepts of space, distance, and size		
14. Has difficulty solving story problems		
15. Exhibits frustration by tearing up papers or refusing to attempt problems		
16. Counts by using fingers		
17. Vocalizes as problems are attempted		
18. Needs concrete materials to manipulate or he cannot work a problem		
TOTAL		

umber of "Generally" scores _____ x 2 = _____

umber of "Sometimes" scores _____ x 1 = _____

Total = _____

otal Score of 25 - Child should be referred for diagnosis for possible learning disabled.

After surveying the printed material on definitions, terminology, and characteristics of specific learning disabilities, this writer concludes that children with specific learning disabilities constitute a heterogeneous group of children who do not fit into the traditional categories of exceptional children, but who have significant individual differences in growth. There is not a concise definition of the problem. The concept of learning disabilities has been difficult to define, but in general it refers to children who are of normal intelligence but who exhibit disorders in spoken and written language, perception, listening, thinking, reading, writing, spelling, or arithmetic skills. This writer agrees with the learning disability authorities who approach the concept of specific learning disabilities as being a disorder that constitutes a significant discrepancy between the child's potential and his actual achievement.

The writer of this paper concludes that the terminology used to describe the LD child does not prescribe the remediation for the learning problem, but rather it describes the learning problem. Only from the description of behavioral characteristics and the analysis of the behavioral manifestation of the disability can an evolving diagnostic hypothesis exist. The LD label cannot alone prescribe the basis for LD remediation. Pinning the LD label on an exceptional learner does provide a meaningful communication and interaction with physicians, neurologists, pediatri-

cians, psychologists, social workers, and other professionals that contribute to the welfare and understanding of the LD learner. The child who is labeled LD is a child who manifests certain mental and sensory-based problems. There are specific procedures, techniques, and educational materials that have been developed and used that apply specifically to the remediation of the LD group. The writer of this paper would like to free all exceptional learners from the negative effects of labels, but in the process the writer is aware that it could create a problem that might limit our overall effectiveness to help educate exceptional learners.

TESTING FUNCTIONS

AND

TEST REVIEWS

After a thorough research of the literature on the subject of psychological assessment, the researcher concludes that there are four basic purposes in the testing procedure: assessment, diagnosis, prediction and trait evaluation. (Tarczan, 1972) In order for the reader to fully understand the tests described in this chapter, it is necessary to explain the purposes for testing.

Each of the four purposes for testing measures a different function. Assessment function measures the level of achievement at a specific time. There are two types of assessment tests: the teacher-prepared test and the standardized achievement test. A teacher-prepared test purports to assess a specific concept that has been taught over a certain period of time. For example, a teacher-prepared examination would assess all the arithmetical concepts and computational skills that have been taught over a certain period of time. Standardized achievement tests cover broader areas and compare the academic performance of a student with that of other students. The results from a standardized achievement test compared to the performance of other students taking the same test should provide the teacher with the means to predict performance rates for success in that given area. Achievement test emphasize a broad scope assessment of knowledge after a short testing period. The difficulty of the items range from simple to complex within the various age levels.

The second function, that of diagnostic testing, attempts to

assess a discrepancy within a specific learning pattern. The tests are designed to measure specific strengths and weakness of the processes involved in the mastery of specific concepts and skills. An example of this would be the comparison of individual subtest scores on a visual perception test which assesses these characteristics in the individual. This diagnostic process attempts to assess the "why" in the child's discrepancy of performance as compared to the achievement and success level of prior norm populations. It is suggested that a complete diagnostic picture be collected such as: performance of students of different ages from varying socioeconomic background and ability levels, in an effort to establish expectancy performance levels based on average normed scores for said students.

The final function of testing is that of assessing psychological traits. These tests measure traits of human behavior. For example, one type of trait testing would deal with the assessment of anxiety reaction in a given situation of an individual to predict what the individual's behavior might be in a related setting.

It is important to emphasize the need for reliability and validity of tests when interpreting test results. Through consistency in administration and interpretation of tests and test data the assessment of need areas for exceptional children can be identified. Diagnostic reports must include such informa-

tion as genetic factors, family life, school records, personality traits, and intellectual ability. No one test can diagnose underlying human traits and mental functioning. The most that a diagnostic test can identify are the symptoms for deviancy, not causality. The diagnosis can indicate the child's strengths and weaknesses in a specific area of learning. (Tarczan, 1972)

This researcher concludes that the purpose of testing and diagnosis is that through this process an exceptional child's educational needs can be identified and met. Diagnostic information is necessary before a prescriptive curriculum can be written for implementation in needed remedial areas for the child. It is important for the educator who uses testing devices, that these tests have defined uses and limits, and that tests are part and not the complete entity in the diagnostic process. The value of a test lies in its ability to determine, in valid and reliable terms, that which it purports to assess.

The writer of this paper researched and reviewed tests that are used for the purpose of determining individual differences, of which there are two basic types: interindividual differences and intraindividual differences. Interindividual differences are those which exist between the member of an age group or grade level. Intraindividual differences are those differences that are observed in the performance of several tasks by a single individual. (Fass, 1976)

The two main types of tests (Fass, 1976) are classification tests and diagnostic tests. Classification tests are tests of interindividual differences. They yield a total score for the purpose of making an educational placement. These scores are usually expressed in normative terms such as mental age, IQ, or grade level. Diagnostic tests are tests of intraindividual differences; they are used to assess performance in specific ability or skill areas. The examiner can identify specific disabilities through subtest scores. It allows the examiner to compare a student's performance in the visual and auditory channels of communications. Many diagnostic tests can also be employed as classification tests.

The items in tests of ability are usually organized into either an age scale or content scale. Tests using an age scale arrange the items into age levels according to their difficulty without regard to their content. Tests arranged into content scales contain a number of subtests which deals with the assessment of a single type of content or ability. The items in each of these subtests are arranged into a hierarchy according to their difficulty.

Based upon research information concerning diagnostic test functions and validity the writer of this paper has chosen the following tests to be used as diagnostic tools in determining specific learning disabilities.

The Kindergarten Auditory Screening Test

The Slingerland Pre-Reading Screening Procedures

The Slingerland Screening Tests

The KeyMath Diagnostic Arithmetic Test

The Woodcock Reading Mastery Test

The Detroit Test of Learning Aptitude

These diagnostic tests assess performance in specific ability or skill areas. Through the subtest score the writer of this paper can identify specific disabilities based upon test results.

The Kindergarten Auditory Screening Test, The Slingerland Tests, and The Detroit Test of Learning Aptitude determine learning style. These screening instruments have visual and auditory channel subtests that provide a complete pattern of styles of learning.

The Woodcock and the KeyMath are survey tests that measure reading and mathematical skills. They indicate the general level of the individual's achievement in reading and arithmetic. Each test provides subtest grade level scores and a single composite grade level score.

The writer of this paper concludes that these diagnostic tests meet the criterion for diagnostic testing. They are designed to analyze the individual's performance and provide information on the symptoms of deviancy. The tests can determine specific areas of strengths and weaknesses of the child's learning

style.

Of equal importance is the examiner using these diagnostic tools. The examiner must be able to identify the different components related to the learning process and be able to readily identify the malfunctioning components of learning based upon the results for these diagnostic instruments.

These tests were used to evaluate a group of 20 children. Ten children were members of a control group who were students without a learning disability profile. The other ten children were children tested and diagnosed by Special School District of St. Louis County as being learning disabled. They were the members of the experimental group who received remediation from the writer of this paper based upon the test results. Each of these tests are reviewed and discussed in detail in the following pages. Pre- and post-test results of the testing are graphed and analyzed in a later section.

THE KINDERGARTEN AUDITORY SCREENING TEST: Jack Katz, 1971

The first test reviewed is The Kindergarten Auditory Screening Test by Jack Katz, 1971, which was developed to assess auditory perceptual skills of kindergarten and first grade children. Katz, 1971, concludes that early detection of inadequate auditory skills is invaluable for prevention of scholastic difficulties. His test identifies high risk children who exhibit inadequate auditory skills and would benefit from early assessment, remedial training and developmental work. Auditory skills are necessary in the area of reading when reading is taught by a phonetic or the Initial Teaching Alphabet (ITA) technique.

The Kindergarten Auditory Screening Test has some important features. The features are as follows:

1. The test is recorded, thus many pitfalls of teacher-administered tests are avoided.
2. It can be administered to small groups or to one individual.
3. It is intended for use with children before they are given reading instruction.
4. It evaluates several auditory skills.
5. It does not require the children to read. They mark their answers in picture response books.

6. The vocabulary is simple.

7. It does not require a special teacher or special training to administer the test. (Katz, 1971)

What are the all-important auditory skills? The author categorizes and describes the auditory perceptual skills as the following:

1. Awareness - Was there sound?

2. Focus - Where was it?

3. Figure-Ground - Was there more than one sound?

4. Discrimination - Were the sounds the same?

5. Sequencing and Synthesizing - What was the sequence of the sounds? What was the length of time between sounds?

6. Scanning - Have I heard the sound before? Where have I heard it?

7. Classification, integration, monitoring - What do the sounds and words mean?

8. Auditory memory (either short-or long-term), is involved in using many of the other auditory skills. (Katz, 1971)

The Kindergarten Auditory Screening Test is divided into three subtests, each focusing on an auditory skill that is needed for scholastic success. The three subtests are:

1. The Speech in Environmental Noise. This subtest will identify the child who is apt to become frustrated and confused in an unfavorable acoustic environment such as a noisy and distracting classroom. There are many children whose performances deteriorate in the presence of background noise. In this subtest the children are to circle three items on each of four pages. The narrator of the recording tells the children to circle the picture of the word he says. There is no background noise for the practice item. As the test words are spoken, background noise becomes louder. Four progressively more difficult speech-to-noise ratios are used for the 12 test items. The words for the test are familiar, phonetically dissimilar, and easy to illustrate. The words and the speech-to-noise ratio were selected on the basis of the results of earlier tests developed by the author to determined test items.

2. Phonemic Synthesis Subtest. This subtest provides information about the child's auditory memory and discrimination skills as well as his sound blending ability. To overcome the difficulty of testing young children who cannot read or write, the test has provided a multiple choice picture test. The children are asked to mark the picture of the word the narrator pronounces. Seven test items are presented. The words for this test are familiar and easily illustrated. Initial consonants, medial vowels, or final sounds are changed to make three other familiar words. The words

the child is asked to synthesize are distorted: The phonemes are elongated, there are pauses between phonemes, and the transient sounds that join one sound to the next in typical speech are absent.

3. Same/Different Subtest. This subtest can pick up a discrimination problem, some memory disorders, and other auditory perceptual abnormalities. This subtest measures the child's ability to discriminate whether words or nonsense words in pairs are the same or different. From the ten word pair test items presented on the tape the child must decide whether two spoken words are the same, but must make this evaluation despite the differences in the voices of the two speakers. One voice is that of a boy and the other a man. The subtest evaluates the child's ability to discriminate sounds in the initial, medial and final positions. Some words are grossly different and others are nonsense word pairs. (Katz, 1976)

If the child fails even one of the three subtests, he is considered to have failed the auditory perception screening test. Follow-up studies have shown that a child who has an auditory perceptual problem in only one of the three areas tested will benefit from auditory training. If the child had extreme difficulty in two or all three of the subtest areas, the prognosis for rapid improvement is not good because so much of the auditory system has been diagnosed as functioning improperly.

INTRODUCTION TO THE PRE-READING SCREENING PROCEDURES &
SLINGERLAND SCREENING TESTS FORM A,B,C,D

The Slingerland Screening Tests, by Beth H. Slingerland, 1970, are designed to provide early identification of learning difficulties and to help teachers determine to which channels the learning difficulties may be principally attributed. (Deno, 1972) The Slingerland attempts to assess modalities of communications.

Beth Slingerland developed two screening devices which can be administered to one student or to a group of students. The Pre-Reading Screening Procedures is to be used with end of the year kindergarten and with first-grade children. The Slingerland Screening Tests Forms A, B, C, and D are to be used at the end of the first-grade to the sixth grade.

The Slingerland tests presume that failure to achieve adequate progress in acquisition of basic school skills may be the result of learning difficulties characterized by poor use of language including poor writing and poor spelling and inadequate performance in certain kinds of perceptual, motor, and visual-motor patterning activities. The Slingerland tests purport to sample these realms of functioning. (Deno, 1972)

One criticism of the Slingerland Tests is the questionable reliability and validity. The absence of data on their reliability and validity has been considered a major flaw of these tests. (Colleen, 1972) The original aim of the tests was to aid local

districts to rank, score, and devise a table of norms and standardization for the local school population. More recent research, however, has lent support to the validity of the tests. Snyder, Brown, and Gates (1972) investigated the concurrent validity of the Slingerland Tests Forms A, B, and C in differentiating children with specific learning disabilities. They compared a group of learning disabled subjects selected by classroom teachers with a matched control group of children who were not experiencing any learning difficulties. They found that in all three forms of the Slingerland Tests the experimental group made a significantly greater number of errors on all subtests except Form C, subtests 1, and 2, where no significant differences were found. (Johnson, 1968)

A study by Oliphant (1969) compared the scores of first graders on the Slingerland Tests with their scores on the Stanford Achievement Test (SAT). She reported correlation coefficients for SAT scores with total Slingerland scores ranging from .57 to .-65. Oliphant concludes that the Slingerland Screening Tests are useful predictive instruments. These studies by Snyder, Brown, Gates, and Oliphant seem to adequately support the validity of the Slingerland Tests. (Johnson, 1968)

Another deficiency of the Slingerland Tests is the lack of standardized norms. The author, Beth Slingerland, defends the omission of standardized norms by pointing out the advantages of

local standardization. Most test consumers do not have the resources to determine local standards and the Slingerland manual has not included any final results. In 1974 a study on standardization was done with 2272 students enrolled in grades K through six of Public School District #1 in Englewood, Colorado.

From the table of norms in the standardization process the results were presented in percentile rank figures. Percentile rank is understandable to classroom teachers and is readily interpreted. The study indicated that further validity, reliability, and normative studies need to be done on other populations. (Johnson, 1968)

THE PRE-READING SCREENING PROCEDURES: Beth Slingerland, 1970

The Pre-Reading Screening Procedures are used when the child appears ready for conventional methods of instruction, but shows indications of a specific language disability requiring immediate preventative instruction. The test can measure potential language and perceptual difficulties, and identify those children not ready for reading and needing more time for mental chronological maturational or language development. It is also an indicator if additional individual testing or referral for medical advice is necessary. (Fass, 1976)

The Pre-Reading Procedures was developed for and is to be used with end of kindergarten and first grade children. The Procedures are based upon the premise that early screening can identify SID (specific language disabilities) children before they begin to read and before they begin to fail.

Beth Slingerland recommends that the Procedures should be utilized to identify specific weakness and strengths in children's perception and recall of symbols as they are finishing kindergarten or beginning first grade. She suggests that screening should occur before the children are introduced to reading. It is recommended that the Pre-Reading Tests be used in conjunction with the standardized tests of readiness and mental ability levels such as the Metropolitan Readiness Tests and the Pintner-Cunningham

Primary Tests. (Fass, 1976)

The Pre-Reading Procedures consist of seven perceptual-motor tests, two auditory tests, plus two optional, individually administered auditory tests. These optional tests may be used when the results of the first seven tests are inconclusive.

