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THE IDENTIFICATION OF THE LEARNING DISABLED CHILD THROUGH THE USE OF THE BENDER VISUAL MOTOR GESTALT TEST AS A MEASURE OF VISUAL MEMORY

The University of Oklahoma ED.D. 1981

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THE IDENTIFICATION OF THE LEARNING DISABLED CHILD THROUGH THE USE OF THE BENDER VISUAL MOTOR GESTALT TEST AS A MEASURE OF VISUAL MEMORY

A DISSERTATION

SUBMITTED TO THE GRADUATE FACULTY

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BY

ROBERTA H. CLARK

Norman, Oklahoma

1981

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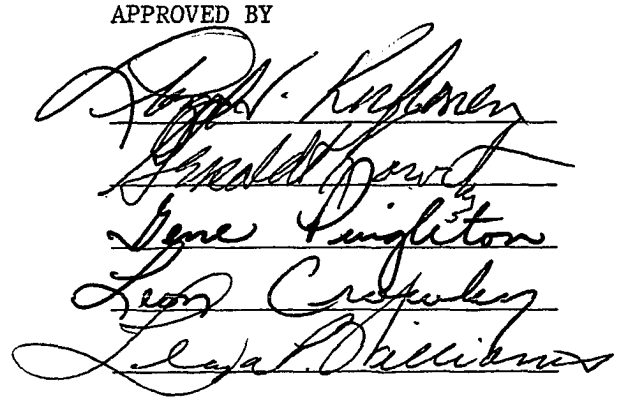
APPROVED BY



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THE IDENTIFICATION OF THE LEARNING DISABLED CHILD THROUGH THE USE OF THE BENDER VISUAL MOTOR GESTALT TEST AS A MEASURE OF VISUAL MEMORY

BY: ROBERTA H. CLARK

MAJOR PROFESSOR: LLOYD J. KORHONEN, Ph.D.

The major purpose of this study was to develop better utilization of the Bender Visual Motor Gestalt Test (BVMGT) as a diagnostic tool for the identification of the learning disabled (LD) child. It was used as a test of visual memory. Most of the research which has used the BVMGT to investigate visual memory has been restricted to adults.

The primary purpose of the BVMGT is not to measure recall but to measure visual motor development. The Memory-For-Designs Test (MFDT), which is a test of visual recall and does discriminate between the LD and non-learning disabled (NLD) child, was correlated with the BVMGT.

The study was concerned with five primary questions:

1. Does the Memory-For-Designs Test discriminate between the learning disabled and non-learning disabled child?
2. What is the relationship of (a) the Memory-For-Designs Test to the Bender Visual Motor Gestalt Test Copy, (b) the Memory-For-Designs Test to the Bender Visual Motor Gestalt Test Recall?
3. Does the Bender Visual Motor Gestalt Test Copy or the Bender Visual Motor Gestalt Test Recall have the strongest relationship with the Memory-For-Designs Test?

4. Is there a relationship between the learning disabled children placed by the placement team and those identified as learning disabled by the Bender Visual Motor Gestalt Test Recall?
5. Will more children be identified as learning disabled by the placement team or by the Bender Visual Motor Gestalt Test Copy?

The population utilized in this study were 64 randomly selected subjects from the total number of students who had been referred for evaluation because of academic problems. Students whose suspected primary difficulty was mental retardation, emotional disturbance, or other handicapping conditions were eliminated. Subjects ranged in age from 8.5 to 11.11 years.

The Bender Visual Motor Gestalt Test Copy (BVMGTC), the Bender Visual Motor Gestalt Test Recall (BVMGTR), and the Memory-For-Designs Test (MFDT) were individually administered under uniform testing conditions. The BVMGTC and BVMGTR were scored according to Koppitz' Developmental Bender Test Scoring System (DBTSS). The MFDT protocols were scored according to the Graham and Kendall scoring system.

The general design of the study was a linear sequencing of testing alternative hypotheses. All tests of significance were at the .05 level.

Statistical analysis of the hypotheses did not reveal any significant findings. The LD and NLD groups were found to be equivalent on the BVMGTC and BVMGTR tasks. The MFDT, the BVMGTC,

and the BVMGTR were unable to discriminate between the LD and NLD child to a greater degree than the placement team criteria.

Several recommendations for future research were made: (a) what type of memory does the BVMGTR measure; (b) development of stratified means and standard deviations for the BVMGTR; and (c) more research needs to be conducted using the BVMGTR with children as the subjects.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS iii

LIST OF TABLES vi

FIGURE CAPTION vii

CHAPTER

I. INTRODUCTION 1

Statement of the Problem 2
Limitations of the Investigation 3
Significance of the Study 4
Definitions of Terms 4

II. REVIEW OF LITERATURE 7

The Education for All Handicapped Children Act of 1975, Public Law 94-142 7
Learning Disabilities 12
Visual Perception 19
Visual Memory 20
Bender Visual Motor Gestalt Test 22
Memory-For-Designs Test 25
Summary 27

III. RESEARCH DESIGN 29

Statement of the Problem 29
Hypotheses 30
Size and Description of the Sample 30
Description of the Instruments 32
Bender Visual Motor Gestalt Test 32
Scoring 33
Reliability of Koppitz' Scoring System 34
Validity of Koppitz' Scoring System 35
Normative Data 36
Memory-For-Designs Test 37
Graham and Kendall Scoring System 37
Reliability 39
Validity 39
Additional Data 39

Data Collection Procedures 40
Administration of the Instruments 40
Criteria for Identification of Learning Disabilities. 41
Federal, State and Putnam City School District Definition of Learning Disabilities 42
Evaluation of Children Suspected of Having a Learning Disability 42
Criteria for Determining the Existence of a Learning Disability 43
Determining Eligibility for Learning Disabilities Placement 46
Statistical Analysis 47
Procedures 47
Limitations 50

IV. RESULTS 52

Background of the Problem 52
Analyses of Data 53
Summary 58

V. DISCUSSION 61

Conclusions 61
Recommendations for Future Research 66
Summary 67

REFERENCES 68

APPENDIX A

Pilot Study 80
Normative Data for Developmental Bender Test Scoring System 81
Raw Data - Learning Disabilities 82
Raw Data - Non-Learning Disabilities 83
Memory-For-Designs Test Scoring Sheet 84
Koppitz Scoring System for the Bender Gestalt 85

LIST OF TABLES

TABLE

1. Putnam City Schools Handicapped Children Data, December, 1979, and December, 1980 18

2. Demographic Description of Sample 44

3. "t" Tests Between Means of LD and NLD Groups on the MFDT . 54

4. Intercorrelations Among Two BVMGT Measures and the MFDT . 55

5. Hotelling's "t_{d}" Test Between "r" of LD and NLD for Two BVMGT $\bar{r}$ Measures and MFDT Scores 56

6. Percentage of Children Identified by the BVMGTR from Putnam City Data v. Placement Team Criteria 58

7. Percentage of Children Identified by BVMGTC from Putnam City Data v. Placement Team Criteria 59

8. Percentage of Children Identified by Koppitz' BVMGTC Data v. Placement Team Criteria 59

Figure Caption

Figure 1. General Design of Study 31

THE IDENTIFICATION OF THE LEARNING DISABLED CHILD THROUGH THE USE OF THE BENDER VISUAL MOTOR GESTALT TEST AS A MEASURE OF VISUAL MEMORY

CHAPTER I

INTRODUCTION

One of the major issues in special education today is the identification of the learning disabled child. With the passage of The Education for All Handicapped Children Act of 1975, Public Law 94-142, there has been increased interest in the identification process of all handicapped children. Educators and psychologists continue to express concern about their ability to evaluate and diagnose the handicapped child. They are seeking new techniques by which their discriminatory skills may be refined. "The need is not so much for more tests as it is for a better and more complete utilization of existing tests." (Koppitz, 1964).

In 1947 Louttit and Browne conducted a survey of the most utilized testing instruments. This type of research was repeated by Sunberg in 1961. Of 63 psychological tests, the Bender Visual Motor Gestalt Test (BVMGT) ranked fourth in test usage by clinical psychologists. Tarnopol (1969) reviewed a number of test batteries that were used in this country for the identification and assessment of children with learning disabilities and found the BVMGT

to be one of the most frequently utilized instruments. According to Sabatino and Ysseldyke (1972), the most commonly administered clinical test was the BVMGT. The BVMGT is regarded by four out of every five clinicians to have value for diagnoses of learning problems regardless of the purpose of their testing, the load, or the nature of their patients (Schulberg and Tolor, 1961). The general use of the BVMGT indicates that it has played a vital part in the educator's and clinician's diagnostic test battery.

The Bender Visual Motor Gestalt Test (Bender, 1946) was developed as a means of evaluating the maturation of visual motor functioning in children four to eleven years of age. Test results showed that the test had wide use for children as well as adults. The purpose of the test is to provide a record of perceptual motor experiences.