Test I. Visual: Discrimination of Letter Forms. (Visual-Visual with motor response). The skills evaluated with Test I are:

1. Visual Perception, without recall
2. Position in space

Test II. Visual: Discrimination of Letter Forms. (Visual-Visual with motor response). The skills evaluated with Test II are:

1. Visual perception without recall
2. Ability to perceive details within words
3. Ability to look at words in a left to right manner

Test III. Visual: Visual Perception Memory (Visual with motor response). The skills evaluated by Test III are:

1. Visual perception
2. Visual memory

Test IV. Visual-Motor: Copying (Visual-kinesthetic with motor response). The skills evaluated by Test IV are:

1. Visual perception
2. Ability to reproduce symbols and forms
3. Motor-kinesthetic ability

Test V. Visual-Motor: Visual Perception Memory (Visual-Kinesthetic with motor response). The skills evaluated under Test V are:

1. Ability to write numbers 1 to 10
2. Visual perception
3. Visual memory
4. Motor-kinesthetic ability

Test VI. Auditory: Discrimination (Auditory-Attentiveness with motor response). The skills evaluated by Test VI are:

1. Auditory discrimination
2. Ability to follow auditory directions

Test VII. Letter Knowledge: Alphabet (Auditory-Visual with motor response). The skills evaluated with Test VII are:

1. Ability to remember the name of a letter
2. Ability to associate the names of letters with the letters when they appear in confused order. (Fass, 1976)

The quality of the child's performance is regarded as being of as much importance as the number of errors. As a result, the Procedures constitute a structured observational instrument rather than a test in the usual sense. There are no norms for the test. They have been replaced with instructions regarding observational factors related to the number of self-corrected items and the type

of item missed.

A Teacher Observation Sheet is provided with each test booklet to aid in the evaluation of each student's performance. Among the types of errors the evaluator is advised to examine are the following:

Reversals=writing letters backwards

Reversed order=writing "saw" for "was"

Inversion=writing letters upside down

Rotation=angular displacement of letters, numbers, words, or geometric forms

Distortions=to distort shape or size of original form

THE SLINGERLAND SCREENING TESTS FROM A,B,C, and D
Beth Slingerland, 1964 Revised 1970

The second set of tests developed by Beth Slingerland are The Slingerland Screening Tests Forms A, B, C, and D to be used with children at the end of first grade and through the sixth grade. Form A-end of first and beginning second; Form B-end of second and beginning third; Form C-end of third and fourth grade; Form D-with fifth and sixth graders.

Slingerland recommends that her tests be utilized in the following ways:

1. To identify children within a grade or group, who manifest specific perceptual-motor behavior that is indicative of the child's problems. Interference with adequate development in reading, writing, and spelling, can hinder in other academic achievement unless preventive or remedial measures are undertaken.
2. To identify probable perceptual-motor difficulty, visual, auditory, or kinesthetic deficiencies that are the underlying cause of dysfunction with written language.
3. To identify children who have average achievement for their age-grade placement despite

Test I. Visual to Motor (far-point copying from a wall chart). The skills evaluated by the test are:

1. Far-point visual perception
2. Visual perception in association with the motor response of writing
3. Discrimination of shape and sequence of symbols
4. Eye-hand coordination
5. Spatial orientation and organization

Test II. Visual to Motor (near-point copying from the printed page). The skills evaluated by this test are:

1. Near-point visual perception
2. Visual perception in association with the motor response of writing
3. Discrimination of shape and sequence of symbols
4. Eye-hand coordination
5. Spatial orientation and organization

Test III. Visual Perception: Memory (V-P-M) of words, letters, and numbers without motor response. The skills evaluated by this test are:

1. Visual memory
2. Visual discrimination
3. Visual matching ability

Test IV. Visual-Discrimination (visual matching without memory or motor response). The skills evaluated with this test are:

1. Discrimination of symbols and sequence within a word
2. Ability to perceive similarities and differences

Test V. Visual-Perceptual-Memory-Kinesthetic. The skills evaluated by this test are:

1. Visual memory
2. Kinesthetic memory
3. Quality of letter and number forms
4. Perception of space and direction

Test VI. Auditory Recall (perception and memory linked with kinesthetic-motor production). The skills evaluated by this test are:

1. Visual-kinesthetic memory (revisualization)
2. Auditory perception - memory
3. Spelling errors
4. Spatial and directional confusion

Test VII. Auditory Discrimination (selecting and writing initial, medial, or ending sounds in dictated words). The skills evaluated by this test are:

1. Auditory perception and discrimination
2. Auditory sequencing and memory
3. Visual-kinesthetic memory (revisualization)

Test VIII. Auditory Association (auditory-visual linkage without the kinesthetic-motor requirement of writing). The skills evaluated by this test are:

1. Auditory perception-memory
2. Visual perception and discrimination
3. Visual memory-revisualization

The test booklet contains provisions for recording data in the form of a "Quick Analysis" and a "Detailed Analysis". The scoring procedure provides an indication of the types and numbers of error and self-corrections the child has made. This test is used to determine the extent to which children have developed a set of skills. Therefore, norms are not included in the test manual. (Fass, 1976)

The following six items are scored in the "Quick Analysis".

1. Number Wrong
2. Self-Corrections
3. Poor Letter, Number, and Geometric Forms
4. Spatial Organization
5. Circle Formation
6. Kinesthetic-motor Performance

The eighteen items included in the "Detailed Analysis" are grouped into five categories. The list of type of error for each category is also given.

Category 1: (Copying-Chart Test I, and Copying-Page Test II)

1. Recall
2. Substitution
3. Insertion

Category 2: Confusion of Direction

1. Reversals
2. Inversions
3. Transpositions
4. Number Reversals

Category 3: Formation Problems

1. Letter Formations
2. Number Formations
3. Geometric Forms
4. Mixed Cursive and Manuscript
5. Mixed Capitals and Lower Case

Category 4: Closure Problems

1. Omissions
2. Incompletions
3. Spelling Errors

Category 5: Spatial-Motor

1. Spatial Organization
2. Circle Formation
3. Kinesthetic-motor Performance (Slingerland, 1970)

Each grade level of the Slingerland is designed to show the relative strengths or weaknesses that may exist in visual, auditory and kinesthetic functioning. The aforementioned tests differ from each other only in vocabulary difficulty; they are the same for all grades in the essential perceptual-motor tasks. Therefore, they may be used for comparative purposes to measure gains after remediation.

The tests reveal deficits that may exist in one or more of the vital areas upon which written language, receptive, and expressive, depends since they afford an opportunity to examine sensory-motor functions in the process of association and interaction of perception discrimination, integration, memory and performance.

The tests are designed for easy administration to groups. Each child's performance is evaluated separately and considered in the light of overall performance of the peer group and of the normal age-grade performance in the general school population. Finally, it is related to the individual's general ability, achievement, and history.

The Slingerland can be used to test children individually. Basic to this type of evaluation is the knowledge of what each subtest is designed to test in the sensory-motor functioning modalities. The subtest can expose a disability in the visual, auditory, or kinesthetic modality, as related to the functioning level and achievement level of the individual.

THE KEYMATH DIAGNOSTIC ARITHMETIC TEST
Austin Connolly, William Nachtman, and
E. Milo Pritchett, 1971

The KeyMath Diagnostic Arithmetic Test (1971), by Austin Connolly, William Nachtman, and E. Milo Pritchett is an individually administered test designed to provide a diagnostic assessment of skill in mathematics. There is much in the literature on Learning Disabilities that focuses on perceptual development, language development, and reading, but relatively little available on arithmetic disabilities and their diagnosis. Educators agree (Gronlund, 1971; Johnson & Myklebust, 1967; Jones, 1973; Lerner, 1971; Reisman, 1972) that diagnosis and evaluation should be available to students and should be used in planning an educational program for each child. Included in the diagnosis should be both assessment of how the child learns (learning modalities, learning styles) and how much he has achieved in each of the academic areas. Evaluation should be continual so that program plans may be changed as necessary toward achieving whatever educational goals have been set. (Tinney, 1975)

The KeyMath is designed to provide diagnostic information that can be used in an individual's educational plan. The KeyMath is designed to provide four levels of diagnostic information. Each succeeding level provides more specific information about the subject's performance. By identifying the individual's strengths

and weaknesses, a foundation is laid for tailoring an appropriate instructional program. The four levels of diagnostic information provided by the KeyMath are:

> LEVEL 1 - Total Test Performance. General placement information is provided through a grade equivalent score based on the subject's total test performance.
>
> LEVEL 2 - Area Performance. A general pattern is identified according to the subject's performance in the three mathematics areas of Content, Operations, and Applications.
>
> LEVEL 3 - Subtest Performance. A profile depicts the subject's relative performance in 14 subtests. The subject's strengths and weaknesses across these subtests can be observed.
>
> LEVEL 4 - Item Performance. Attention is focused on the subject's performance on each item. A description of the skill sampled by each item is included in the manual. This focus on the content of individual items provides the examiner with a criterion-referenced scale.
>
> (Fass, 1976)

The KeyMath is primarily used in preschool through grade six, but there is no upper limit for individual clinical and remedial

use. All materials are incorporated into the Easel-Kit: the manual, the test items, and the Diagnostic Record. The KeyMath test items are divided into 14 subtests organized into three major areas - Content, Operations, and Applications:

CONTENT: Numeration, Fractions, Geometry and Symbols

OPERATIONS: Addition, Subtraction, Multiplication, Division, Mental Computation, Numerical Reasoning

APPLICATIONS: Word Problems, Missing Elements, Money Measurement, Time (Fass, 1976)

The goal of the KeyMath Test is to measure the subject's performance on items within his critical range. This range will extend from a basal level, established by three consecutive correct responses, to a ceiling level, marked by three consecutive errors. The same procedure for establishing basal and ceiling levels is used with all subtests. Next the examiner calculates the subjects raw score for each subtest. Raw score is calculated by counting all correct responses including those items prior to the basal level established and not actually administered. The sum is recorded in a box provided for each subtest on the diagnostic profile. The raw scores are then converted to a grade equivalent (G.E.) score which is given at the bottom of the diagnostic profile sheet. To find the sum of subtest raw scores all subtest

raw scores are added and then converted to a G.E. score that is given at the bottom of the diagnostic profile sheet. The G.E. score determines the functioning level of a student compared to the grade in which he is enrolled. Because of its special design, the diagnostic profile sheet is able to show the subject's performance at the area level, subtest level and item level along with grade equivalent subtest scores and total test grade equivalent score. (Connolly, Nachtman, Pritchett, 1971)

When an examiner is formulating recommendations from the KeyMath it is important that he/she evaluates information and data contained in the diagnostic profile with the following questions taken into consideration:

1. Does the grade level in which the subject is currently enrolled fall near the subject's total test performance?
2. Are any trends evident in the subject's relative performance in the three areas of Content, Operations, and Application?
3. On which of the subtests did the subject's performance appear weak and on which subtests did the subject's performance appear normal or strong?

4. What readiness skills were necessary to perform each subtest and has the subject been exposed to the skill?
5. What other factors might have influenced the subject's performance? (background, academic achievement) (Connolly, Nachtman, Pritchett, 1971)

For instructional purposes the KeyMath test manual provides a description and key to the content of each test item. It also organizes the items by their relative proximity of content. This provides a key to the content that items have in common. Because the KeyMath (1971) is a relatively new instrument it is still involved in research.

In 1975 an investigative study comparing the KeyMath and the California Arithmetic Test (CAT) found that the KeyMath offered an advantage over the CAT by providing individual diagnostic information as well as achievement data. (Tinney, 1975)

In the KeyMath test manual an account of the tests validity and reliability are provided. After reviewing this information this writer concluded that this test instrument accomplishes the purpose for which the test was intended. According to the research presented in the test manual the test is reliable.

THE WOODCOCK READING MASTERY TEST: Richard W. Woodcock, 1973

The Woodcock Reading Mastery Test (1973) by Richard W. Woodcock is a battery of five individually administered reading subtests for use from kindergarten to grade twelve. The five subtests are Letter Identification, Word Identification, Word Attack, Word Comprehension, and Passage Comprehension. In addition, an index of Total Reading is obtained by combining performance on the five separate tests. (Woodcock, 1973)

Two alternate forms of the battery are available. All five tests of either form may be administered in twenty to thirty minutes. Complete test materials for each form are self-contained in an Easel-Kit.

This battery of tests is useful for clinical or research purposes and in any other situation for which precise measures of reading achievement are desired. Raw scores can be converted to traditional normative scores including grade scores, age scores, percentile ranks and standard scores. For interpretive emphasis; however, the Woodcock is especially designed to yield a Mastery Scale which predicts the individual's relative success with reading tasks at different levels of difficulty.

Mastery Scores indicate the percent of success a student will have in each subtest at grade placement. Grade scores indicate that the performance of the student was comparable to that of the

average performance of pupils at the grade level indicated by the grade score. There are three grade scores for interpreting the student's performance. One of these grade scores is identified as the "Easy Reading Level" (E), at a 96% success level; "Reading Grade Score" (R), at a 90% success level; and the other is "Failure Reading Level" (F) at 75% success. By establishing these scores the instructional range is obtained at "Reading Grade Level." (Woodcock, 1973)

The development of the Woodcock Reading Test was designed with the objective of compiling a battery of reading tests with the following three characteristics:

1. The tests should measure skill in each test area with greater precision than that available from other tests.
2. Administration of tests should be as simple as possible to learn; procedures should be as simple as possible to administer.
3. New ways of interpreting test scores should be incorporated, allowing more useful interpretations of the subject's status.

The development of these three characteristics followed through these major stages: establishing test specification, preparing the item pool, analyzing items, norming, and constructing the final test. (Woodcock, 1973)

Two forms of the Woodcock, "Form A" and "Form B", were developed and designed to be used interchangeably. They are of significant value when retesting a subject within a short period of time. In case retesting is needed the alternate form of the test is recommended since some of the tests may show a practice effect.

Each of the five tests and the area of reading skill measured is described below:

Letter Identification: The Letter Identification test contains 45 items which measure a subject's ability to name letters of the English alphabet. The test items include a variety of common and uncommon styles of type.

Word Identification: The Word Identification Test consists of a set of 150 words ranging in difficulty from words presented in a beginning reading program to words that are above average difficulty for superior students in the twelfth grade.

Word Attack: The Word Attack Test contains 50 items which measure the subject's ability to identify nonsense words through the application of phonic and structural analysis skills. Items are arranged in order of difficulty.

Word Comprehension: The Word Comprehension Test contains 70 items designed to measure the subject's knowledge of word meanings. An analogy format, each analogy consisting of a double pair of words, was chosen for this test.

Passage Comprehension: Passage Comprehension contains 85 items in which a word is missing in a passage. The subject is to read the passage silently and fill in an appropriate word for the blank space, using context and/or pictorial cues. (Fass, 1976)

In a wide-range test such as the Woodcock, the range of difficulty from the simple items to the harder items in each test, far exceeds the "operating range" of any single subject. The operating range is the set of items below which the subject has essentially a 100 percent chance of getting all items correct (basal level) and above which a zero percent chance of getting any items correct (ceiling level).