Statement of the Problem

The problem investigated in this study was the use of the BVMGT as a measure of visual memory to identify the learning disabled (LD) child.

Most research which has utilized the BVMGT to investigate visual memory has been restricted to adults. The two major exceptions have been the studies by Hutton (1966), Snyder and Pope (1970). Psychometrists and psychologists administer the recall phase of the BVMGT. The results of the memory phase are usually filed in the child's records and are not used for any diagnostic purpose.

The primary purpose of the BVMGT is not to measure recall but to measure visual motor age. The Memory-For-Designs Test (MFDT)

is a test of visual recall and has been shown to discriminate between the LD and non-learning disabled (NLD) child.

The investigation has addressed itself to five primary questions:

1. Does the Memory-For-Designs Test discriminate between the learning disabled and the non-learning disabled child?

2. What is the relationship of (a) the Memory-For-Designs Test to the Bender Visual Motor Gestalt Test Copy, (b) the Memory-For-Designs Test to the Bender Visual Motor Gestalt Test Recall?

3. Does the Bender Visual Motor Gestalt Test Copy or the Bender Visual Motor Gestalt Test Recall have the strongest relationship to the Memory-For-Designs Test?

4. Is there a relationship between the learning disabled children placed by the placement team and those identified as learning disabled by the Bender Visual Motor Gestalt Test Recall?

5. Will more children be identified as learning disabled by the placement team or by the Bender Visual Motor Gestalt Test Copy?

Limitations of the Investigation

1. The sample population was drawn from the elementary students of the Putnam City School System.

2. The population utilized in this study was 64 randomly selected subjects from the total number of students who were referred to the Putnam City Schools for evaluation of learning disabilities between November, 1979, and November, 1980.

3. The 64 subjects ranged in age from 8.5 years to 11.11

years and were referred because of academic problems. Students whose suspected primary difficulty was mental retardation, emotional disturbance, or other handicapping conditions were eliminated.

Significance of the Study

The major purpose of this study was to determine how the BVMGT can be better utilized as a diagnostic tool to discriminate between the normal child and the learning disabled (LD) child when used as a test of visual memory.

Since the Bender Visual Motor Gestalt Test is one of the major diagnostic tools administered by psychometrists and psychologists, the investigation of the recall phase should be useful in providing more meaningful data which can be utilized by various professionals.

Definition of Terms

The Education for All Handicapped Children Act of 1975, Public Law 94-142 (PL 94-142). This Act contains mandatory stipulations that all handicapped children ages three to eighteen years by 1980 have available to them a free, appropriate public education in the least restrictive environment. Related services must also be provided. This law provides federal financial assistance to states and local education agencies which are in compliance with the law for the purpose of assuring that all handicapped children are provided a complete public educational program.

Federal Definition of Learning Disabilities. For this study, the definition proposed by PL 94-142 will be used to refer to

learning disabilities: 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 aphasia, 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 disadvantage. (PL 94-142, 1975).

Short-Term Memory. The interval between presentation and recall. It refers to the retention of new information over short periods of time--for example, up to thirty seconds.

Visual-Motor Skill. The ability of the eye and hand to work together to reproduce visually presented stimulus.

Visual Perception. The ability to recognize and discriminate visual stimulus--e.g., geometric forms, letters, words, numerals, etc.

Visual Memory. The storing in the memory of visually presented stimulus. This storage may be either for a short or long period of time.

Discrimination. The distinction between the learning disabled child who meets the criteria for placement in a special education program and the normal child who does not qualify for special

placement.

Gestalt Function. That function of the integrated organism whereby it responds to a given constellation of stimuli as a whole, the response itself being a constellation or pattern or gestalt. (Bender, 1938, p. 3).

Individualized Education Program (IEP). A management tool that is designed to insure that each handicapped child is provided special education and related services appropriate to his/her special learning needs. Must be developed by a team at the eligibility/placement team meeting.

CHAPTER II

REVIEW OF LITERATURE

The review of literature presented in this chapter is centered on six subtopics which relate to the total study. The discussion relating to each subtopic presents the significant research pertaining to the area discussed. Neither time nor space permits an elaborate discourse concerning all studies relevant to each subtopic. The first section of this chapter is a brief history of the events which led to the passage of The Education for All Handicapped Children Act of 1975, Public Law 94-142. A brief review of the learning disability movement is described in the second section. Section three touches upon the topic of visual perception. The fourth section includes the subject of memory and visual recall. The fifth section centers around the Bender Visual Motor Gestalt Test as it applies to the identification of the learning disabled child. The Memory-For-Designs Test, as a means of identifying the LD child, is the topic of the sixth section. Finally, the literature findings are summarized in the last section.

The Education for All Handicapped Children Act of 1975, Public Law 94-142

Court decisions on special education have had a massive impact on the education of handicapped children and adults. The precedents set forth by court rulings were necessary in order that appro-

priate educational services and opportunities were not denied to these special people.

A review of the history of PL 94-142 indicates the evolutionary nature of education for handicapped persons. Between 1827 and the passage of PL 94-142 in 1975, 195 laws specific to the handicapped were enacted (Meyen, 1978). From March, 1970, through November, 1975, 61 of these laws were passed. In 1974, 36 federal bills which were directly or indirectly related to the handicapped and gifted were signed into law (LaVor, 1976).

An indepth review of legislative history pertaining to the handicapped is beyond the range of this chapter; therefore, only the major court cases and legislation preceding PL 94-142 will be discussed.

Court Cases

The foundation for later court cases regarding special education was based on court rulings pertaining to the civil rights cases founded on the Fourteenth Amendment of The United States Constitution. The importance of the right to an equal education was first recognized by the United States Supreme Court in 1954 in Brown v. Board of Education of Topeka. The Court in Brown stated:

> In these days, it is doubtful that any child may reasonably be expected to succeed in life if he is denied the opportunity of an education. Such an opportunity, where the state has undertaken to provide it, is a right which must be made available to all on equal terms (Ohio State Law Review, 1979).

The Brown Court concluded that "in the field of public education the doctrine of 'separate but equal' has no place. Separate educational facilities are inherently unequal." (Reutter and Hamilton, 1976). The ruling was based on belief in equality once the state had provided public education.

Although Brown established the right to an equal educational opportunity, it was not until the cases of Pennsylvania Association for Retarded Children (PARC) v. Pennsylvania (1971) and Mills v. Board of Education of District of Columbia (1972) that the Court decision in the Brown case had meaning for the handicapped. The PARC was a class action suit filed on behalf of all the retarded children in Pennsylvania. There was not an actual court ruling in this case (Lippman and Goldberg, 1972). Since the case was settled by agreement of the parties, no actual ruling was required by the court. The agreement provided that Pennsylvania place each mentally handicapped child in "a free public program of education and training appropriate to the child's capacity." It further provided a guarantee to the child and his family of "the right of due process and written notice." (Ohio State Law Review, 1979).

Mills was not like the PARC case. It was resolved by a judgment against the defendant school board (Turnbull and Turnbull, 1978). The suit was filed in behalf of children who were not retarded but had other handicapping conditions. The court ruled that no handicapped child could be barred from a regular public school assignment unless the child was provided adequate alternative educational services appropriate to the child's needs, a constitutionally

adequate prior hearing, and a periodic review of the child's status and progress (Ohio Law Review, 1979). These rulings were later incorporated into PL 94-142 in 1975.

Educational and legal authorities were relied on by the courts in both the PARC and Mills cases to support their findings that education was necessary to permit a child to function in society. The courts applied the equal-protection and due-process guarantee of the Fifth and Fourteenth Amendments to provide this major right to handicapped students (Turnbull and Turnbull, 1978). Ensuing cases have followed closely the legal arguments made in PARC and Mills.

Federal Bills

Traditionally education has been a local and state matter. This is based on the Tenth Amendment. Funds in past years have provided incentives to the states for the development of their own special education services with little federal control. In 1975, The Education for All Handicapped Children Act, Public Law 94-142 (PL 94-142), was passed. This was a landmark decision as it contained a mandatory provision (Meyen, 1978). It mandated that in order for a school system to receive federal funds "beginning September, 1978, every school system in the nation must make provisions for a free, appropriate public education for every child between the ages of 3 and 18 (ages 3 to 21 by 1980) regardless of how seriously he may be handicapped." (Turnbull and Turnbull, 1978).

PL 94-142 is the most recent federal legislation passed in a long list of federal enactments. In 1958 PL 85-926 was passed.

This law provided training grants to institutions of higher learning and state education agencies to train professional personnel to work with the mentally retarded. In 1963 PL 88-164 was passed. Funding was provided to train professional personnel to work with the other areas of the handicapped in addition to the mentally retarded.

One of the most important acts to be passed was PL 89-750 in 1966. This was an amendment to the Elementary and Secondary Education Act (ESEA) of 1965. This Act was important because it established the Bureau of Education for the Handicapped (BEH) in the U. S. Office of Education (Hallahan and Kauffman, 1978). Grants were also provided to states for pre-school, elementary and secondary school children under Title VI, ESEA monies.

Public Law 93-380, the Education of the Handicapped Amendment, was passed in 1974 to extend and amend the Elementary and Secondary Education Act of 1965 (Meyen, 1978). Because it represents major statements on confidentiality and due process procedures, this law is sometimes referred to as the Privacy and Procedure Act. Programs for the education of handicapped students were funded through this Act with Title VI-B money.

Many educators tend to perceive PL 93-380 and PL 94-142 as representing the major legislative resources for the improvement of education for handicapped children. The review of literature would not be complete, however, without the inclusion of Section 504: The Rehabilitation Act of 1973. Section 504 is the first federal civil rights law which specifically protects the rights of the handicapped (Meyen, 1978). The regulations of Section 504 are similar to those

in PL 94-142. Both guarantee a free appropriate public education to all handicapped children and guard against discrimination by any public agencies furnishing special education services.

Major changes have occurred in our society in relation to the education of all handicapped children. The courts, beginning in 1954, and federal legislation beginning 1958, have become major forces in decreeing the right of all handicapped children to a free and appropriate education.

Learning Disabilities

History

Children who cannot learn in school, despite the fact that they have the abilities and intelligence required for successful academic achievement, have perplexed educators for years. These children have been labeled "learning disabled" (LD). The field of learning disabilities, as we currently know it, is still in the integration phase. In 1974 Weiderholt, in The Second Review of Special Education, published one of the most comprehensive reviews of the history of learning disabilities. The history had been presented earlier at the 1974 International Conference of the Association for Children with Learning Disabilities. Three distinct periods of development were listed by Weiderholt (1974): "(1) The foundation phase (about 1800-1930); (2) The transition phase (about 1930-1960); (3) The integration phase (1963-the present).

According to Weiderholt (1974) the foundation phase included the major contributions of Gall (1802), Bouillaud (1825), Wernicke (1908), Head (1926), Orton (1925), and Goldstein (1939). Orton

(1928), an early pioneer, used the term "strephosymbolia" for reading problems in children. The writings by Goldstein (1936) about perception and motor theory during this phase had an influence on the later works of Werner and Strauss.

> Thus, Werner and Strauss, relying heavily upon the work of Goldstein and others, postulated specific disabilities in perception, thinking, reasoning, concept formation, behavior, body awareness, and attention of brain injured children. Their work was to have a profound effect upon the growth of the LD field (Weiderholt, 1974).

The transition phase saw the publication of books, journal articles and diagnostic tools. Remedial techniques were developed and implemented in an attempt to provide educational programs to those children and adults identified as LD.

In 1947 Strauss and Lehtinen published a book Psychopathology and Education of the Brain Injured Child. The term "brain injured" was originated in this book. This term was used to describe a variety of characteristics and caused considerable confusion. A new term "Strauss Syndrome" was introduced by Stevens and Birch (1957), which was used to describe the child who had perceptual defects and learning disorders. One of the first major textbooks in the field of learning disabilities was the publication in 1960 of Kephart's The Slow Learner in the Classroom. In the field of perceptual motor theorists, Kephart was pre-eminent (Li, 1977).

Two of the major contributors in the field of special education and learning disabilities in particular, were Samuel Kirk

and William Cruickshank (Weiderholt, 1974; Li, 1977).

> While Kephart emphasized the conceptualization of perceptual motor matching, Kirk took the route of C. E. Osgood's model of communication and the Illinois Test of Psycholinguistic Abilities (ITPA) and Cruickshank, the concept of the psychoeducational match and structure (Cruickshank, 1977).

One of the most popular tests during this period was the Developmental Test of Visual Perception published by Frostig (1961) and her co-workers. Five visual perceptual areas were measured: (1) eye-motor coordination; (2) figure-ground perception; (3) form constancy; (4) position in space; and (5) spatial relationships. This test lost its popularity in the 1970's and is no longer widely used.

> Thus, Frostig, Getman, Borsch, Kephart, Cruickshank and Lehtinen, operating in the transformation phase, felt that perceptual-motor functions were fundamental, if not essential, to academic success in reading, writing and other basic school subjects. They viewed these functions as developmental in nature and strongly suggested that perception must be reasonably intact before academic skills can be mastered (Weiderholt, 1974).

During the integration phase, the field of specific learning disability became a reality (Weiderholt, 1974). The Fund for the Perceptually Handicapped Children met on April 6, 1963, in Chicago. One of the major issues of the conference was the choice of a name

for the new organization. The name chosen was the Association for Children with Learning Disabilities (ACLD).

Li (1977) in her review of the history of learning disabilities stated:

> Several major events occurred in the late 1960's. In January, 1968, the first issue of the Journal of Learning Disabilities made its appearance. Also in 1968, the Division for Children with Learning Disabilities (DCLD) was established within the Council for Exceptional Children. The U. S. National Advisory Committee on Handicapped children made its first annual report in January, 1968, and included the area of learning disabilities in its recommendations for the first time. This committee also presented a definition of learning disabilities which has become the 'official' and the most widely used definition since . . . The first official recognition at the federal level came in 1970 with the passage of U. S. Public Law 91-230, which contained a subpart that referred to learning disability as a separate handicapping condition. Thus, the field of learning disabilities has come into being as a separate entity in the field of special education.

In August, 1975, The Education for All Handicapped Children Act of 1975, Public Law 94-142 (PL 94-142), was passed. Learning disabilities was listed as one of the major handicapping conditions. December 29, 1977, saw the passage of specific federal regulations

for learning disabilities. These regulations were published in the Federal Register, Volume 42, December 29, 1977. The guidelines set forth in the Federal Register are the ones which are in operation at the present time.

Problems

> Despite this rapid growth during the 1960's and 1970's, or perhaps because of it, the LD field is currently confronted with several major problems. These include problems of definition, territorial rights, and an adequate data base (Weiderholt, 1974).

The definition which is currently being used is the one which was introduced by Kirk in 1963, proposed in 1968 by the National Advisory Committee on Handicapped Children, and is included in the Federal Register, Volume 42, December 29, 1977:

> 'Specific learning disability' means a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, which may manifest itself in an imperfect ability to listen, think, speak, read, write, spell or to do mathematical calculations. The term includes such conditions as perceptual handicaps, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia. The term does not include children who have learning problems which are primarily the result of visual, hearing, or motor handicaps, of mental retardation, of emotional disturbance, or of environmental, cultural, or economic

disadvantage.

Vaughn and Hodges (1973) conducted a study using ten LD definitions that were to be ranked in order of acceptability as a working definition by 100 practitioners in the field of special education. Four definitions which were abstract in nature were rejected by the group. Another study was conducted by Mercer, Forgone and Wolking (1976) which surveyed 42 state departments of education regarding their particular definitions of learning disabilities. The study revealed most definitions were abstract in nature. "Most states listed descriptive criteria for LD children but have not operationalized these definitions in terms of explicit criteria such as test scores" (Mercer, Forgone and Wolking, 1976). Most of the states operate as Oklahoma does, using an interdisciplinary team for selection of an LD child. Prevalence figures were not generally included in state definitions; 24% of the states suggested prevalence figures which ranged from 1 to 7%.

There have been no major changes in the definition of LD in almost twenty years. The development of an acceptable definition is necessary to the success of the field of learning disabilities if it is to prosper and grow.

Gender

A review of LD literature and other special education programs revealed that more males than females are referred for evaluation and placed in special programs (Robbins, Mercer and Meyers, 1967; Nicholson, 1967; Hyde, 1975; Tomlinson, et al, 1977).

One study concluded that the major reason teachers referred

children at the elementary level was academic problems, while secondary teachers usually referred children for behavioral disturbances (Robbins, Mercer and Meyers, 1967). It was also reported that males had a higher rate of referral for behavior problems. Hyde (1975) found in her study, as did Gilbert (1957) and Nicholson (1967), that academic difficulties accounted for the majority of all school psychological referrals.

Males usually outnumber females in special education programs a little more than 5 to 1 (Critchley, 1964; Goltesman, 1979). The data reported on Table I for grades one through twelve are taken from the December, 1979, and December, 1980, Oklahoma State Department of Education Handicapped Children Register for the Putnam City Schools and give further evidence that there are more males than females in LD programs.

Table 1

1979						1980					
Males		Females		Total		Males		Females		Total	
n	%	n	%	n	%	n	%	n	%	n	%
721	71	296	29	1017	100	674	70	284	30	958	100

The reasons for more males than females may vary. Miller (1972) suggested that teachers tend to rate students on one criterion--classroom performance. Werry and Quay (1971) reported that behaviors found in females such as shyness, hypersensitivity and physical complaints do not attract the attention of the classroom teacher.