In these tests a basal level is established by five consecutive correct responses to a ceiling level marked by five consecutive errors. Frequently, subjects may not demonstrate a basal level of performance at the lower end of the test or a ceiling level performance at the upper end of the test. Once the basal and ceiling levels have been established and correct responses are

counted a raw score is obtained. The raw scores are then recorded on the response form. The back sheet of the response form (Figure 2) is used to interpret test results. The top half of the page is a "Summary of Scores", which is the information necessary for interpreting test scores. The lower half of the page provides a "Mastery Profile" which graphically summarizes the observed and predicted performance of the subject. (Woodcock, 1973)

To help complete the interpretation of this section a special appendix in the test manual has been provided to interpret the subjects following scores:

Raw Score: Raw score indicates the number of items with the correct response on the test.

Mastery Score: The Mastery score is a mathematical derivation developed for the Woodcock based on the assumption that all test items are measuring the same underlying ability or trait.

Grade Scores: The grade score is a normed-referenced scale.

Relative Mastery: Relative mastery score is the predicted performance of a subject on tasks accomplished with 90 percent mastery by average students of the referenced grade level.

FIGURE 2

WOODCOCK "SUMMARY OF SCORES" PROFILE SHEET

INTERPRETATION OF TEST RESULTS / FORM B

SUMMARY OF SCORES

Subject's Grade Placement (G) 7.8

TEST	Raw Score	(MS) Mastery Score TABLE I	(E) Easy Reading Level TABLE I	Relative Mastery at E	(R) Reading Grade Score TABLE I	Relative Mastery at R	(F) Failure Reading Level TABLE I	Relative Mastery at F	(MS_G) Mastery Score at G TABLE II	(MS)–(MS_G) Achievement Index (Indicates + or –)	Relative Mastery at G TABLE III	Percentile Ranks TABLE III
Letter Identification	(45) 45	184	12.9+	96%	12.9+	90%	12.9+	75%	173	+11	97%	80
Word Identification	(150) 102	172	3.4	96%	3.9	90%	4.7	75%	205	-33	19%	6
Word Attack	(50) 18	93	2.0	96%	2.7	90%	3.7	75%	121	-28	29%	8
Word Comprehension	(70) 28	84	2.8	96%	3.7	90%	5.3	75%	103	-19	53%	16
Passage Comprehension	(85) 50	108	4.2	96%	5.5	90%	7.4	75%	120	-12	71%	26
	(Total) 641											
TOTAL READING	(Total ÷ 5)	128	3.4	96%	4.3	90%	5.6	75%	145	-17	58%	9

SPECIAL INSTRUCTIONS

1 Assume a mastery score of 173 for pupils reading at grade six or above who were not administered the Letter Identification Test.

2 Total reading score is based on the average mastery score for the five tests.

3 Double-check all arithmetic calculations.

4 Complete the Mastery Profile as follows:

a) place dots within each bar to represent points E, R, and F

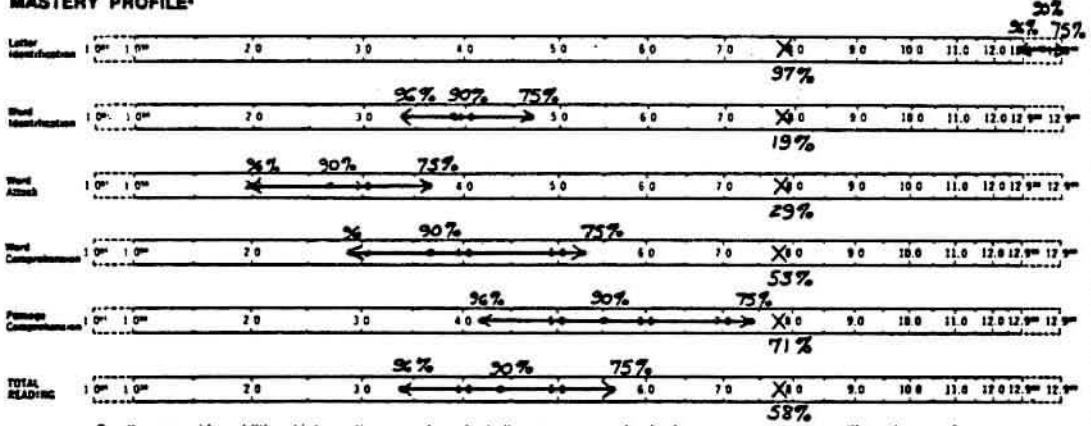
b) draw a double-ended arrow (⟷) between each pair of E and F points to represent the instructional range

c) record, above the bar, the percent of mastery for each E, R, and F point

d) using a different color, place an "X" within each bar to represent point G

e) record, below each bar, the percent of mastery at G.

MASTERY PROFILE



See the manual for additional interpretive procedures including age scores, standard scores, separate percentile rank norms for boys and girls, SES-adjusted norms, and use of the Reference Scales in criterion-referenced interpretations.

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Achievement Index: Achievement index provides a comparison of achievement with some referent such as grade placement, chronological age, or mental age.

Relative Mastery at G: Relative mastery at G indicates the predicted mastery when the subject is given tasks similar to those that the average pupil at the subject's grade level could perform with 90 percent mastery.

Percentile Ranks: A subject's percentile rank indicates the percent of cases scoring lower at that particular grade level. (Woodcock, 1973)

The Woodcock is designed to measure precise reading achievement. It is independent of any published reading program and is therefore ideally suited for independent use. It is useful not only in the general school situation, but also as a diagnostic tool to determine instructional needs by analyzing the subject's performance on the test through the standardized summary scores which are interpreted in the test manual.

The test is useful because of the concept of "instructional range". Instructional range refers to the grade level range in which a subject can function; easy at 96% success, grade level at 90% success, and failure level at 75% of success. It is well-suited for individual pupil evaluation and for interpreting the subject's performance. It provides information as to prior

learning experiences, the success of a reading program, and the subject's ability to use phonics, structional analysis, word knowledge, comprehension, identify English letters, and identify words.

The reliability and validity are discussed in detail in the Woodcock manual. Extensive research is presented and it is the opinion of this writer that the test is a valuable diagnostic tool.

THE DETROIT TEST OF LEARNING APTITUDE: Harry J. Baker and Bernice Leland, 1935, Revised in 1967

The Detroit Test of Learning Aptitude (DTLA), by Harry J. Baker and Bernice Leland, is a comprehensive individual psychological examination and a practical diagnostic instrument. The earlier edition of the DTLA was published in 1935 and was revised in 1967. The DTLA is comprised of nineteen subtests, each having a scaled score, and from these a variety of subtests may be selected for specific cases. The subjects that may be tested include the blind and visually handicapped, the deaf and the acoustically handicapped, the orthopedically handicapped, the cerebral palsied, the speech handicapped, the neurologically handicapped and the brain injured, and the emotionally disturbed and socially maladjusted. The test battery may also measure the special disabilities of both normal and mentally retarded people and the outstanding talents of the mentally gifted. (Waugh and Bush, 1971) Waugh and Bush identify eight mental faculties in their 19 subtests. (see Figure 3)

The 19 subtests of the DTLA provide a wide range and rich variety of psychological information. The DTLA was originally designed for use by psychologists who were looking for practical ways to evaluate children's learning problems. In recent years the tests have been found useful by learning disability specialists

FIGURE 3

SUBTESTS, MENTAL FACULTIES, AND SUBTEST NUMBERS OF THE DETROIT TEST OF LEARNING APTITUDE

Subtests

1. Pictorial Absurdities
2. Verbal Absurdities
3. Pictorial Opposites
4. Verbal Opposites
5. Motor Speed
6. Auditory Attention Span for Unrelated Words
7. Oral Commissions
8. Social Adjustment A
9. Visual Attention Span for Objects
10. Orientation
11. Free Association
12. Designs
13. Auditory Attention Span for Related Syllables
14. Number Ability
15. Social Adjustment B
16. Visual Attention Span for Letters
17. Disarranged Pictures
18. Oral Directions
19. Likenesses and Differences

Mental Faculties	Subtest Numbers
(a) Reasoning and comprehension	1,2,8,10,15,17
(b) Practical judgement	5,7,10,18
(c) Verbal ability	2,4,11,19
(d) Time and space relationships	10,12,17
(e) Number ability	7,14
(f) Auditory attentive ability	6,7,13,18
(g) Visual attentive ability	1,3,9,12,16, 17,18
(h) Motor Ability	5,7,12,18

who are working with pre-adolescent and adolescent students. The test is also utilized in the gathering of data which might enable the examiner of a younger child to confirm or refute the presence of specific learning problems that might have been suspected after the use of other diagnostic instruments or procedures. (Fass, 1976)

M. N. Meeker, in her 1963 book, The Structure of Intellect; Its Uses and Interpretation, wrote about the new trend in the frontier of diagnosis and evaluation. In her book she shows expectancy norms for the various functions measured on the Stanford-Binet, WAIS, and the WISC-R intellectual tests. She devised code sheets to be used with the ITPA, the Slosson Intelligence Test and the DTLA that would identify these expectancy norms at learning-age levels. Tally sheets and arrangements of Guilford's SOI (structure of the intellect) factors are also identified by Meeker. In 1959 J. P. Guilford reported his factored construct of the intellect (SOI) showing 120 functions within the three "faces" of operations, content, and products. These three-dimensional functions are elements or components of intelligence or the structure of mental processes. They are the product of factor analytic research conducted by J. P. Guilford and his associates at the University of Southern California. (Waugh and Bush, 1971) Guilford says of his cubicle construct that it is

only a beginning and that educators may look forward to more and varied factors for describing individual behavior. (Waugh and Bush, 1971) Ideas such as Guilford's structure of the intellect (1959) have lead to new interpretations of the DTLA and other testing instruments. The work of Meeker has made the SOI applicable to the education process.

Educators of today use the DTLA to help determine the learning style of the child. The DTLA has visual and auditory channel subtests that can be used to help determine learning styles, but does not provide a complete pattern. A single test such as the DTLA will not provide enough information to determine learning styles. (Waugh and Bush, 1971) The purpose of the DTLA is to assess learning capability in subjects three years through adult in a practical and flexible manner. The test is not beneficial for measuring the IQ, but is useful primarily for the subtest results and the mental age (MA) profile for each subtest. (Tarczan, 1972)

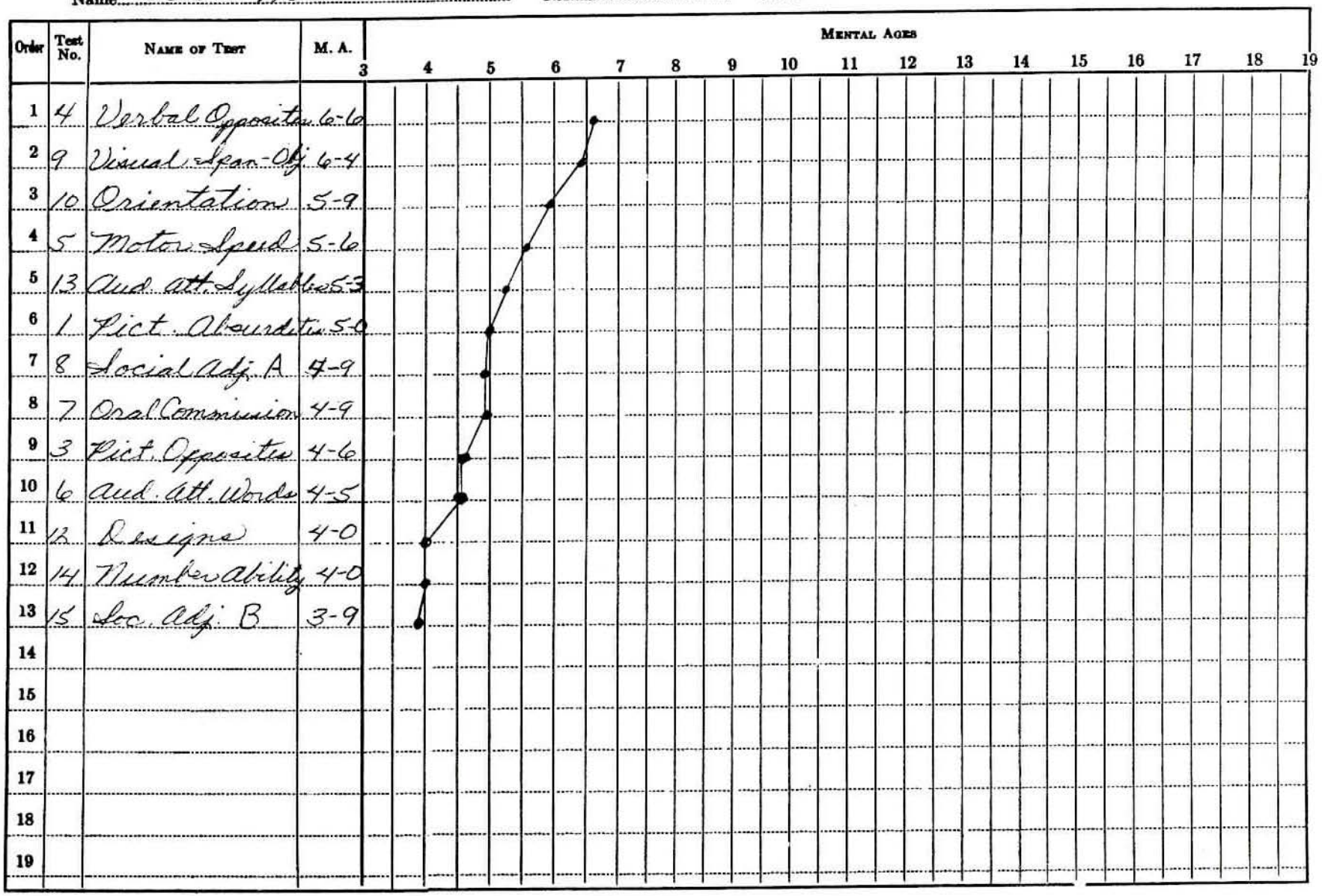
It is possible to determine from the MA profile (Figure 4) a subject's strengths or his degree of weakness in the visual, auditory, or kinesthetic channel, by ranking the subtest scores from highest to lowest. This can be accomplished by varying the choice of tests administered. A minimum of at least nine of the subtests should be given and this number should be increased when it is evident that there is a "scattering" of mental ages with no

THE DETROIT TEST OF LEARNING APTITUDE, MA PROFILE

PROFILE OF TEST RESULTS

Name Case No. 4 C.A. 5-0 Median M. A. 5-0 I. Q. 103

Order	Test No.	Name of Test	M. A.
1	4	Verbal Opposites	6-6
2	9	Visual Span-Obj.	6-4
3	10	Orientation	5-9
4	5	Motor Speed	5-6
5	13	Aud. Att. Syllables	5-3
6	1	Pict. Absurdities	5-0
7	8	Social Adj. A	4-9
8	7	Oral Comprehension	4-9
9	3	Pict. Opposites	4-6
10	6	Aud. Att. Words	4-5
11	12	Designs	4-0
12	14	Number Ability	4-0
13	15	Soc. Adj. B	3-9
14			
15			
16			
17			
18			
19			



marked central trends, though this seldom occurs. A maximum of thirteen subtests is recommended; if the examiner wishes to continue further, two test sessions are desirable.