Research leaves many questions unanswered, but this is known: there are more males referred for evaluation and more males placed in special education programs.

Visual Perception

Visual perception is involved in perceptual motor functioning and affects the quality of the perceptual motor performance (Silver, 1953). Attneave (1954) considered visual perception as a processing system, believing that much information perceived by the system is repetitious. Individuals may have a motor impairment which limits their ability to copy geometrical forms and yet have no perceptive impairment (Koppitz, 1964). A child may copy a form incorrectly and comment that the drawing is incorrect, but be unable to correct it. The problem is a motor deficit. The functions of visual perception and motor coordination are separate, but both are necessary parts of visual-motor perception (Bender, 1970).

Some writers believe that visual perception is the primary learning channel (Frostig, 1966; Getman, 1961). It is through visual perception that an individual is able to learn and understand what is seen. The process is ongoing, thus allowing information about the environment to be continuously processed (Whipple and Waterman, 1977).

Some researchers (Larsen and Hammell, 1975) contend that there is not a high correlation between selected visual-perceptual abilities and school learning while others consider it to correlate highly with academic success (Kephart, 1960; Getman, 1961; Frostig and Maslow, 1973).

A unanimously agreed-upon definition and theory of visual perception does not exist, and any efforts to formulate a satisfactory definition would result only in more problems and failure (Leibowitz, 1965).

Visual Memory

Psychologists believe memory to be a very important part of the learning process. It is through the use of memory that students apply their past knowledge of information to current learning tasks. The interest in the study of children's memory can be traced several centuries. Two areas of memory studied have been the type of material recalled and the order of recall. One of the first studies which considered the type of material was conducted by Jacobs (1887), who found age differences in digit span, and Kirkpatrick (1894), who found developmental changes in free-recall performance. Children's recall was studied by Binet and Henri (1894), and they reported that memory for prose was superior to that for lists of unrelated words.

The twentieth century has seen a continuation of research involving memory, more specifically visual recall. The type of material used to test memory does affect the results secured. Experimental results indicate that the most difficult material to reproduce is nonsense syllables, then letters, then digits, sentences, and related words (Blankenship, 1938). Brener (1940) concluded from his study that the materials in terms of increasing difficulty were: digits, consonants and colors (the latter two of about equal difficulty), concrete words, geometrical designs, and abstract words (the latter three of about equal difficulty), paired

associates, nonsense syllables, memory for commissions, and sentences. In a similar study, Cavanagh (1972), using the visual modality, reported the easiest to more difficult materials to recall were digits, colors, letters, geometrical shapes, words, random forms and nonsense syllables. Sentences are easier to remember in both short and long-term memory than comparably long lists of random words (Coleman, 1963; Marks and Jack, 1952).

Not only is the type of material presented important in memory, but also the amount of information that can be recalled. One of the more significant studies concerning the quantity of information that can be stored was done by Miller (1956). According to Miller, the memory span is a fixed number of units or chunks, seven plus or minus two units. The number of chunks of information can be increased simply by recoding or regrouping information into larger chunks, each chunk containing more information than the previous chunk.

The average number of correct letters recalled by the subjects in Sperling's (1960) study was 4.3 from a total of eight letters. The mean number of digits reported by Mackworth's (1963) subjects was 7.6. Harber (1969) found that subjects were able to report 4.5 items from brief stimulus exposures of 5 or more symbols. These studies reflect the theory of seven plus or minus 2.

One principle that has evolved from the study of children's intellectual development (and more specifically, their capacity to recall information) is that children are incapable of dealing with more than a few items of information at a time. Children of the

same age many times differ in their ability to recall information as well as children of varying ages do. Several experimenters found that it was not as much a difference in age as in the ability of older children to apply more sophisticated memory strategies (Chi, 1977; Farnham-Diggory, 1972; Case, 1978; Kail, 1979). The results of Dempster's (1978) study with children from seven to twelve years of age suggest that age differences in memory span reflect chunking processes.

Another area of concern in visual memory is that of serial position. A subject may be presented a series of items and asked to recall them in a specified order, or the subject may be free to recall as many of the items as he can in any order. Past studies (Bigham, 1894; Robinson and Brown, 1926; Hovland, 1951; Broadbent, 1958) have found that items appearing in the first and final position are more often recalled. Items appearing between the first and final positions show a relatively low rate of recall. Also, the first half of a series is usually recalled more frequently than the second half (Robinson and Brown, 1926; Broadbent, 1958). Studies conducted using the BVMGT have resulted in similar conclusions (Goodstein, Spielberger and Williams, 1955).

Bender Visual Motor Gestalt Test

The Bender Visual Motor Gestalt Test (Bender, 1946) was first published in 1938 in the Research Monograph No. 3 of the American Orthopsychiatric Association under the title of "A Visual Motor Gestalt Test and Its Clinical Use." In 1946 Bender updated the Visual Motor Test under the title of the Bender Visual Motor

Gestalt Test: Cards and Manual of Instructions. Since that time there has been an increased demand for the test forms. Several hundred research articles have been written about the BVMGT, which include topics from the use of the BVMGT as a means for identifying brain dysfunction in children and adults to the identification of children with emotional problems. The BVMGT was originally used as a maturational test in visual motor gestalt function in children (Bender, 1938).

The BVMGT can be interpreted in several ways to identify various visual motor problems and school problems in children. This section will be concerned with the review of literature which relates to the use of BVMGT for the identification of learning problems in children and recalled reproductions of the BVMGT.

Bender Visual Motor Gestalt Test Copy

Inferior copies of the BVMGT figures frequently have been related to learning disorders and poor school achievement in children (Ames, 1969; Billingslea, 1963; deHirsch, 1966; Keogh, 1969; Koppitz, 1958, 1964, 1970, 1975; Thweatt, 1963). The results of a study conducted by Koppitz (1960) with 1055 school-age children first through fourth grades, found the BVMGT to be valuable in the identification of children with poor visual motor maturation, a good predictor of school achievement. Several investigators have concluded from their studies that the total developmental BVMGT scores can differentiate between groups of successfully performing children and groups of children with reading problems (Ackerman, et al, 1971; Connor, 1969; Hunter and Johnson, 1971; Kerr, 1972;

Stavrianos, 1971). Bender Visual Motor Gestalt Test scores have been shown to correlate closely to achievement in arithmetic for first through fourth grade children (Ackerman, Peters, Dykman, 1971; Henderson, Butler and Gaffeney, 1969; Keogh and Smith, 1967; Koppitz, 1964).

The BVMGT has been widely used in diagnosing brain dysfunction of learning disabled persons (Barkley, 1949; Beck, 1959; Bender, 1938, 1964, 1970; Hanvik, 1953; Koppitz, 1962; Shaw and Cruickshank, 1956). Most of the research in this area has utilized adults as subjects. Only Bender (1970), Hanvik (1953), Koppitz (1963), Shaw and Cruickshank (1956) have exclusively used children. Koppitz (1962) used 384 elementary-age children ranging in age from five to ten years. Her findings were significant at the .001 level for all five age levels tested. The brain-damaged subjects were rarely found to have good Bender protocols whereas the Bender scores for the non-brain damaged group were above average in three out of four cases.

Bender Visual Motor Gestalt Test Recall

There have been many studies using the BVMGT copy, but there have been few studies using the BVMGT recall (Armstrong, 1965; Garron and Cheifetz, 1965; Gavales and Millon, 1960; Goodstein, Spielberger and Williams, 1955; Hutton, 1966; Koppitz, 1975; McPherson and Pepin, 1955; Olin and Reznikoff, 1957, 1958; Peek and Olson, 1955; Shein, 1975; Stewart, 1957; Tolor, 1956; Weiss, 1970). There have been very few studies which have used children as their only subjects. The studies which concerned children were completed by Hutton (1966),

Koppitz (1975), Shein (1975), and Weiss (1970). In the study conducted by Hutton (1966), the number of Bender designs recalled increased as both age and intelligence increased. The question as to how many designs an average child of a certain age can be expected to recall was not answered. The order in which Bender designs are recalled was reported by Weiss (1970). Figures 8 and 1 were the two designs most frequently recalled. Figure 3 was the least recalled design. This was also reported by Shein (1975) and Olin and Reznikoff (1958). Koppitz' (1975) research concluded that the degree of accuracy in copying the Bender Test designs is not related to the subsequent recall thereof.

"At this point it is not clear just what the Bender Test Recall method measures and how it can contribute to a better understanding of children's mental processes, or how it can improve the diagnosis of problems in school children" (Koppitz, 1975).

Memory-For-Designs Test

Since its introduction in 1946, the Memory-For-Designs Test (Graham and Kendall, 1960) has been used mainly to discriminate brain-damaged persons from other types of handicapped individuals. Grundvig, Needham and Ajax (1970) and Persinger and Holmes (1978) reported that the MFDT is the most extensively used of any single psychological test for the diagnosis of perceptual, motor and memory deficits related to organic brain dysfunction.