The DTLA has been found useful in the diagnosis of learning disabilities. (Fass, 1976) The results of the subtests are graphed on a visual MA profile which is very meaningful for determining abilities and disabilities in the auditory, visual or kinesthestic sensory modality. For example, subtests that measure visual attention span for letters, visual attention span for objects, and sequencing of disarranged pictures provide help in determining visual-spatial and/or visual memory problems. Other subtests that measure auditory attention span for unrelated words, auditory attention span for related syllables, and the ability to follow oral directions aid in the assessment of auditory problems, while motor speed and orientation subtests help diagnose eye-hand coordination and directionality problems. (Waugh and Bush, 1971) Figure 5 provides a chart of the nineteen DTLA subtests, the modality used by the subject while taking the test, possible primary remediation implications and some remediation techniques. The important factor is to identify profile patterns in regard to abilities and disabilities so that the remediation is most effective. To determine the areas of remediation, the subject's chronological age (CA) is compared to the mental age (MA) achieved on the subtest. For those subjects who fall within the average or above IQ

FIGURE 5

THE DETROIT TEST OF LEARNING APTITUDE
19 Subtests and Learning Modalities

	Subtests	Modality	Possible Remediation Implications (Ability-(Tested)	Remediation Techniques
1.	Pictorial Absurdities	visual	abstract reasoning comprehension visual attentiveness cultural deprivation	field trips What's Funny Cards (Spec. Educ. Aids) tachistoscope sorting pictures into categories (...foods, furniture)
2.	Verbal Absurdities	auditory	abstract reasoning comprehension auditory attentiveness cultural deprivation	field trips tape recorder riddles; make up nonsense sentences Peabody Language Kit (AGS)
3.	Pictorial Opposites	visual	abstract reasoning visual perception visual attentiveness	tachistoscope Peabody Language Kit (AGS) flannel board Opposites (M.B.) Seeing Likenesses & Differences (Continental Press)
4.	Verbal Opposites	auditory	abstract reasoning verbal ability	Peabody Language Kit (AGS) verbal commands games: child does opposite of what said
5.	Motor Speed and Precision	kinesthetic	visual perception hand-eye coordination motor integration	Fitzhugh Plus Prog. 101, 102 (Allied) chalkboard excercises tracing, lacing (DLM) bean bag toss clay, finger painting
6.	Auditory Attention Span for Unrelated Words	auditory	auditory perception auditory sequential memory auditory attention	tape recorder imitating clapping patterns Buzzer Board (DLM) rhythm instruments
7.	Oral Commissions	auditory	auditory perception auditory sequential memory body in space, motor number ability auditory attentiveness	Twister (M.B.) language master games such as "Simon Says" command games ..."Bring me the pen and sit down."

FIGURE 5 (cont.)

	Subtests	Modality	Possible Remediation Implications (Ability-(Tested)	Remediation Techniques
8.	Social Adjustment A	auditory	reasoning and comprehension cultural deprivation social class values	field trips Experimental Development Program (Benific) Focus on Self Development (SRA)
9.	Visual Attention Span for Objects	visual	visual perception visual sequential memory knowledge of environment visual attentiveness spatial orientation	Spatial Orientation & Sequential Board (DLM) Fitzhugh Plus Program 101, 104 (Allied) tachistoscope field trips memory games (show child 3-5 objects in box; blindfold him; he must tell what he saw)
10.	Orientation	auditory	auditory perception auditory sequential memory body in space (directionality) and laterality) reasoning and comprehension practical judgement	"Tell Me A Story" (Garrard) Frostig Training Program (Follett) hopscotch (Constructive Playthings) Vanguard School Program (Teaching Resources) follow-the-leader field trips
11.	Free Association	kinesthetic	verbal fluency auditory imagery language development	Peabody Language Kit (AGS) Distar Language Kit (AGS) "show and tell," daily news Let's Start Poster and Story Box (Scholastic)
12.	Memory for Designs	visual motor kinesthetic visual perception	visual perception (time and space relationships) visual memory eye-hand coordination visual attentiveness	Pathway School Program (Teaching Resources) tachistoscope Beginning To Learn (SRA) Visual Memory Cards (DLM) teacher hold up design, removes it, child draws it from memory

FIGURE 5 (cont.)

	Subtests	Modality	Possible Remediation Implications (Ability-(Tested)	Remediation Techniques
13.	Auditory Attention Span for Related Syllables	auditory	auditory perception auditory sequential memory language development and comprehension	Distar Language Program (AGS) Buzzar Board (DLM) Listen-Hear Books (Follett) The First Talking Alphabet (Scott, Foresman)
14.	Number Ability	auditory visual motor or kines-thetic	visual perception auditory perception knowledge of numbers ability to follow directions	Counting Picture Cards (DLM) First Arithmetic Game (Garrard) Structural Arithmetic (Houghton-Mifflin) Distar Arithmetic Kit (AGS) Peabody Language Kit (AGS)
15.	Social Adjustment B	auditory	same as 8	same as 8
16.	Visual Attention Span for Letters	visual	visual perception visual sequential memory directionality visual attentiveness	Clunk A Glunk (Whitman) Pyramid Puzzles (Beckley Cardy) Visual Memory Cards (DLM) Independent Activities (Continental Press)
17.	Disarranged Pictures	visual	visual perception synthesis knowledge of environment visual motor organization visual attentiveness visual discrimination	Motor Expressive Cards (DLM) Sequential Picture Cards (DLM) Frame Tray Puzzles (Whitman) Wood Inlay Puzzles (Judy) Visual Discrimination (Continental Press) cut-up comic stripes field trips Parquetry Blocks & Designs (DLM)
18.	Oral Directions	auditory	auditory perception auditory sequential memory eye-hand coordination auditory and visual attentiveness motor integration	rhythm instruments clapping patterns finger plays matching boxes with similar sounds Listen-Hear Books (Follett) Auditory Discrimination in Depth (Teaching Resources)

FIGURE 5 (cont.)

Subtests	Modality	Possible Remediation Implications (Ability-(Tested)	Remediation Techniques
9. Likenesses and Differences	auditory	auditory perception abstract reasoning language development cultural deprivation	Distar Language Program (SRA) Peabody Language Program (AGS) field trips Classification and Seriation Kit (Harper & Row) Building Reading Skills (McCormick Mathers)

(Tarczan, 1972)

range the MA score should fall within the CA range or above. If the MA falls below the CA a disability is exposed in that sensory modality and remediation is needed.

Results from the DTLA MA profile can be checked with similar subtests under the WPPSI, WISC-R, Stanford-Binet, ITPA, WAIS, and Slosson Intelligence Test. (Tarczan, 1972) Of equal benefit, the DTLA list of remediation techniques can be supplemented with remediation techniques suggested by other testing instruments that yield scores for the auditory, visual, and kinesthetic sensory modalities.

Standardization of the DTLA was accomplished using students from the Detroit Public Schools. The authors felt that this population was typical of large metropolitan cities, as measured by group intelligence tests and standardized tests of educational achievement. The initial standardization was performed on 50 pupils at every age level. Age norms were developed for each of the nineteen subtests and a general mental age was derived from the median ages of the particular series of subtests administered. (Baker and Leland, 1967) On subsequent testing, there were 150 pupils at each level (the IQ range was 90-110) as measured by group intelligence examinations. The standardization was carried on for several years and used on over 75,000 children. Sixteen subtests were correlated within the battery using profiles of 100 children 8 to 12 years. The majority of correlations fell from .2

to .4 indicating low yet positive correlations. The biggest correlation was .679 between subtest No. 2 Verbal Absurdities and No. 4 Verbal Opposites. (Tarczan, 1972)

The writer of this paper concludes that the DTLA is an accurate diagnostic tool that identifies learning style, their strengths and weaknesses, at learning-age levels. From the DTLA the examiner can obtain subtest scores that measure visual, auditory, and kinesthetic channels of learning. From the subtest scores, the deficit areas to be remediated are identified.

GRAPHING AND EVALUATION OF

PRE-POST TEST RESULTS

This section contains a review of pre and post test results of the experimental and control group of children. Twenty children were tested by this graduate student. All of the individuals cited for this testing had measured intellectual ability within the average to above average range. Ten of the children were students who had been referred to and diagnosed by Special School District of St. Louis County as being learning disabled. These ten children were members of the experimental group ranging from age six years five months to 12 years and 11 months. These ten children received remedial learning disability instruction from this graduate student over a period of 14 weeks. Remediation instruction was based upon diagnostic test scores.

Another ten children were students who did not demonstrate a learning disabled profile. These ten children ranged from 5 years 11 months to 11 years 5 months in age and were members of the control group. The tests were administered to this group in order to gain experience and expertise in the actual administration of the testing instruments and to compare pre and post test results to the results of the experimental group.

Test scores of the two groups are evaluated according to individual achievement and growth in learning style during a six month period. The writer of this paper expects a six month growth as measured by pre and post test scores. The graphs presented in this section compares individual and group progress.

This graduate student conducted this evaluation to provide information about learning disabled children who received remediation. One question to be answered by this evaluation of test scores is the amount of progress made by a learning disabled child enrolled in a regular classroom and who is receiving remediation instruction. The graphing of test results shows to what extent they have progressed as compared to themselves and as to other normal average students within the same age range and grade level.

The following pre and post test scores are illustrated to show individual growth during a six month period. Students are identified according to case numbers. Each number represents a student arranged chronologically from youngest to oldest. Figures 6 and 7 present grade level scores achieved on the Woodcock and KeyMath Tests. These two tests were not applicable at the present grade level of the two youngest members of each group. The Detroit Test of Learning Aptitude was administered to all members of each group. Figures 8 to 11 present mental ages at which each individual functioned in the Visual-Kinesthetic and auditory modality subtests on The Detroit Test of Learning Aptitude.

Figure 6 shows the comparison of the pre and post test total reading composite grade level scores achieved on the Woodcock Reading Mastery Test for both the experimental and control group of children. Based upon this graph the writer concludes that grade level scores achieved by the control group were significantly

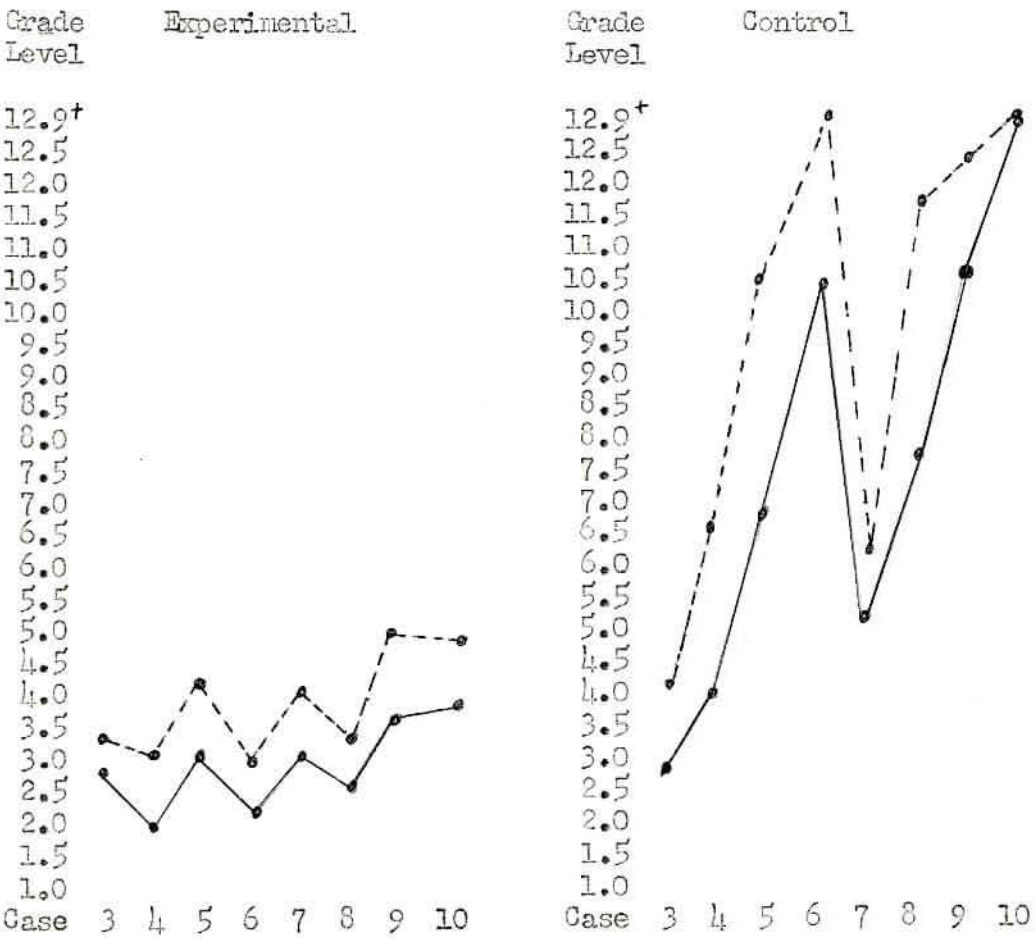
higher than those of the experimental group. The control group did not demonstrate below grade level scores for the grade in which they were enrolled, as did the experimental group. Older members of the experimental group showed the greatest deviance from expected grade level. Overall results demonstrated favorable growth for both groups.

Figure 7 shows the comparison of the pre and post test total math composite grade level scores achieved on the KeyMath Diagnostic Arithmetic Test. Comparing group scores the graph indicates a significant growth for both groups, although growth for the control group is greater than the experimental group. It is noted by this writer that the amount of growth expected during the time interval of pre and post testing is six months and the average amount of growth achieved should be six months. Members of the control group all achieved above the normal growth range. Members of the experimental group experienced as a group, normal growth, although some members of this group achieved below the average. Remediation for them is still needed in the area of math, but the experimental group is starting to progress and more closely approximate expected grade level functioning.

Figures 8 to 11 show the average growth in learning styles as determined by the Detroit Test of Learning Aptitude. The writer of this paper concludes that both groups averaged about the same amount of growth in both modalities. Mental ages yielded by the control group on the pre tests were significantly higher than

FIGURE 6

PRE-POST GRAPHING OF THE WOODCOCK READING MASTERY TEST FOR EXPERIMENTAL AND CONTROL GROUP



Pre-Test ————

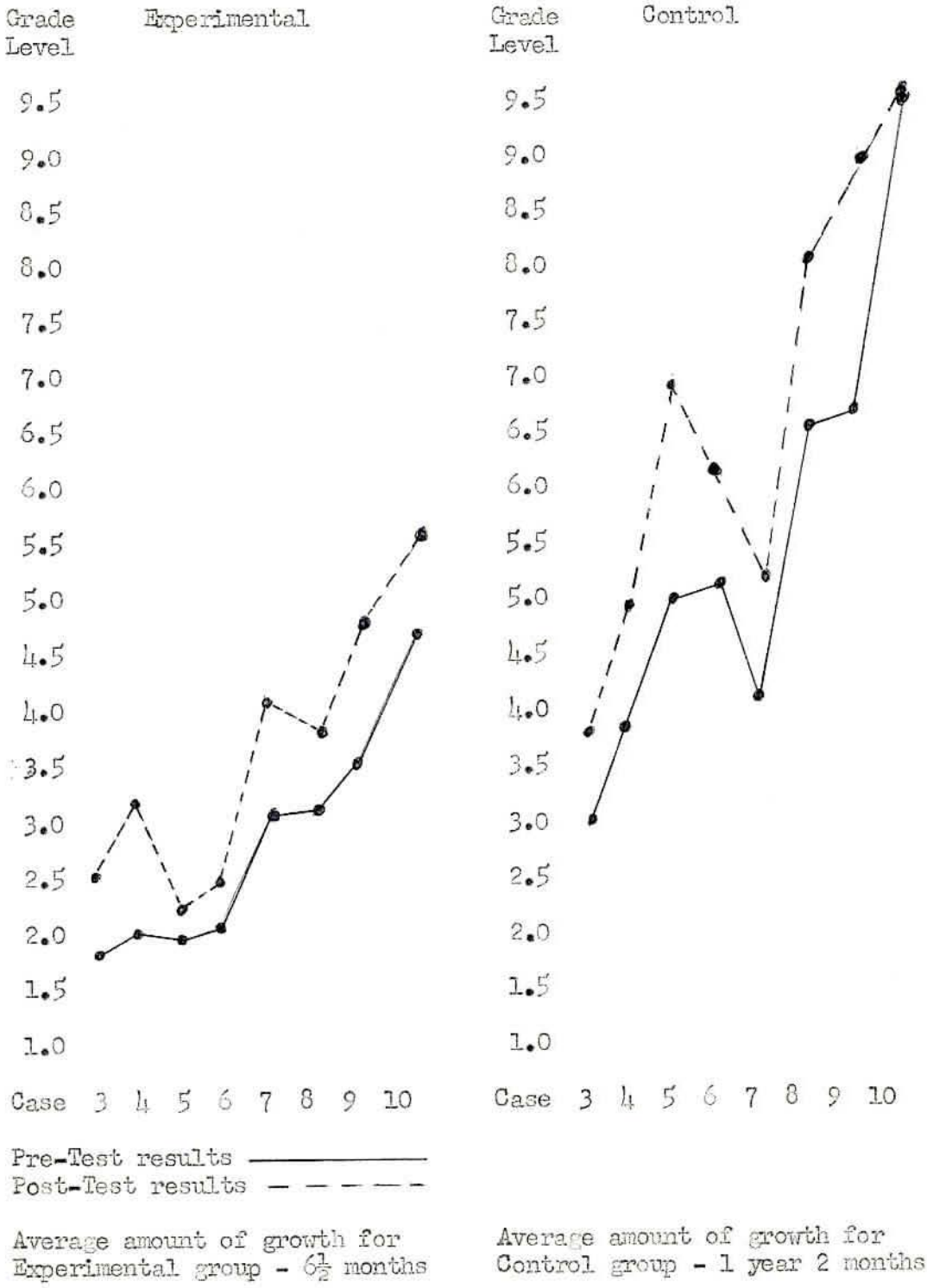
Post-Test - - - - -

Average amount of growth for Experimental group - 8½ months

Average amount of growth for Control group - 2 years 2 months

FIGURE 7

PRE-POST GRAPHING OF THE KEYMATH DIAGNOSTIC ARITHMETIC TEST FOR EXPERIMENTAL AND CONTROL GROUP



Pre-Test results ————————
Post-Test results — — — — —

Average amount of growth for Experimental group - $6\frac{1}{2}$ months

Average amount of growth for Control group - 1 year 2 months

FIGURE 8

PRE-POST GRAPHING OF THE DETROIT TEST OF LEARNING APTITUDE
VISUAL-KINESTHESTIC MODALITY FOR THE EXPERIMENTAL GROUP

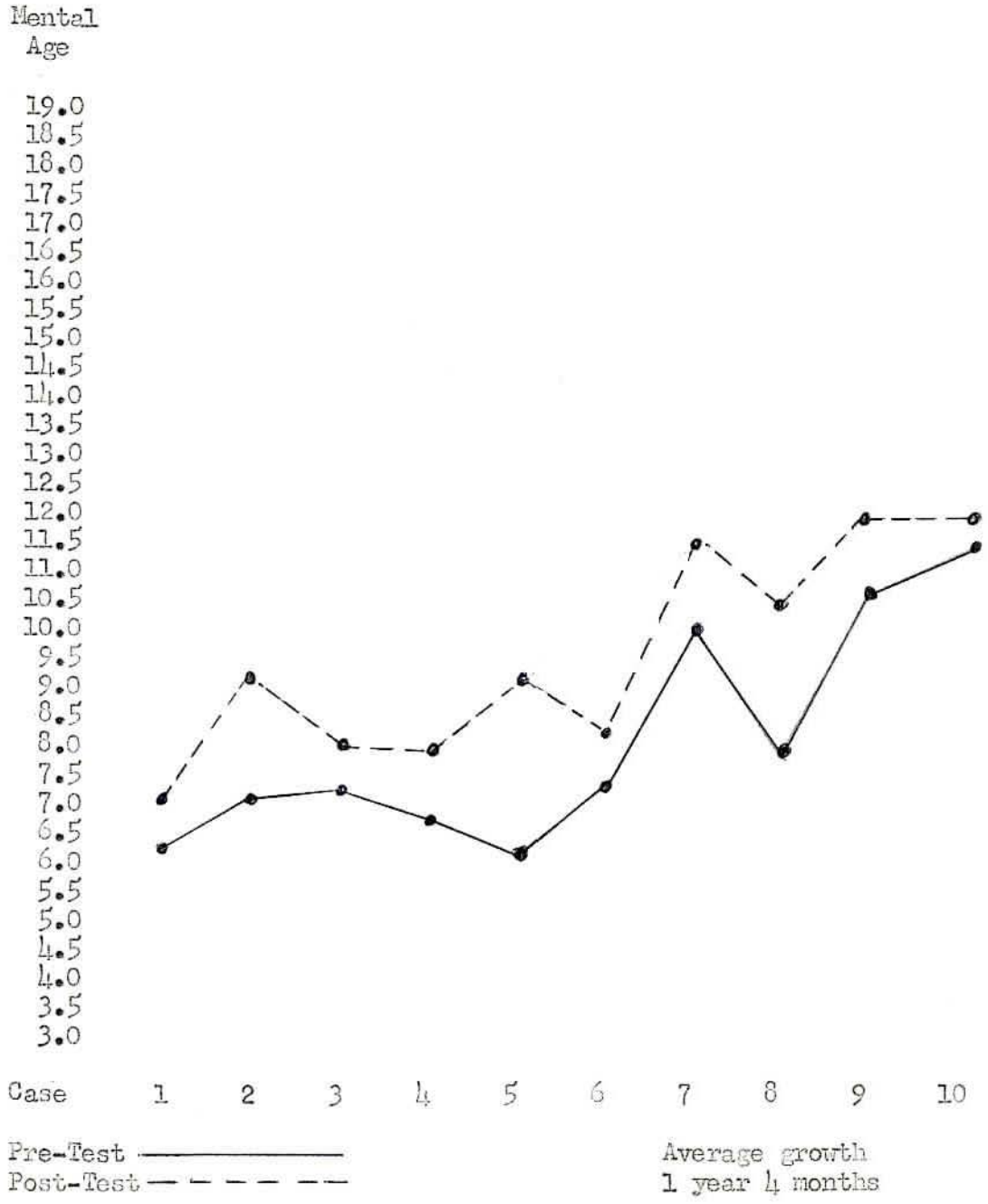
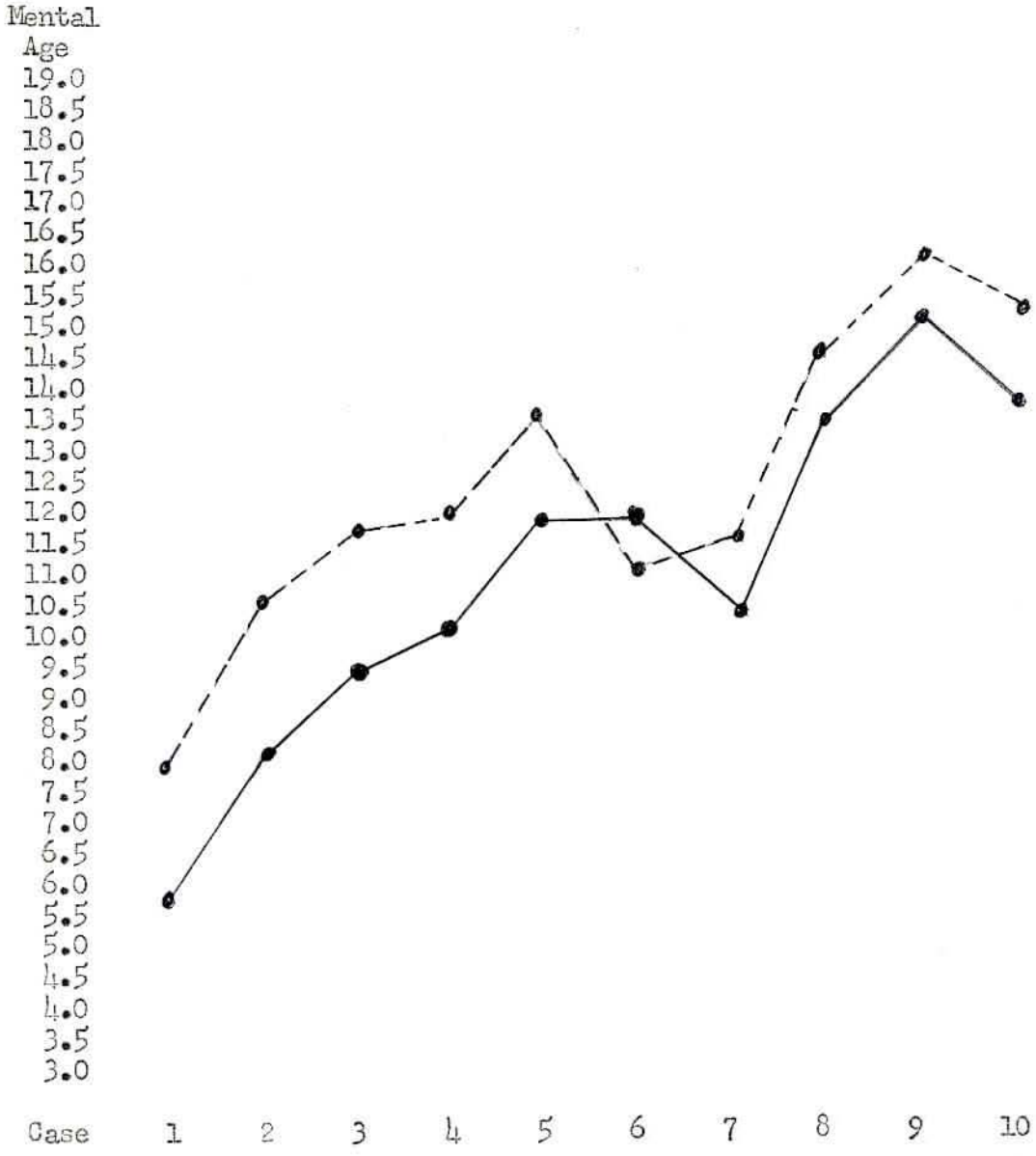