MFDT-BVMGT

Only a limited amount of research conducted using both the MFDT and the BVMGT for identification of brain damage in children

is available. There have been research studies conducted which have obtained a positive correlation between scores on the MFDT and BVMGT as indicators of brain damage in mental hospital patients. Anglin, Pullen and Games (1965) obtained point-biserial correlation of .55 for the BVMGT and .67 for the MFDT in comparison to a dichotomous criterion rating of brain-damaged or non-brain damaged based on staff diagnosis. These validity coefficients did not differ significantly. Quattlebaum (1968) obtained a correlation of .85 between MFDT scores and BVMGT scores. Sixty-nine percent of all subjects scored in the same range on both tests, and no subject scored in the critical range for brain damage on one test and in the normal range on the other.

Memory-For-Designs Test - Diagnostic Tool

Defective visual-motor functioning is one cause of reading disability in children. Walters (1961) conducted an investigation using the MFDT to identify reading disabilities in 35 second-grade children ages 7 years 5 months to 8 years 5 months. The results of this study suggest that reading retardation is related to visual-motor development as measured by the MFDT. The mean difference of 26.71 (SE of 11.40) in favor of the better reading group ("t" = 2.3429) was significant at the .05 level.

In a study conducted by Bannatyne (1969) in which he investigated visuo-spatial and visuo-motor Memory-For-Designs Tests and the relationships that various measures on these tests have to other sensory, motor and psycholinguistic functions, he found that fragmentation on the MFDT was associated with visuo-spatial organization and that the MFDT ranked number one out of five tests in the

ability to identify poor visuo-spatial visuo-motor organization which relates to neurological dysfunction.

Summary

A pattern of concern for exceptional children has been developing since the turn of the century. It was not until the 1970's that major legislation was passed. Public Law 94-142, The Education for All Handicapped Children Act of 1975, was a landmark decision as it contained a mandatory order to provide special education to all handicapped children. Internalized within PL 94-142 was the establishment of due process procedures and procedural safeguards. The concept of "separate is not equal," which was established in the Brown case, was implemented. The impact of the litigation and legislation of the 1970's is continuing to affect the field of special education in the 1980's.

Included in the 1970's was the rapid expansion of the field of learning disabilities, which is defined under PL 94-142. The infant field of LD is in need of an operational definition. This need has given rise to the development and refinement of diagnostic tools. One of the earliest test instruments used to diagnose visual-motor-perceptual problems in LD children was the Bender Visual Motor Gestalt Test. Another test which has been used by clinicians for the same purpose is the Memory-For-Designs Test. The instruments measure visual perception and motor coordination. Memory, an important factor in learning, is measured by the MFDT. Studies have been conducted which used the BVMGT as a test of recall. As Koppitz (1964) stated, "The need is not so much for more tests as it is for

complete utilization of existing tests."

The achievements of the 1970's have made the "specialness" of special education more special. In the decade of the 1980's, education has a responsibility to continue the progress made in the past through the development of better instructional technology and to validate organizational models for the delivery of special education services.

CHAPTER III

RESEARCH DESIGN

The elements describing the research design are: (a) Statement of the Problem; (b) The Hypotheses; (c) Size and Description of the Sample; (d) Description of the Instruments; (e) Procedures for Collecting the Data; (f) Statistical Analysis; and (g) Limitations of the Study.

Statement of the Problem

This study was conducted as an attempt to refine the use of BVMGT, which is one of the major evaluative tools used in the identification of the LD child. The investigation conducted in this study centered around the use of the BVMGT as a measure of visual memory to discriminate between the learning disabled (LD) and the non-learning disabled (NLD) child.

The purposes of this study were: (a) to determine whether the BVMGT, when used as a test of visual memory, discriminated between the LD child and the NLD child; (b) to determine the relationship between (1) the MFDT and the Bender Visual Motor Gestalt Test Copy phase (BVMGTC), and (2) to determine the relationship between the MFDT and the Bender Visual Motor Gestalt Test Recall phase (BVMGTR); (c) to determine whether the MFDT discriminates between the LD child and the NLD child; (d) to determine which test is more significant in discriminating between the LD child and the NLD child.

The general design of the study was a linear sequence of testing alternative hypotheses. These are outlined in the Flow Chart in Figure 1 (page 31).

Null Hypotheses

Ho:1 No significant difference exists between the mean score on the Memory-For-Designs Test for the learning disabled child and the non-learning disabled child.

Ho:2 (a) No correlation exists between the Memory-For-Designs Test and the Bender Visual Motor Gestalt Test Copy.

(b) There is no correlation between the Memory-For-Designs Test and the Bender Visual Motor Gestalt Test Recall.

Ho:3 There is not a stronger relationship between the Memory-For-Designs Test and the Bender Visual Motor Gestalt Test Recall than between the Memory-For-Designs Test and the Bender Visual Motor Gestalt Test Copy.

Ho:4 There is no relationship between the number of learning disabled children placed by the team and the number identified as learning disabled by the Bender Visual Motor Gestalt Test Recall.

Ho:5 The Bender Visual Motor Gestalt Test Copy will not identify correctly a significant percentage of children identified by the placement team for learning disability placement and a significant percentage of children identified by the placement team who were not placed in a learning disability lab.

Size and Description of the Sample

A small pilot study was used to determine effective sample size (See Appendix A, page 80). Using procedures suggested by Feldt

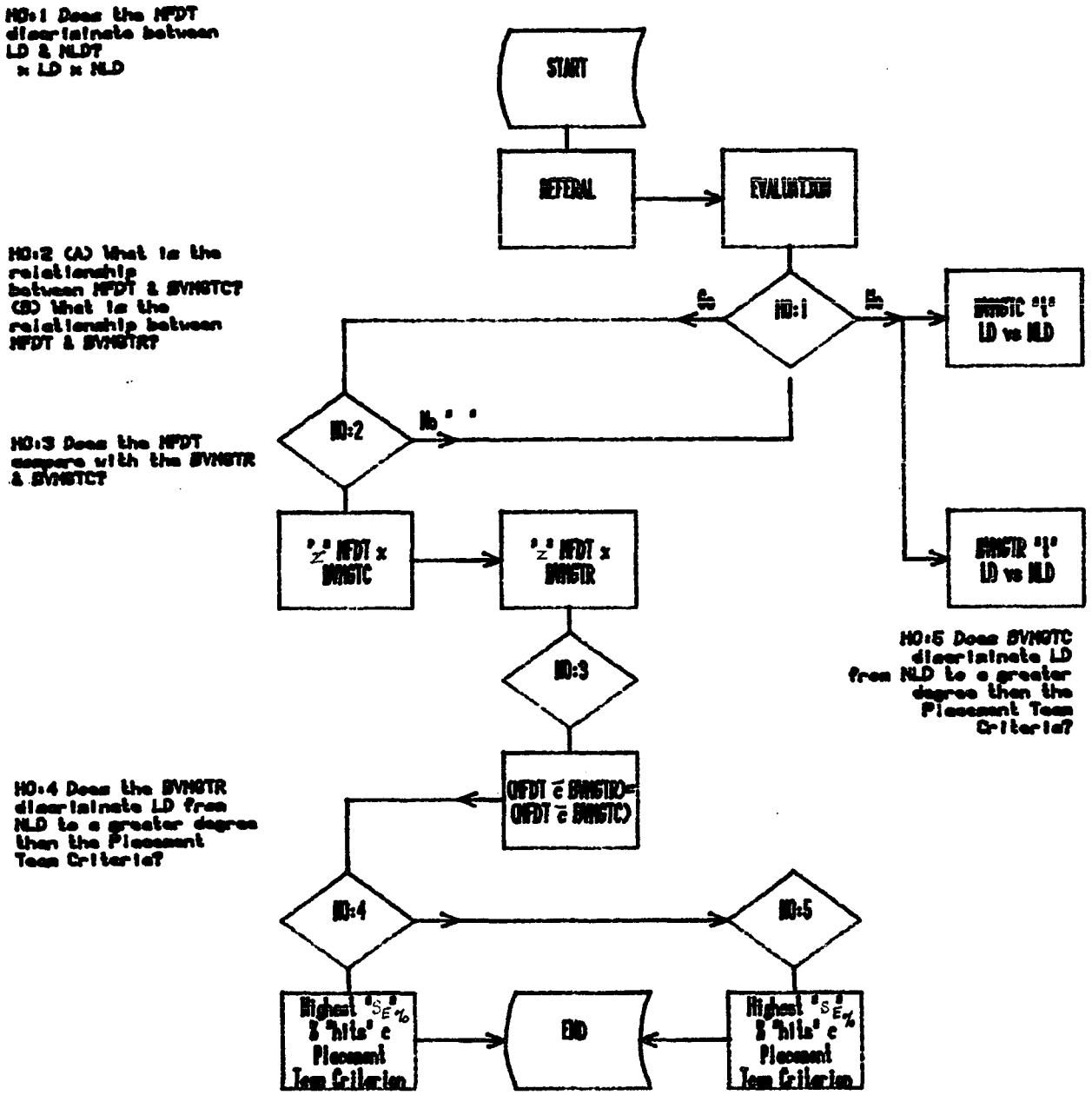
HO:1 Does the NFDT discriminate between LD & NLD
≠ LD ≠ NLD
HO:2 (A) What is the relationship between NFDT & SVMSTCT (B) What is the relationship between NFDT & SVMSTR?
HO:3 Does the NFDT compare with the SVMSTR & SVMSTCT
HO:4 Does the SVMSTR discriminate LD from NLD to a greater degree than the Placement Team Criteria?
HO:5 Does SVMSTC discriminate LD from NLD to a greater degree than the Placement Team Criteria?
START
REFERRAL
EVALUATION
HO:1
HO:2
HO:3
HO:4
HO:5
LD vs NLD
LD vs NLD
END
Placement
Team Criterion
Placement
Team Criterion