FIGURE 9

PRE-POST GRAPHING OF THE DETROIT TEST OF LEARNING APTITUDES
VISUAL-KINESTHETIC MODALITY FOR THE CONTROL GROUP



Average Growth 1 year 4 months

FIGURE 10

PRE-POST GRAPHING OF THE DETROIT TEST OF LEARNING APTITUDE
AUDITORY MODALITY FOR THE EXPERIMENTAL GROUP

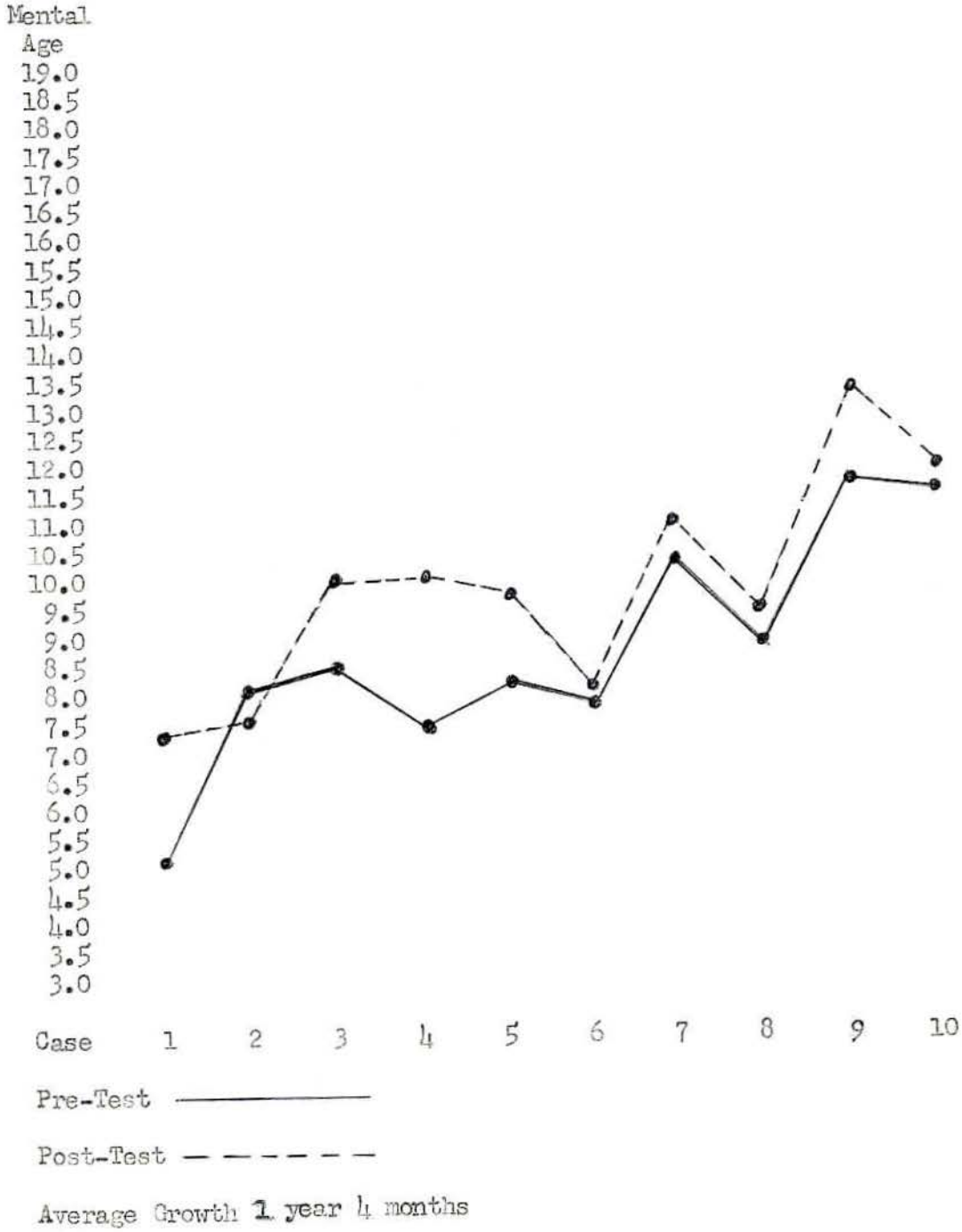
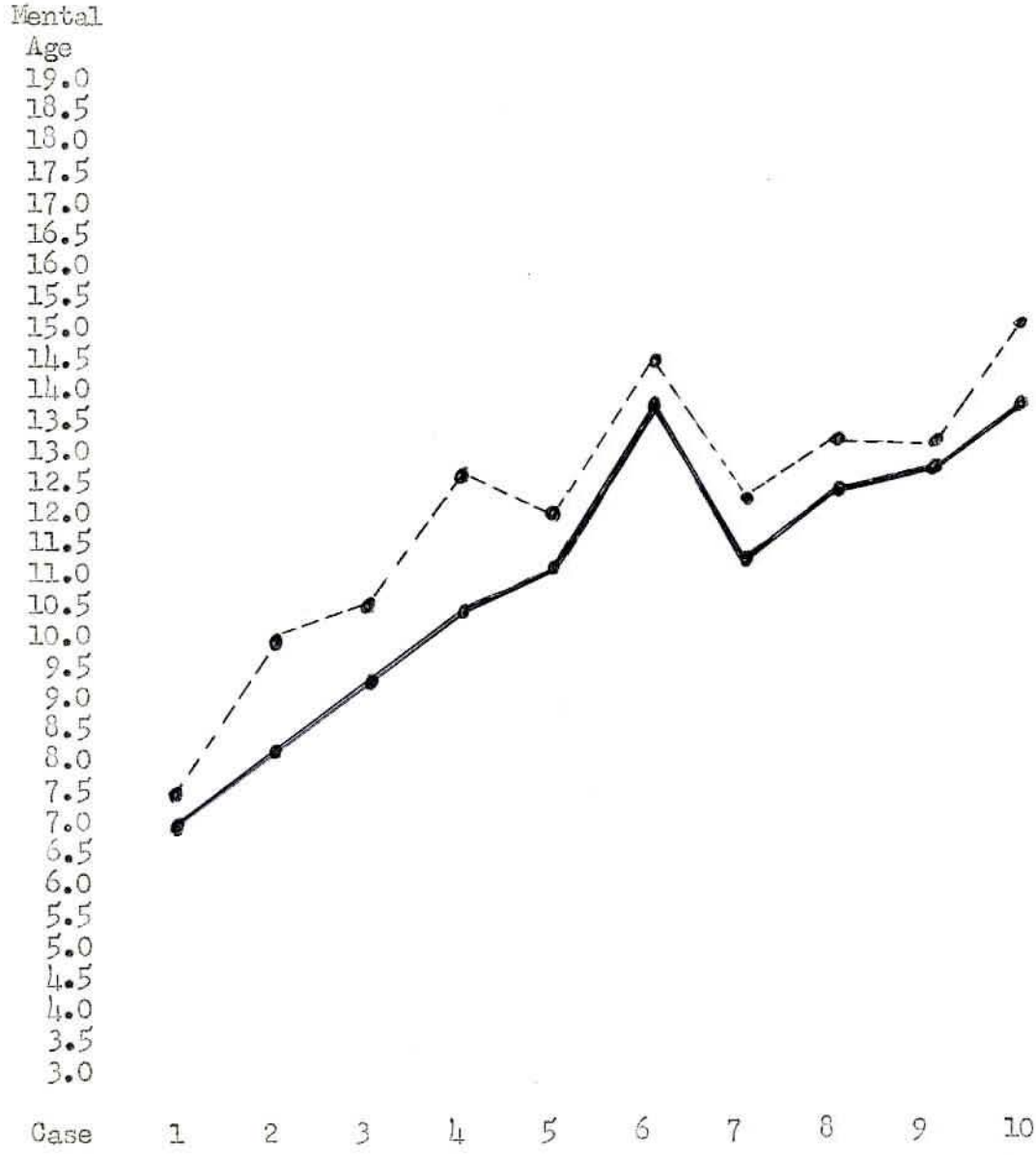


FIGURE 11

PRE-POST GRAPHING OF THE DETROIT TEST OF LEARNING APTITUDE
AUDITORY MODALITY FOR THE CONTROL GROUP



Average Growth 1 year 6 months

their chronological ages. The experimental group's mental age scores demonstrated a mild to great defiency from their chronological ages, with the greatest deviance in the modality related to the previously diagnosed learning disability. Post test scores reveal a significant growth in mental age for the modality receiving remediation services. One would conclude from the post test scores that the experimental group progressed and in some instances achieved at and above their chronological age.

The writer of this paper concludes from the information revealed on the graphing of pre and post test scores that children diagnosed as being learning disabled can progress and achieve when remediation is appropriately prescribed and instruction is given by a trained learning disabled teacher. Remediation procedures prescribed were based upon the diagnostic test information. One would conclude that the remediation procedures used by this graduate student to remediate deficient areas were successful. One would conclude that the experimental group of children are experiencing some success. It is noted by this writer that the younger the child the greater the amount of progress. Their deviance from expected performance appeared less after remediation. In some, but not all, cases the older children who were members of the experimental group demonstrated greater deviance in grade level and mental age scores. Post-test results revealed that these children in some cases still demonstrate below grade level

scores and mental age scores are still below chronological age, but these children are demonstrating some growth.

REMEDIATION OF SAMPLE CHILD

This section contains one case selected from the 10 experimental cases cited in this study. This section describes the child tested, the evaluation and diagnosis, pre and post test results, the remediation objectives, and the plan of implementation for remedial procedures administered.

This child has been tested and diagnosed by the Special School District Evaluation Clinic of St. Louis County as eligible for itinerant service from the department of the Learning Disabled Program.

The psychological tests were administered by a certified clinical psychological examiner at the Evaluation Clinic. Test behavior descriptions, scoring, and interpretation of the in-school screening were done by this graduate student under the supervision of Myrna Meador, faculty sponsor.

All remediation was administered by this graduate during two half-hour sessions per week for 14 consecutive weeks under the direction and supervision of Alice Kimes, faculty sponsor.

Case #6

This boy, age 8 years 3 months, was referred by school personnel for evaluation for placement in a Learning Disabled Program in July of 1976 at the age of six years and two months. Referral information indicated that this child was having academic difficulties, and was particularly deficient in the visual motor area. He was functioning below expectancy for paper/pencil tasks. Verbal ability and expressive communication was adequate. The teacher also noted that he was quite distractible. These observations were noted at school and at home. (Clinic Evaluation, 1976, Note 2)

This child was screened at the Special School District Evaluation Clinic of St. Louis County Missouri, on July 6, 1976. The following tests and test results were administered and scored by a certified psychological examiner:

Stanford & Binet Intelligence Scale:

Form L-M; CA 6-2, MA 6-8, IQ 102

Wechsler Intelligence Scale for Children-Revised:

Verbal Scale IQ 113 Performance Scale IQ 89

Full Scale IQ 101

Berry Developmental Test of Visual-Motor Integration:

CA 6-2 VMI Age Equivalent 5-0

House-Tree-Person Drawing; Incomplete Sentence Blank: Projective screening responses were suggestive of a somewhat immature boy who was experiencing some difficulty with peer and sibling relationships.

Bender Motor Gestalt Test: CA 6-5, Developmental Bender Score (Kappitz) 13- score one standard deviation below age group mean. (Clinic Evaluation, 1976)

The recommendation was that the child appeared appropriate for services from the department of Learning Disabilities. This child is now receiving itinerant services (within his home school) provided by the Learning Disability Program of Special School District.

An in-school screening was administered by this graduate student during the month of October of 1977, to determine the subject's educational needs and specific deficits in sensory modalities from which remedial activities should be based.

Two groups of tests were given: one group to diagnose and evaluate learning disabilities; the other group of tests to evaluate academic achievement. The following instruments were administered by this graduate student with the following results:

Case #6 Grade Placement 2.3 D.O.B. 2-13-70 C.A. 7-9

LEARNING DISABILITIES EVALUATION: PRE-TEST RESULTS

Detroit Tests of Learning Aptitude:

Subtests:	Visual-Kinesthetic Modality	M.A.
5	Motor Speed and Precision	5-0
9	Visual Attention Span for Objects	9-9
12	Memory for Designs	4-3
16	Visual Attention Span for Letters	8-0
17	Disarranged Pictures	3-0
Subtests:	Auditory Modality	M.A.
2	Verbal Absurdities	13-6
6	Auditory Attention Span for Unrelated Words	7-0
10	Orientation	6-9
13	Auditory Attention Span for Related Syllables	7-6
18	Oral Directions	6-6

Slingerland Screening: Form A	High	Average	Low
Near and Far Point Copying	___	___	✓
Visual Discrimination	___	✓	___

Conclusion: Kinesthetic performance and quality of letter formations were not consistent with the preferred script. Spatial organization also appeared inadequate.

ACADEMIC ACHIEVEMENT: PRE-TEST RESULTS

Woodcock Reading Mastery Test: Form A		Grade Level 2.2
1.	Letter Identification	2.2
2.	Word Identification	3.9
3.	Word Attack	4.2
4.	Word Comprehension	3.0
5.	Passage Comprehension	3.2
	Total Reading	3.2
KeyMath Arithmetic Diagnostic Test		Grade Level 2.2
1.	Numeration	2.5
2.	Fractions	2.4
3.	Geometry & Symbols	2.1
4.	Addition	1.4
5.	Subtraction	1.1
6.	Multiplication	0.5
7.	Division	2.4
8.	Mental Computation	2.0
9.	Numerical Reasoning	1.9
10.	Word Problems	2.0
11.	Missing Elements (Not applicable at grade level enrolled)	___
12.	Money	1.7
13.	Measurement	2.0
14.	Time	2.2
	Total Score	1.9

TESTING BEHAVIOR:

During testing this child appeared to have adequate language structure. Gross and fine motor coordination appeared to be below expectancy with mixed hand dominance evidenced on paper/pencil tasks. The child was spontaneous and friendly, and was positive in his task approach. He proved to need considerable structure, as he was quite impulsive and distractible. Despite tiring, the subject was cooperative throughout with good rapport being easily established.

SUMMARY OF LEARNING STYLE:

Strengths: Specific strengths demonstrated on the DTLA were noted in the sensory modalities of visual sequential memory and auditory attentiveness. In the area of academics, specific strengths were demonstrated in the area of reading. As determined by the Woodcock Reading Mastery Test Form A, the child is functioning above grade level for word identification, word attack, and comprehension skills. No significant strengths were demonstrated in the area of math. Adequate scores were achieved in numberation, fractions, and division.

Weaknesses: Specific weaknesses were demonstrated on the DTLA and the Slingerland Form A in the area of visual and kinesthetic performance. Hand and eye coordination when a kinesthetic response was required was inadequate. Visual motor integration and organization skills were also inadequate. Auditory

sequential memory also scored below CA. In the area of math, specific weaknesses were noted on the KeyMath in the areas of content, operation, and application math skills.

CONCLUSION:

An analysis of this child's academic scores indicates this boy evidenced above grade level scores in reading with superior ability in the area of word attack and word identification. Below grade level scores in math indicated the child is lacking in math knowledge, computation skills, and in the functional use of math.

This child evidenced difficulty with visual-kinesthetic subtests with depressed integration and organizational skills. Testing indicates that this child's visual memory skills are superior to his visual motor abilities, and eye-hand coordination abilities. Auditorially the child evidenced difficulty with auditory sequential memory and oral directions. Auditory perception and attention skills are superior to auditory memory.

Based upon the preceeding test results and diagnosis, the following plan of implementation for remedial procedures was administered by this graduate student over a period of 14 weeks. This graduate student met with the child twice weekly for two half hour remediation sessions per week.

The implementation plans were used by this graduate student to record the short term objective, task, and lesson for remedial procedures indicated by the child's diagnostic testing. Indicated

on the implementation plan are each dated objective, the criterion for meeting the objective and the data on which the criterion was met. Teaching strategies and materials used are also recorded on the plan. The following pages discuss and summarize remediation sessions. Short term objects are recorded for each week's two half hour sessions along with teacher intervention, criterion, and the results.

Long term objectives for the 14 week session were:

1. To increase eye-hand coordination skills (visual-motor integration) in forming upper and lower case alphabet manuscript letters.
2. To increase visual attention.
3. To increase spatial awareness.
4. To increase left-right laterality.
5. To increase auditory memory.
6. To increase auditory attention.

As indicated by the objectives, this graduate student worked directly with the child on specific learning disabilities.

Remediation in the area of academics was indicated in math computational and functional skills. This graduate student worked with the classroom teacher as a consultant to remediate the weak math areas. The classroom teacher was advised of teaching methods and given supplementary materials to use.

Academic long term math objectives for the 14 week sessions were:

1. To be able to write numerals from 1 to 100.

2. Can add two-place numerals without carrying.

3. Can subtract two-place numerals without borrowing.

4. Can tell time to half and quarter hour.

Resource Materials: These materials were used during consultant sessions by this graduate student.

Myers, Patricia and Hammill, Donald. Methods for Learning Disorders. John Wiley & Sons, Inc., New York, 1969.

Hammill, Donald and Bartel, Nettie. Teaching Children with Learning and Behaviors Problems. Allyn and Bacon, Inc., Boston, 1975.

Supplementary Materials: These materials were used in the classroom.

Edu-Cards	Telling Time Flash Cards
Frank Schaffer	Dot-to-Dot Math Skills
Milton Bradley	Tell Time Quizmo
Milton Bradley	Wise Old Owl Clock

Week 1

SHORT TERM OBJECTIVES:

1. The child will be able to grip his pencil in a fashion to reproduce simple paper pencil tasks.

2. The child will be able to recognize, name, trace, and reproduce (without excessive pencil pressure) these geometric forms. □ ○ ▭ ◇ △

TEACHER INTERVENTION:

1. Correct position for holding the pencil is shown by the instructor.

2. Child is asked to pick up the pencil holding it correctly. He is also asked to pick up a crayon, ballpoint pen, and varied size pencils.

3. Child is to practice scribbling on a blank sheet of paper- instructor is to monitor correct pencil position. Monitor body posture, proper paper angle, proper pencil grip. In order to instruct and retain some of the new hand-eye coordination skills, a "Grip-Erase" was placed on the pencil. This triangular, soft plastic gripper slides on the pencil quite easily. It relaxes the fingers and the hand while writing. The three smooth surfaces form support for the thumb, index finger, and side of the middle finger. The procedure of gripping the pencil is practiced using the OK sign as a starting posture from which to go to a relaxed writing pose. 4. The child is asked to produce the following without lines. ıı,oo,cc,nn,ıı,ıı (Arena, 1970) 5. The child is

asked to recognize and name the geometric forms first. 100% accuracy on the recognition of names, then he is asked to trace over the forms with his finger. 6. With the use of templates, trace and reproduce the geometric forms. 7. Make the geometric forms in a pan of moist sand with his finger. 8. Draw geometric forms with visual aid. 9. Draw geometric forms without visual aids. 10. Draw a picture using the geometric templates.

CRITERION: Reproduce geometric shapes with 80% accuracy.

RESULTS: The child was able to name and recognize the geometric shapes. Pencil control still jerky, and fingers stiff. Geometric shape lines were fairly firm on the □ ○ ▭ △ but erratic on the ◇. Angles were present with some "dog earing". Basic shapes were recognizable. Not all lines were closed.

CLASSROOM ACTIVITIES: DLM Pegboard Exercises Unit 1
Paper cutting and pasting
Mosaics made with rocks from the parking lot

RESOURCE MATERIALS: These resource books were used throughout the 14 week sessions.

Arena, John I. Building Handwriting Skills in Dyslexic Children. San Rafael, California: Academic Therapy Publications, 1974.

Farrald and Schamber. A Diagnostic and Prescriptive Technique Handbook 1. Sioux Falls: ADAPT Press, 1973.

Gillingham, A & Stillman, B. Remedial Training for Children with Specific Disabilities in Reading, Spelling, and Penmanship. New York: Steckett and Williams, 1940.

Mann, Philip & Suiter, Patricia. Handbook in Diagnostic Teaching. Boston: Allyn & Bacon, Inc., 1974.

Week 2

SHORT TERM OBJECTIVES:

1. The child will be able to grip and manipulate his pencil without excessive pencil and finger pressure.

2. The child will be able to draw a straight line between two dots.

3. The child will be able to look at the picture of a dot in the model, find and circle the copy that is exactly like the model.

4. The child will be able to look at the placement of the dot in the model and place a dot in the same position in all the small-windows and the large-windows.

TEACHER INTERVENTION:

1. The child is to practice gripping his pencil as outlined for week one. 2. Child is to complete Drawing Within Limits Visual-Motor Skills, Level A, Continental Press, 1974, pages 1-4. 3. Child was to track across the dots with his finger. Check eye tracking and eye movements. 4. Child is to complete pages 1-15 in Look and Write, an Eye-Hand Coordination Work Book, Educational Developmental Laboratories New York, McGraw-Hill Book Company, 1965. Teaching strategy given in workbook.

CRITERION: Decreased pencil pressure. Paper pencil tasks and visual-motor skills are to be completed with firm lines and few deviations. 100% accuracy with eye-hand coordination work book excercises.

RESULTS: The child demonstrated less pencil pressure with 30% better control. Visual motor skills displayed waved lines although

the child was able to draw from one dot to the other. 100%

accuracy was demonstrated in the eye-hand coordination work book.

CLASSROOM ACTIVITIES: Continue Pegboard Excercises Unit 1
Finger painting

Week 3

SHORT TERM OBJECTIVES:

1. The child will be able to trace over designated lines or formations.

2. The child will be able to connect two dots with a line in the window model.

3. The child will be able to draw a line from one dot to the other, in the shadow line, following in the direction indicated by arrow.

4. The child will be able to draw a similar line, in the same position as the model window, in the remaining windows.

TEACHER INTERVENTION:

1. Child is to trace with his finger the designated lines or formations. Monitor pencil grip, eye tracking, and eye movements. 2. Child is to complete Visual-Motor Skills, Level A, pages 5-8. (Continental Press, Elizabethtown, Pennsylvania, 1972) 3. Child is to complete pages 16-29 in the eye-hand coordination work book. Teaching strategy given in work book.

CRITERION: The child will be able to draw across designated lines or formations with 80% accuracy. The child will be able to complete a similar line in the same position as the model with 90% accuracy.

RESULTS: The child completed visual-motor exercises with 80% accuracy. Eye-hand coordination drawings demonstrated deviations from the lines. 70% accuracy level.

CLASSROOM ACTIVITIES: Pegboard Exercises Unit 1
Water color painting
Puzzles

Week 4

SHORT TERM OBJECTIVES:

1. The child will be able to copy a simple 3 to 4 line dot to dot design.

2. The child will be able to look at a model containing a curved line and circle the curved line that is shaped like the model out of a choice of three.

3. The child will be able to look at a curved line in the model and then be able to reproduce the curved line in the same position in each of the remaining windows.

TEACHER INTERVENTION:

1. The child is to trace over the pattern before copying. Child is to complete pages 13-16 of Continental Press Visual-Motor Skills Level A. 2. The child is to look at the points where the curved line starts and stops, and then notice how the curve "fills" a certain portion of the window. After noting both of these features he is to find and circle the copy. 3. The child is to look at the line in the model. Then he is to draw this line in the shadow in the window below the model in the direction indicated by the arrow. Next he is to draw a similar line in the same position in each of the remaining windows. 4. Complete pages 32-49 in Eye-Hand Coordination Work Book.

CRITERION: 80% accuracy for design copying. 90% accuracy for eye-hand coordination work book.

RESULTS: The child met accuracy levels.

CLASSROOM ACTIVITIES: Pegboard Unit 2
Reproduce a three dimensional object with clay.

Week 5

SHORT TERM OBJECTIVES:

1. The child will be able to cut and fit four parts into a whole.

2. The child will be able to look at a model letter formed by straight and/or curved lines, then find and circle the one copy from a series of three that is exactly the same as the model letter.

3. The child will be able to look at a model letter formed with straight and/or curved lines, then reproduce the letter in sequential writing steps.

4. The child will be able to form the lower case letters a, d,b,c,e,f,g,h,i, on color lined paper.

TEACHER INTERVENTION:

1. The child is to cut four puzzle pieces. While looking at the model he is to place the four pieces he has cut on the model to form a whole. Complete Continental Press Level A Visual-Motor Skills pages 17-19. 2. The child is directed to note that the model window now contains a letter formed by straight and/or curved lines. The child is to study the model letter, noting the placement of each line, the beginning and ending points of each line, and the way in which the lines relate to each other. Then he is to find and circle the copy which is exactly the same as the model. 3. First the child is to look and study the model, then write in all the shadow lines to aquaint the child with the sequential writing experience. Next he is to add all of the lines that are necessary to finish the letter. Then he is to write the

model letter in the vacant window. Complete Eye-Hand Coordination Work Book exercises pages 52-57. 4. The child is to practice forming the letters a,b,c,d,e,f,g,h, and i on color lined paper. Color lined paper has a thick green line for the base line where the child is to begin each letter. The middle line is a broken red line to mark where the short letters are to stop. The top thin green line marks where the tall letters are to stop. This color lined paper produced by Educational Products is helpful to the child because the colored lines stand out and act as stop and go lines to him.

CRITERION: 90% accuracy for fitting parts into a whole. 90% accuracy for forming lower case letters a,b,c,d,e,f,g,h, and i.

RESULTS: The child has difficulty fitting the parts of the puzzle together. The child was asked to color each piece before fitting the parts together and accuracy was increased to 90%. The letters e and f were difficult for the child to form: however 90% accuracy was achieved for each of the other letters.

CLASSROOM ACTIVITIES: Pegboard Exercises Unit 2
Practice lower case letters
e and f.

Week 6

SHORT TERM OBJECTIVES:

1. The child will be able to complete a simple picture sequence.

2. The child will be able to look at a model letter formed by straight and/or curved lines, then find and circle the one copy from a series of three that is exactly the same as the model letter.

3. The child will be able to look at a model letter formed with straight and/or curved lines, then reproduce the letter in sequential writing steps.

4. The child will be able to form the lower case letters k, l, j, m, n, o, p, q, and r on color lined paper.

TEACHER INTERVENTION:

1. The child is to look at the sequence of five pictures and determine what picture is to be next in the sequence. Complete Continental Press Visual-Motor Skills pages 21-24. 2. The technique and teaching strategy for Eye-Hand Coordination Work Book pages 64-69 is the same as forementioned in teacher interventions for week five. 3. The child is to practice forming the lower case letters k, l, j, m, n, o, p, and q on lined paper.

CRITERION: 100% accuracy for sequential picture exercises. 90% accuracy for eye-hand coordination work book.

RESULTS: The child met accuracy level for sequential picture exercises but lower case letter performance was erratic. 70% accuracy in forming lower case letters.

CLASSROOM ACTIVITIES: Pegboard Exercises Unit 2
Practice lower case letters m, n, p, and q on color lined paper.

Week 7

SHORT TERM OBJECTIVES:

1. The child will be able to visually and mechanically follow a simple maze.

2. The child will be able to visually and mechanically follow a simple alphabet dot-to-dot sequence to complete a picture.

3. The child will be able to look at a model letter formed with straight and/or curved lines, then find and circle the one copy from a series of three that is exactly the same as the model letter.

4. The child will be able to look at a model letter formed with straight and/or curved lines, then reproduce the letter in sequential writing steps.

5. The child will be able to form the upper case letters A, B, C,D,E, and F on color lined paper.

6. The child will be able to form all lower case manuscript letters without a model.

TEACHER INTERVENTION:

1. Given a starting point the child will be able to draw within limits existing between two lines from the starting point to the ending point. Complete Ann Arbor Perceptual Activities Level 1 pages 1-7. 2. Given a dot-to-dot alphabet sequence the child will be able to follow the letter sequence to complete the picture. Complete Ann Arbor Perceptual Activities Level 1 pages 18, 20-23. 3. Teaching technique and strategy for upper case letters presented in the Eye-Hand Coordination Work Book pages 74-77 are the same as forementioned in teacher interventions for week five. 4. The child is to practice forming the upper case letters A,B,C,D,E,

and F. 5. Child is asked to produce the lower case manuscript letters as the teacher dictates them to him.

CRITERION: 90% accuracy for perceptual activities. 90% accuracy for forming upper case letters and 100% accuracy for lower case letters post test.

RESULTS: The child met all accuracy levels for letter formations and dot-to-dot exercises. The child was unable to perform mazes with expected accuracy level. Lines were erratic, crossing over lines and drawing his line outside of the maze. More structure is needed stressing that there is no time limit for the mazes.

CLASSROOM ACTIVITIES: Eye-Hand Coordination Activities DLM
Practice upper case letters A,B,C,D, E, and F on color lined paper.

Week 8

SHORT TERM OBJECTIVES:

1. The child will be able to visually and mechanically follow a simple maze.

2. The child will be able to look at a model letter formed with straight and/or curved lines, then find and circle the one copy from a series of three that is exactly the same as the model letter.

3. The child will be able to look at a model letter formed with straight and/or curved lines, then reproduce the letter in sequential writing steps.

4. The child will be able to form the upper case letters G,I,J,K, and L on color lined paper.

TEACHER INTERVENTIONS:

1. Given a starting point the child will be able to draw within limits existing between two lines from the starting point to the ending point. Complete Ann Arbor Perceptual Activities Level 1 pages 8-14. 2. Teaching technique and strategy for upper case letters presented in the Eye-Hand Coordination Work Book pages 78-81 are the same as forementioned in teacher interventions for week five. 3. The child is to practice forming the upper case letters G,H,I,J,K, and L on color lined paper.

CRITERION: 90% accuracy for perceptual activities. 90% accuracy for forming upper case letters.

RESULTS: All criterion accuracy levels were met.

CLASSROOM ACTIVITIES: Mazes and Puzzles Educational Insights
Practice upper case letters G,H,I,J,K, and L on color lined paper
Pegboard Exercises Unit 3

Week 9

SHORT TERM OBJECTIVES:

1. The child will be able to find and circle a word shown visually from a figure ground of letters.

2. The child will be able to draw lines up, down, away from his body on the blackboard.

3. The child will be able to look at a model letter formed with straight and/or curved lines, then find and circle the one copy from a series of three that is exactly the same as the model letter.

4. The child will be able to look at a model letter formed with straight and/or curved lines, then reproduce the letter in sequential writing steps.

5. The child will be able to form the upper case letters M,N,O,P,Q, and R on color lined paper.

TEACHING INTERVENTIONS:

1. The child is given four words visually and is asked to pronounce and spell each word, then he is to find the word from a figure ground of letters. Point out to the child that the word may appear in an across position or an up or down position. Complete Ann Arbor Perceptual Activities Level 1 pages 26-30. 2. The child is asked to draw lines on the blackboard following the teachers instructions. These directions involve directionality, drawing with left or right hand, and other variations involving spatial awareness. (Farrald and Schamber, 1973) 3. Teaching technique and strategy for upper case letters presented in the Eye-Hand Coordination Work Book pages 82-85 are the same as forementioned in teacher interventions for week five. 4. The child is to

practice forming the upper case letters, M,N,O,P,Q, and R on color lined paper.

CRITERION: 90% for perceptual activities. 80% on spatial awareness activities. 90% accuracy for upper case letter formations.

RESULTS: Criterion met for perceptual activities and upper case letter formations. The child confused left and hand directions.

CLASSROOM ACTIVITIES: Mazes and Puzzles Educational Insights
Practice upper case letters M,N,O,P,Q, and R on color lined paper
Pegboard Exercises Unit 3

Week 10

SHORT TERM OBJECTIVES:

1. The child will be able to find and circle a word shown visually from a figure ground of letters.

2. The child will be able to distinguish his left from right.

3. The child will be able to look at a model letter formed with straight and/or curved lines, then find and circle the one copy from a series of three that is exactly the same as the model letter.

4. The child will be able to look at a model letter formed with straight and/or curved lines, then reproduce the letter in sequential writing steps.

5. The child will be able to form the upper case letters S, T,U,V,W,X,Y, and Z on color lined paper.

TEACHER INTERVENTIONS:

1. The child is given six words visually and is asked to pronounce and spell each word, then he is to find the word from a figure ground of letters. Complete Ann Arbor Perceptual Activities Level 1 pages 31-38. 2. "Secret Word Game" (Ferrald & Schamber, 1973) The instructor reads a story and the child is directed to raise his right or left hand each time the key words are read. 3. Teaching technique and strategy for upper case letters presented in the Eye-Hand Coordination Work Book pages 86-91 are the same as forementioned in teacher interventions for week five. 4. The child is to practice forming the upper case letters S,T,U, V,W,X,Y, and Z on color lined paper.

CRITERION: 95% accuracy for perceptual activities. 80% on

laterality. 90% accuracy for upper case letter formations.

RESULTS: Accuracy level was met for perceptual activities, but performance was slow and the child was distracted. "Secret Word Game" accuracy level was 60%. Child is still confused by left and right. Letter formations were consistent with 80% accuracy level.

CLASSROOM ACTIVITIES: Mazes and Puzzles Educational Insights
Practice upper case letters S,T,U,V,W, X,Y, and Z on color lined paper
Pegboard Exercises Unit 3

Week 11

SHORT TERM OBJECTIVES:

1. The child will be able to indicate his relative distance from objects in the room.

2. Given two symbols the child will be able to visually track from left to right across the page, and recognize and circle the sample symbol stimuli from a series of seven symbols.

3. The child will be able to reproduce all upper case manuscript letters.

4. The child will be able to follow a two part oral direction and distinguish correctly direction involving right and left.

TEACHER INTERVENTIONS:

1. The child is asked to indicate his relative distance from objects in the room by answering the instructor's questions. Example: Are you nearer the front or the back of the room? Is the big chair closer to you than the green book? (Ferrald & Schamber, 1973) 2. The instructor points to the symbols displayed at the top of the page. The child is to track from left to right across the series of seven symbols and mark the symbols displayed at the top of the page. Complete Michigan Tracking Program, Symbol Tracking, pages 1-7. 3. The child is asked to reproduce the upper case manuscript letters dictated by the instructor. 4. The child is to follow two part oral directions given by the instructor. These directions involve using his right and left hand and right and left body movements. Following Direction Lessons No. 3, 19, and 27 from Dunn, L & Smith, J. O. Peabody Language Development

Kit #2. Circle Pines, Minnesota: American Guidance Services, Inc., 1966.