Figure 1.

and Mahmoud (1975) for determining sample size and looking at the probability of $p = > .05$ with an 80% power, it was determined that the sample size should be approximately 32 in each group. Two groups of children were identified: those who were placed in a learning disability (LD) laboratory by the placement team and another group of 32 who were evaluated by the placement team but not placed in the special laboratory, the non-learning disabled children (NLD).

The subjects in this study consisted of 64 elementary students 8.5 years to 11.11 years of age, third through sixth grades. The students were from the 16 elementary schools in the Putnam City School District. They were randomly selected from the group of students who were referred to the Special Services Department for evaluation because of academic problems.

Description of the Instruments

Bender Visual Motor Gestalt Test

The Bender Visual Motor Gestalt Test (BVMGT) consists of nine test cards, 4x6 inches with abstract designs on them. (See Appendix A, page 85). They are presented one at a time. The test is a paper and pencil task in which the subject is asked to copy each design by making one just like it. The subject is provided with white unlined 8½x11-inch paper and a number 2 pencil. There is no time limit on the test although Koppitz (1964) has computed a mean for each age group. Figures are not removed until they are reproduced.

The designs were originally used by Max Wertheimer (1923) for research in visual gestalt psychology. The Visual Motor Gestalt

Test (Bender, 1938) evolved as a method for evaluating maturation of visual motor gestalt functioning in children four to eleven years of age.

Scoring

The psychometrist/psychologist chooses from several scoring systems for the Bender Visual Motor Gestalt Test (BVMGT) if he/she wishes to substitute an objective for a subjective evaluation of an examinee's response. The scoring systems differ in the number of score items from Koppitz' (1964) list of 30 items to Billingslea's (1948) list of 137 items. Keller (1955) makes available three scoring categories with a total of 114 items, and Pascal and Suttell's (1951) scoring system includes 98 items to score eight of the nine stimulus figures.

The scoring system chosen for use in this study utilized the Developmental Bender Test Scoring System (DBTSS) which was developed by Koppitz (1964). Other scoring systems are applicable to older children and adults. Koppitz' application of the BVMGT for young children is one of the best recognized uses of an objective scoring system to test intelligence and school achievement and to diagnose brain injury, mental retardation and emotional disturbance in elementary-age children (Bender, 1970). This scoring system is appropriate only for elementary-age children as it was developed to assess the visual-motor maturity level of children five to 11.11 years of age. The growing awareness of and concern for the identification of children with learning disabilities has brought about a need for a quick, easy-to-administer, reliable and valid scoring

method of the Bender Visual Motor Gestalt Test. The Koppitz DBTSS met the criteria in all areas and consists of the least number of items to score.

The DBTSS is comprised of 30 mutually exclusive scoring items which are scored as either absent or present. The BVMGT is scored for errors; a high score indicates a poor performance while a low score reflects a good performance. The errors which Koppitz found valid for the DBTSS were: (1) distortions of shape; (2) rotations; (3) making circles for dots; (4) perseveration; (5) difficulties with integration of parts; (6) angles converted to curves; and (7) incorrect angles. Each of these criteria is applied to each of the nine individual figures, and a raw score is compiled which can be converted into a visual-motor age.

Reliability of Koppitz' Scoring System for the Bender Visual Motor Gestalt Test

In order to demonstrate reliability of the DBTSS, two aspects must be considered: (1) the agreement among different scorers (inter-judgesliability) using the scoring system independently from each other; and (2) the reliability of the BVMGT (test-re-test).

The original interscorer correlations study for the DBTSS was first published in 1963 by Miller, Linder, Lowenfeld and Turner. Thirty Bender Visual Motor Gestalt Test protocols were scored independently, and then copies of the Bender Visual Motor Gestalt Test records were sent to Koppitz for further scoring. Pearson "r" was computed between the test scores of Koppitz and each of the five raters. All correlations were statistically significant and ranged

from .88 to .96.

Further studies on the interscorer reliability of the DBTSS conducted between 1965 and 1972 were published by Koppitz in 1975. The 31 interscorer correlations ranged from .79 to .99. Eighty-one percent were at .89 or higher. The studies indicated that two scorers who evaluate a child's BVMGT record with the DBTSS obtained approximately the same test score.

The reliability of the BVMGT scores can be determined by repeated administration of the BVMGT within a short period of time. Nine studies have been reported by Koppitz (1975) that offer data on test-retest reliability with the BVMGT for normal elementary school children. The test-retest correlations ranged from .50 to .88 ($p < .105$ to $p < .01$). Results from these studies indicate that the total Developmental Bender Visual Motor Gestalt Test scores of normal elementary school children were reasonably stable and the BVMGT scores are reliable.

Validity of Koppitz' Scoring System for the Bender Visual Motor Gestalt Test

The BVMGT has been referred to by some as a test of visual perception, a test of motor coordination, and by Koppitz (1975) as a test of visual-motor integration. She believes that it must be emphasized that this test is concerned with a higher level, integrative process. Bender (1970) refers to the global nature of the gestalt function and of the unity between the perceptual and motor capacities.

Investigations as to the validity of the BVMGT have been conducted in various research studies utilizing it as a tool to identify

various problems in children and adults. This study was concerned with the use of the BVMGT as a means of identifying the LD child.

In 1963 Koppitz conducted a crossvalidation study of the DBTSS. The subjects were 51 children seen at a child guidance clinic. All were attending public school and ranged in age from 6 years 4 months to 10 years 8 months. The BVMGT was administered to all children. All tests were scored according to the DBTSS. The mean composite scores were determined for the first and second graders, the third and fourth graders, and for all subjects combined. Chi-squares were computed comparing the number of subjects with and without learning problems whose BVMGT scores were above or below the mean score for that particular grade level. All three chi-squares were statistically significant at the one percent level (Koppitz, 1964). The DBTSS demonstrated it can differentiate between the LD child and the NLD child. Recent research according to Koppitz (1975) has shown that the BVMGT can reveal the presence of brain dysfunction in children.

Normative Data

In 1975 Koppitz published a new normative sample using the DBTSS. The sample she used included 975 elementary school pupils ages 5 to 11 years from the West (15%), from the South (2%), and from the Northeast (83%). The racial analysis was as follows: 86% were White, 8.5% Black, 4.5% Mexican-American and Puerto-Rican, and 1% Oriental. Seven percent of the children lived in rural areas, 31% lived in small towns, 36% lived in suburbs, and 26% lived in metropolitan centers. Means were computed for the sample group ranging in age from 5.0 to 11.11 years using 6-month intervals

(Koppitz, 1975). (See Appendix A, page 81).

The differences of the BVMGT mean scores decrease as the children grow older. By age nine most children are able to copy the Bender designs without major imperfections so that exact age groupings of older children become less crucial in research studies. The importance of the BVMGT as a test for perceptual-motor development becomes less significant at age 10. The BVMGT scores are meaningful for older children only if the child's perceptual-motor integration functions below the nine-year level. A child is usually considered to have a perceptual-motor problem if he/she functions more than minus one standard deviation based on his/her raw score from the mean normative Bender score for a given age group (Koppitz, 1975).

Memory-For-Designs Test

The Memory-For-Designs Test (MFDT) developed by Graham and Kendall in 1946 consists of fifteen simple geometric designs and requires the reproduction of these designs from immediate memory. Test materials consist of 5x5-inch cards, each of which is printed in black. All of the designs use only straight lines in order to reduce errors which might occur in reproducing curved lines. Curved lines cannot be scored as objectively as straight lines (Graham and Kendall, 1960).

The designs are presented one at a time for 5 seconds. After the five-second exposure, the design is removed, and the subject is asked to reproduce it from memory. Total administration time is usually five to ten minutes.

Graham and Kendall Scoring System

The scoring system employed for this test is the one developed

by Graham and Kendall (1960). The total score on the test is the sum of the scores for each design. The score obtained is a raw score. A score of zero is given a satisfactory reproduction or an omitted or incomplete reproduction, a score of one is given when more than two easily identifiable errors are made but the general configuration or gestalt is retained, a score of two is given when the reproduction does not satisfy the previous criteria, and a score of three is given when the figure is reversed or rotated.

Weights given to different types of errors were assigned on an empirical basis (Graham and Kendall, 1960). Orientation errors were more frequent in the brain-disordered subjects and resulted in the subjects being more heavily penalized. As many control subjects omitted or failed to complete designs as did brain-disordered subjects. For this reason, no penalty is given for incomplete or forgotten designs (Graham and Kendall, 1946).

Performance of the groups differs in certain ways which are not fully exploited in the scoring system. Brain-disordered subjects, for example, are more likely to make definitely shaky lines in reproducing the figures. The closing of an open figure was found between four and five times more frequently among brain-disordered subjects.

The MFDT is appropriate for subjects ranging in age from 8.5 years through adult. Graham and Kendall (1946) found the test to be unsatisfactory below the 8.5 year age level because of the rate at which children develop visual-motor ability.

Studies conducted by Graham and Kendall (1946, 1960) and

other researchers (Garrett, Price and Deabler, 1957) have shown that performance on the MFDT significantly discriminates brain-disordered subjects from non-brain-disordered subjects.

Reliability of the Graham and Kendall Scoring System

Reliability of the scoring method is demonstrated by a correlation of .89 between total raw scores as assigned by Graham and Kendall (1946) for the 140 original validation subjects. An estimate of the reliability when scoring may be obtained from Howard and Shoemaker's study (1954) which reported 93% agreement in independent scoring of individual designs.

Self-consistency and test-retest reliability of raw scores are also sufficient. The index of reliability, using the split-half method, is .92 for the same 140 subjects. Reliability indices are in the .80's. The average score for all groups was 1.89 lower on retest, indicating some practice effect.

Validity of the Graham and Kendall Scoring System

Validation studies for the MFDT were conducted using raw scores in matched validation and cross-validation groups. The mean score of the matched control group was 3.47 (SD 4.62) while that of the brain-disordered group was 11.54 (SD 7.3). Both the differences in variance and mean score are significant at better than the .01 level ("t" = 2.57 and "t" = 7.73, respectively), (Graham and Kendall, 1946).

Additional Data

The use of the MFDT as a copy test was studied by Graham and Kendall (1960) with subjects in the age range of 8.5 to 60.0 years,

and it was found that the copying task was too easy for subjects and would not discriminate among groups. The function measured by the test is a complex one, some elements of which may be intuitively abstracted, and the interaction of memory with other functions produces a higher level of difficulty more nearly optimal for this kind of sample (Graham and Kendall, 1960).

Data Collection Procedures

Administration of the Instruments

All of the subjects were administered the three individual tests (BVMGC, BVMGTR and MFDT) as part of the total test battery for possible placement in a special education program for learning disabled students. The tests were administered at the school which the child attended within the Putnam City School District. The tests were given by a certified school psychometrist/school psychologist who was instructed in the procedures of administering the instruments.

All tests were administered on an individual basis. The BVMGTC was administered first, then the BVMGTR, followed by the MFDT. This sequence of test administration was followed in order that the subjects not be preconditioned to the recall phase of the testing.

The subjects were administered the BVMGTC and the MFDT according to the standardized testing instructions for each instrument. After the administration of the BVMGTC, the nine test cards and copied figures were removed from the subject's view and the subject was instructed to "draw as many of the designs from memory as you can." The examiner was instructed not to prompt the subject

but to allow the subject to recall as many designs as possible independently from memory. The examiner made documentation of the order of the recall and the total amount of time it took the subject to recall the figures.

The MFDT and the BVMGTC were scored according to standardized instructions set forth in the appropriate manuals. The designs on the BVMGTR that were reproduced from memory were scored according to the Koppitz (1975) scoring system. Those designs that were not recalled received the total score for that figure. Raw scores were totaled for all three tests.

After completion of the diagnostic battery, a portfolio was developed on each child, which was presented to the placement team to be used as a basis for making their decision as to which group a child should be placed in, LD or NLD. The BVMGTC and the BVMGTR remained in the folder. A copy of the BVMGTC and the BVMGTR was given to the experimenter. The MFDT was not given to the placement committee. Table II (page 44) presents a summary of the demographic description of the students.

Criteria for Identification of Learning Disabilities

The definition of learning disabilities and the criteria for placement in a learning disabilities program, for the purpose of this study, are the ones found in The Education for All Handicapped Children Act of 1975, Public Law 94-142 (PL 94-142), the State Department of Oklahoma Policy and Procedure Handbook for Special Education, 1980, and the Putnam City School District Plan for 1979-1980 written in compliance with PL 94-142.

Federal, State and Putnam City School District Definition of Learning Disabilities

The following is the learning disability (LD) definition which is stated in PL 94-142, the same definition used by the Oklahoma State Department of Education and the Putnam City School District:

> Specific learning disability" means a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, which may manifest itself in an imperfect ability to listen, think, speak, read, write, spell or to do mathematical calculations. The term includes such conditions as perceptual handicaps, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia. The term does not include children who have learning problems which are primarily the result of visual, hearing, or motor handicaps, or mental retardation, or emotional disturbance, or of environmental, cultural or economic disadvantage.

Evaluation of Children Suspected of Having a Learning Disability

Public Law 94-142 mandates that each child shall be administered by a qualified examiner a complete diagnostic battery of tests that have been validated for the specific purpose for which they are used and other evaluation materials designed to assess specific areas of educational needs. No single procedure is to be used

as the sole criterion for determining an appropriate educational program for a child.

In evaluating a child suspected of having a learning disability, in addition to the requirements for evaluation, each public agency shall require that the final decision be determined by a multidisciplinary evaluation team. That team shall consist of: (1) the child's regular teacher; or (2) if the child does not have a regular teacher, a regular classroom teacher qualified to teach a child of his or her age; and (3) for a child of less than school age, an individual qualified by the State Educational Agency to teach a child of his or her age; and (4) at least one person qualified to conduct individual diagnostic examinations of children, such as a school psychologist, speech-language pathologist, or remedial reading teacher (PL 94-142).

Criteria for Determining the Existence of a Learning Disability Federal, State, and Putnam City School District

The criteria for determining whether a child has a learning disability, which the Oklahoma State Department of Special Education and the Putnam City School District must comply with, are based on the guidelines set forth in the Federal Register, Volume 42, Number 250, Thursday, December 29, 1977, which states:

> A team may determine that a child has a specific learning disability if: the child does not achieve commensurate with his or her age and ability levels in one or more of the following areas listed in this section, when provided with learning experiences

Table 2.

Demographic Description of Sample

		LD (n = 32)	NLD (n = 32)
Age (Years-Months)	Range	8.5 - 11.8	8.5 - 11.11
	Mean	9.83	9.43
Grade (Years-Months)	Range	1.7 - 5.8	2.6 - 6.8
	Mean	4.13	4.08

> appropriate for the child's age and ability levels; and the team finds that a child has a severe discrepancy between achievement and intellectual ability in one or more of the following areas: (1) oral expression; (2) listening comprehension; (3) written expression; (4) basic reading skills; (5) reading comprehension; (6) mathematics calculation; or (7) mathematics reasoning. The team may not identify a child as having a specific learning disability if the severe discrepancy between ability and achievement is primarily the result of visual, hearing or motor handicaps, mental retardation, emotional disturbance or environmental, cultural or economic disadvantage.

The phrase "severe discrepancy" is not specific in the federal criteria, and the interpretation of this term is left to the discretion of the individual Local Education Agency (LEA). Each LEA must meet the minimum requirements set forth in the Federal Regulations but may go beyond and set additional criteria.

The Putnam City School District used the following criteria in addition to federal and state criteria for determining eligibility for placement in an LD program:

> Kindergarten through Second Grade--Child must have a developmental delay of approximately six months or more; difficulty in academic functioning based upon evaluation and/or teacher recommendation.

Third Grade through Twelfth Grade--A discrepancy of two or more years between achievement and intellectual functioning in one of the seven areas listed in the Federal Register.

Determining Eligibility for Learning Disabilities Placement

Regulations for identification of LD students provide that the eligibility decision must be made by a team. One member of the team besides the child's regular classroom teacher will observe the child in the classroom and submit a written statement concerning the behavior observed and how it relates to the child's academic functioning.