CRITERION: 90% accuracy for direction following, distance, and symbol tracking. 100% accuracy for upper case letter formations.

RESULTS: The child exhibited appropriate memory for direction following. Left and right in relationship to his body was inappropriate. Symbol tracking demonstrated erratic skipping around on the page to find visual stimuli. 85% accuracy was demonstrated on the upper case letter post test. Letters formed incorrectly were: J, K, Q, Y, and Z.

CLASSROOM ACTIVITIES: Visual Discrimination Level 1
Continental Press pages 1-12
Discrimination of letter and word forms
Practice upper case letters J, K, Q, Y, and Z on color lined paper
"Simon Says" involving use of right and left

Week 12

SHORT TERM OBJECTIVES:

1. The child will be able to interpret directions on a map. (north, south, east, and west)

2. The child will be able to identify pictures of left and right hand in front and back positions.

3. Given three symbols the child will be able to visually track from left to right across the page, and recognize and circle the sample symbol stimuli from a series of seven symbols.

4. The child will be able to listen to a series of three letters or numbers given by the instructor and recall them auditorially.

TEACHER INTERVENTIONS:

1. The child will be able to interpret the directions on a map by teaching the concept north as up, south down, east to the right, west to the left. 2. The child will be provided with teacher made materials showing these views of the hands. Front view of right and left hand, back view of right and left hand. The instructor will play the game "Do As I Say But Not As I Do" using right and left positions. (Ferrald & Schamber, 1973) 3. The instructor points to the three symbols displayed at the top of the page. The child is asked to track across the page with his finger naming each symbol and marking the symbols displayed at the top of the page. The child is then asked to track across the page without naming each symbol, but using his finger. Complete Michigan Tracking Program, Symbol Tracking, pages 8-17. 4. The child is asked to repeat a series of three numbers, example 437, or three

letters, example AFK, with no more than three errors per exercise. (ten series to an exercise) Auditory Memory Training Exercises, Special School District, St. Louis County. Exercise 1, 2, 6, 7.

CRITERION: 75% accuracy for knowing the directions on a map. 80% accuracy for correct hand positions. 95% accuracy for symbol tracking and 80% accuracy on the auditory memory exercises.

RESULTS: All accuracy levels were met.

CLASSROOM ACTIVITIES: Visual Discrimination Level 1
Continental Press pages 13-24
Discrimination of letter and word forms

Week 13

SHORT TERM OBJECTIVES:

1. The child will be able to interpret directions to complete a simple graph.

2. Given four symbols the child will be able to visually track from left to right across the page, and recognize and circle the sample symbol stimuli from a series of seven symbols.

3. The child will be able to listen to a series of four letters or numbers given by the instructor and recall them auditorially.

4. The child will be able to copy from far-point, two sentences with 100% accuracy.

TEACHER INTERVENTIONS:

1. The child will be given a simple graph. He is to read the directions and graph the information given. Complete Ann Arbor Perceptual Activities, Level 2, pages 52-55. 2. Instructions the same as forementioned in Week 11 Teacher Interventions. During second half of session, time the child's performance and chart his time for each exercise. Complete Michigan Tracking Program, Symbol Tracking, pages 18-25. 3. The child is asked to repeat a series of three numbers or letters. Auditory Memory Training Exercises, 3, 4, 8, and 9. 4. The instructor will place two sentences on the blackboard which the student will read and copy on color lined paper.

CRITERION: 90% accuracy on graphing. 90% on symbol tracking. 80% accuracy on auditory memory exercises and 100% accuracy on far-point copying.

RESULTS: The child enjoyed the graphing and achieved 90% accuracy on three of the graphs. On the fourth graph the child miscounted the horizontal lines although he had the correct symbol on the vertical line. 90% accuracy was achieved on the symbol tracking. Time charted ranged from 3 minutes and 24 seconds to 2 minutes and 13 seconds per page. Far-point copying was done slowly with two omissions of letters and inconsistent spatial organization.

CLASSROOM ACTIVITIES: Far-point copying activities.

Week 14

SHORT TERM OBJECTIVES:

1. The child will be able to follow a three/four part oral direction given by the instructor.

2. The child will be able to follow written instructions, discriminating right and left to complete instructions.

3. The child will be able to copy three sentences from a far-point with 100% accuracy.

4. The child will be able to write down a series of three letters or numbers given by the instructor auditorially.

TEACHER INTERVENTIONS:

1. The child is to follow three/four part oral direction given by the instructor. These directions involve the use of objects in the room and body movements. Following Direction Lessons No. 13, 53, and 63 from Peabody Language Development Kit #3. 2. The child will be able to complete written instructions from Frank Schaffer, Lefty-Righty, pages 1-4. The student must locate the mystery word by first locating the boxed letter from which he is to move right, left, up, or down to discover all the letters in the mystery word. 3. The child is to copy from the blackboard three sentences he has read in his social studies book. 4. The child is to write down a series of three letters or numbers given orally by the instructor. He is to repeat the auditory stimuli before writing it down. Auditory Memory Exercises 5, 6, and 10.

CRITERION: 90% accuracy for following oral directions. 90% accuracy

for following written instruction. Far-point copying should be consistent with preferred script and without omissions. 90% accuracy on Auditory Memory Exercises.

RESULTS: Achieved 95% accuracy level for oral directions. Much teacher intervention was needed for the Lefty-Righty exercises; therefore accuracy was not measured. Copying abilities have improved with 100% accuracy for word forms. Spatial organization was not consistent. 90% accuracy was met for auditory memory exercises.

CLASSROOM EXERCISES: Frank Schaffer, Lefty-Righty pages 5-10
Far-point copying activities

Case #6 Grade Placement 2.8 D.O.B. 2-13-70 C.A. 8-2

LEARNING DISABILITIES EVALUATION: POST-TEST RESULTS

Detroit Tests of Learning Aptitude:

Subtests:	Visual-Kinesthetic Modality	M.A.
5	Motor Speed and Precision	5-6
9	Visual Attention Span for Objects	12-0
12	Memory for Designs	9-0
16	Visual Attention Span for Letters	9-9
17	Disarranged Pictures	7-6
Subtests:	Auditory Modality	M.A.
2	Verbal Absurdities	13-6
6	Auditory Attention Span for Unrelated Words	10-0
10	Orientation	10-6
13	Auditory Attention Span for Related Syllables	7-0
18	Oral Directions	6-9

Slingerland Screening: Form B	High	Average	Low
Near & Far Point Copying	___	✓	___
Visual Discrimination	✓	___	___

Conclusion: Kinesthetic performance and quality of letter formations were consistent with the preferred script. Spatial organization was adequate.

ACADEMIC ACHIEVEMENT: POST-TEST RESULTS

Woodcock Reading Mastery Tests: Form A	Grade Level 2.8
1. Letter Identification	2.9
2. Word Identification	4.8
3. Word Attack	10.1
4. Word Comprehension	3.0
5. Passage Comprehension	4.1
Total Reading	4.1
KeyMath Arithmetic Diagnostic Test	Grade Level 2.8
1. Numeration	2.9
2. Fractions	2.4
3. Geometry & Symbols	3.6
4. Addition	1.8
5. Subtraction	0.5
6. Multiplication	2.0
7. Division	2.4
8. Mental Computation	2.0
9. Numerical Reasoning	2.7
10. Word Problems	2.9
11. Missing Elements	0.5
12. Money	2.5
13. Measurement	2.6
14. Time	3.0
Total Score	2.1

TESTING BEHAVIOR:

During testing this child appeared attentive and responded with adequate language structure. Eye-hand coordination, speed, and precision of paper/pencil tasks are below expectancy level. The child was spontaneous and friendly, but tired easily. He needed some structure with the academic tests and was distracted to some extent on several of the subtests. The child was cooperative throughout with good rapport being easily established.

SUMMARY OF LEARNING STYLE:

Strengths: Specific strengths demonstrated on the DTLA were noted visual sequential memory, auditory sequential memory for words, and auditory attentiveness. In the area of academics, specific strengths were demonstrated in the area of reading. As determined by the Woodcock Reading Mastery Test Form A, this child is functioning above grade level for word identification, word attack, and comprehension skills. One strength was noted in the math area of geometry and symbols. No significant strengths were achieved in any area of math.

Weaknesses: Specific weaknesses were demonstrated on the DTLA in the area of visual/spatial, eye-hand coordination, and visual kinesthetics. Visual motor integration and organizations skills were inadequate. In the area of math specific weaknesses were noted on the KeyMath in the areas of computation skills, the functional use of math and the area of application.

CONCLUSION:

An analysis of this child's academic scores indicates this boy evidenced above grade level scores in reading with superior ability in the area of word attack and word identification. Below grade level scores in math indicated the child is lacking in math knowledge, computation skills, and in the functional use of math.

This child evidenced difficulty with visual-kinesthetic motor integration skills with depressed spatial organizational skills. Testing indicates that this child's visual memory and auditory memory skills are superior to his eye-hand coordination and visual motor abilities. Auditorially the child evidenced difficulty with auditory sequential memory and oral directions. Auditory perception and attention skills are superior to auditory sequential memory.

CONCLUSION TO REMEDIATION:

Based upon 14 weeks of remediation and the scores demonstrated on the post-tests the writer of this paper concludes that this child has improved significantly in the areas of visual-motor memory integration with noted improvement in eye-hand coordination skills. Subtest scores on the DTLA indicate the growth of several years in learning age level scores; although not all the MA's achieved were commensurate with the child's CA. Performance on the Slingerland subtests of Near and Far Point copying and Visual Discrimination exhibited improvement within the average to high

range of achievement. Significant improvement was also noted in the area of auditory sequential memory and orientation which demonstrated above CA scores, except on the oral directions. Auditory attention span for related syllables subtest yielded a lower MA than previously.

In the area of academics the child made expected grade level gains in reading, but was significantly deficient in math. The total math score is one year below expectancy level. Improvement was noted in the area of geometry and symbols, numeration, numerical reasoning, word problems, money, measurements, and time; however, all subtest scores are at or below with the exception of geometry and symbols which measured above expectancy.

It is the opinion of this graduate student that this child continue with remediation sessions. Areas of concern are math computational skills, functional math, visual-motor integration, spatial organization, auditory-visual motor integration skills.

CONCLUSION

This paper has reviewed the topic of learning disabilities, diagnostic learning disability testing, and remediation. The initial section of this paper defined learning disabilities, listed terms describing learning disorders, and summarized characteristics that might indicate a deficiency. One would conclude that the term "learning disabilities" generally refers to the problems of children who, although normal in intelligence, exhibit disorders in perception, sensory-motor, cognitive, academic, or related developmental levels which interfere with the performance of educational tasks; who may or may not show demonstrable deviation in central nervous system functioning; and whose disabilities are not secondary to general mental retardation, sensory deprivation, or serious emotional disturbance. The definition of "learning disability" depends upon the field in which the person is involved, whether he be an educator, physician, psychologist, etc. It is noted by the writer of this paper that the national and state educational agencies' definitions of learning disabilities are concerned with the problem of placement and identification. Individual authorities define learning disabilities in precise and comprehensive terms. These functional definitions are related to basic disorders in the learning process. A large number of descriptive terms have been developed to identify learn-

ing problems. These terms help identify the problem, but they fail to provide specific information needed for planning remediation procedures. Of major importance are the characteristics that relate to causative factors. These characteristics provide a base for explaining academic failures and for establishing directions for remediation. A summary of learning characteristics components, their strengths and weaknesses, aid the diagnostician in identifying all areas that may need to be evaluated in the process of diagnosis and planning for remediation.

The second major section of this paper reviewed tests used in the assessment and diagnosis of learning problems. The writer of this paper chose the following tests to administer: The Kindergarten Auditory Screening Test, The Slingerland Pre-Reading Procedures, The Slingerland Screening Tests, Woodcock Reading Mastery Tests, KeyMath Diagnostic Arithmetic Test, and Detroit Test of Learning Aptitude. These tests were chosen in order to make an accurate diagnosis of learning style and academic achievement. The writer of this paper concludes that these tests are valuable diagnostic instruments because of the profile information they yield. They were designed to provide detailed measurement of learning modalities, specific concepts, and skills. Their intensive emphasis is to distinguish possible learning styles and evaluate academic achievement in a curricular area. The tests are helpful in the identification of specific strengths and weaknesses in the

student's learning style and his mastery of the processes involved in the curricular area being measured. Other well-known tests can aid in the task of diagnosis for most tests do not measure one specific function, but rather they overlap from one area of assessment to another. From tests administered, diagnosticians must be able to identify the different components related to the learning process in order to identify the malfunctioning components from the variety of responses given.

These tests were described in relation to diagnosing learning disabilities. Based upon the results of these tests the writer of this paper was able to identify and diagnose learning disabilities and academic achievement. Once the learning profile patterns were identified, instruction and remediation was adapted for that child's particular style of learning.

The third major section of this paper contained the results of pre and post diagnostic tests. Two groups of children were tested. Children diagnosed by Special School District of St. Louis County as being learning disabled were members of the experimental group. These children remained in a regular classroom and received remedial instruction from this graduate student. The other group of children were members of the control group who did not exhibit a learning disability profile. This graduate student administered the aforementioned tests (see section two) to the control group and experimental group of children as pre tests and

six months thereafter as post tests. The profile information received from pre and post tests determined the strengths and weaknesses of the student's learning pattern and the instructional methods administered to the experimental group. One would conclude from the test results that a child who has a learning disability can successfully achieve in a regular classroom with the use of a diagnostic-prescriptive remedial program. It is also noted that the majority of test scores received by the control group were significantly higher and demonstrated no significant deficiencies in their learning style or academic profiles.

The fourth major section of this paper contained one case study describing a sample child, the diagnostic testing, remedial prescription, summary of remedial procedures, and results of remedial procedures. The section discussed remedial objectives, teaching strategy, and objective criteria. Teaching techniques were described and the commercial materials used were listed along with resource materials consulted. This type of remedial program described in the section proved effective in strengthening the child's learning style with concern for more remediation in the area of math. The Detroit Test of Learning Aptitude indicated a significant growth in mental age on the auditory and visual-motor subtests. From these measurable results the writer of this paper concludes that remedial intervention can increase the child's performance and enable him to continue his education in a regular classroom.

In summary, major testing instruments are useful in the diagnosis of learning disabilities; however, these tests are to be administered by a trained examiner who knows how to identify components of learning characteristics. Diagnostic tests are of value in determining and identifying a learning disability and prescribing remediation procedures. The successful use of the remedial prescription with the child who has a learning disability is the final objective of the diagnostic-prescriptive process. This diagnostic-prescriptive process is on-going during remediation so that an instructor can effectively evaluate the success of remediation procedures. It is important to apply an educational prescription over a period of time long enough to prove its effectiveness. The type of remedial program which is best for an individual child depends upon his learning problems. The program planned for the child should be one which calls for the least possible interruption of the child's regular school life while still providing the degree of attention required to be effective.

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