The eligibility team will consist of a regular teacher, an LD teacher and a person qualified to give individual diagnostic evaluations. They will meet as a team, evaluate the information compiled concerning the student and complete an eligibility form. This team can then become the placement team to write the Individualized Education Program (IEP) for the child by adding an administrative representative and the parent (State Department of Oklahoma Policy and Procedures Manual for Special Education, 1980).

The team shall prepare a written report of the results of the evaluation although this is usually done prior to the meeting by the evaluator. The report must include a statement of: (1) whether the child has a specific learning disability; (2) the basis for making the determination; (3) the relevant behavior noted during the observation of the child; (4) the relationship of that behavior to the child's academic functioning; (5) the educationally

relevant medical findings, if any; (6) whether there is a severe discrepancy between achievement and ability which is not correctable without special education and related services; and (7) the determination of the team concerning the effects of environmental, cultural or economic disadvantage.

Each team member shall certify in writing whether the report reflects his/her conclusion. If it does not reflect his/her conclusion, the team member must submit a separate statement presenting his/her conclusions and the basis for the conclusion (State Department of Oklahoma Policy and Procedures Manual for Special Education, 1980).

Statistical Analysis

Procedures

The first examination was to verify that the MFDT would discriminate between the LD and the NLD groups. In order to explore the efficacy of the MFDT, a "t" test of difference between means was conducted. Decision point will be a probability of the magnitude of the difference exceeding $p > .05$. Depending on the results, two possible channels of further exploration will be made. If the test is not significant, a post-hoc analysis to explore magnitude of the difference of scores between group LD and group NLD on the BVMGTC will be made. Another similar test will be made on the BVMGTR. This outcome is not anticipated; should it occur, the results will be recorded as descriptive data and discussed only as such. At this point, Null Hypothesis 1 has been discussed, which states: No significant difference exists between the mean score on the MFDT for

the LD child and the NLD child.

Given the ability to reject Ho:1 the investigation will continue to Null Hypothesis 2, which states: (a) no significant correlation exists between the Memory-For-Designs Test and the Bender Visual Motor Gestalt Test Copy; (b) there is no correlation between the Memory-For-Designs Test and the Bender Visual Motor Gestalt Test Recall.

In the exploration of Ho:2 the LD and NLD groups are combined. The correlations were calculated on the total group. Again, the correlations coefficients will be evaluated using $p > .05$ criterion. If the correlations are not significant, the flow will revert to the post-hoc descriptive evaluation (See Figure 1, page 31). If one is significant but not the other, the one will proceed on the main flow and the other be described in the post-hoc analysis. If both are significant, the next step will be to explore Hypothesis 3.

Ho:3 states the possibility that neither the BVMGTC nor the BVMGTR will have a stronger correlation with the MFDT. The possibility of a stronger correlation with one form of the BVMGT than the other will be explored through the use of Fisher's "z" transformation. Again, $p = > .05$ will be used to establish whether or not one correlation is stronger than the other. In the interest of efficiency, the subsequent evaluative work will be done only with the strongest relationship if one correlation is significantly greater than the other by using Fisher's z transformation. If there is no difference, then the largest correlation coefficient will be explored first even though the difference is not significant. This is based on the

assumption that if there is no difference here, there cannot be in the other since they are significantly different and if there is a difference here, there would be in the other since again the difference between them is only chance variation.

If one correlation should prove to be stronger than the other, only the strongest will be tested. Initially, if the results are significant, it will be necessary to test the other since the correlations are significantly different. The final hypothesis then affirms the efficiency of placement using the alternate test.

Ho:4 will explore the ability of the form of the BVMGTR to discriminate between the LD group and NLD group as established by the placement team. Null Hypothesis 4 is that there is no relationship between the number of learning disabled children placed by the team and those identified as learning disabled by the BVMGTR.

This test will use the number of correctly identified children by the BVMGTR against those identified by the placement team. The evaluation will be based upon the significant percent of placements. This will be evaluated using the standard error of percentage at the $p > .05$ level. This statistic will be calculated for both the LD and the NLD groups.

As a possible alternative, a fifth hypothesis will be considered. This will be done in case, which the study hopes or intends will occur, that the correlations between the MFDT and the BVMGTC and the MFDT and the BVMGTR are significantly different. In this case, the correlation which is significantly higher than the other will be tested. Ho:5: The BVMGTC will not identify correctly a

significant percentage of children identified by the placement team for learning disability placement and a significant percentage of children identified by the placement team who were not placed in a learning disability lab.

Again, the evaluation of the number of children correctly identified by the placement team will be based on the standard error of the percent correctly placed, and the evaluation level will be at $p > .05$.

Limitations

There are several limitations of this study, some of which the investigator was unable to control. The first limitation involves the age range of children sampled. Referrals are made on students from birth through 21 years of age. Part of this is required under PL 94-142 (1975), which mandates that each school system conduct an ongoing search-find effort for handicapped children. The age group in this study is not usually identified as handicapped until they enter school. Learning laboratory programs are provided for children four years of age through 21 years of age. The scoring system used for the BVMGT is applicable for children 5.0 years to 11.11 years of age, which limits the age group sampled.

The second, and one of the most important limitations was the federal regulations mandated by PL 94-142. The ambiguity of many parts of the regulations, especially the vague criteria referring to "severe discrepancy," left much to be defined. The term "learning disability" itself is open for argument even among the "experts." The criteria for placement in a learning disability

program fluctuate from one school system to another.

The federal, state and local criteria under which the placement team must function are the third limitation. On occasion, a placement team may decide that a child should be placed in a learning disability lab even though the child may not qualify under the criteria set forth. The placement team will then write a cover letter permitting the child to be placed for one year. The team members may disagree among themselves as to the most appropriate placement for a child. The composition of the placement team and the various personalities involved cannot be controlled by the investigator.

Therefore, this study was conducted in an attempt to determine a more effective use of the Bender Visual Motor Gestalt Test by psychometrists and school psychologists in the identification of the LD child. The hypotheses which are presented will answer some questions regarding the use of an evaluation tool for the identification and diagnosing of the LD child as opposed to the identification by a placement committee using criteria set forth in PL 94-142. This study may resolve some questions pertaining to the LD child and the BVMGT, but it may also postulate new concerns.

CHAPTER IV

RESULTS

This chapter is divided into three sections in order to present a brief background of the study and the results. The first section is a brief description of the purpose of the study. The second section contains the results of the statistical analyses for the five hypotheses. The results are summarized in the third section.

Background of the Problem

The major purpose of this study was to develop better utilization of the BVMGT as a diagnostic tool for the identification of the LD child. It was used as a test of visual memory.

The subjects were 64 elementary children from the Putnam City School District who had been referred for evaluation because of academic problems. Thirty-two of the children had been diagnosed as LD and placed in a laboratory; thirty-two had been diagnosed as NLD by a placement team. The team used guidelines from federal, state and local district regulations. The children ranged in age from 8.5 to 11.11 years.

The BVMGTC, the BVMGTR, and the MFDT tests were administered to the total sample of 64 children in order to answer five research questions:

1. Does the MFDT discriminate between the LD and the NLD child?
2. What is the relationship of (a) the MFDT to the BVMGTC, (b) the MFDT to the BVMGTR?
3. Does the BVMGTC or the BVMGTR have the strongest relationship with the MFDT?
4. Is there a relationship between the LD children placed by the placement team and those identified as LD by the BVMGTR?
5. Will more children be identified as LD by the placement team or by the BVMGTC?

Analyses of Data

Ho:1: No significant difference exists between the mean score on the Memory-For-Designs Test for the learning disabled child and the non-learning disabled child.

Data relative to this hypothesis (Table 3) resulted in a mean score of 6.25 for the LD group and a mean score of 7.88 for the NLD group. A "t" test was computed to test the difference between the two sample means and yielded a "t" ratio of -1.14 which was smaller than the -2.00 value required to reject the null-hypothesis at the .05 significance level. The Memory-For-Designs Test did not discriminate between the LD and NLD samples.

Ho:2: (a) No correlation exists between the Memory-For-Designs Test and the Bender Visual Motor Gestalt Test Copy.

The LD and NLD samples were combined (N = 64) to test this hypothesis. The results for this hypothesis is reported in Table 4.

Table 3

"t" Tests Between Means of LD

and NLD Groups on the MFDT

Memory-For-Designs Test		
	LD	NLD
Mean	6.25	7.88
"t" ratio	-1.14	
$p < .05$		

The correlation was .40, and larger than the .25 (df = 62) required to reject the null hypothesis at the .05 level. This means there was a tendency for higher BVMGTC scores to correspond with higher MFDT scores.

When the groups were separated and the correlation computed, the value for the LD was .49, which was significant at the .05 level. The value of the NLD group was .28, which was not significant. When Fisher's "z" transformation was applied to the two correlations (z = .94), it was below the 1.96 value necessary to reject the null hypothesis. The two correlations were considered as essentially equivalent and differed only by sampling error.

Ho:2: (b) There is no correlation between the Memory-For-Designs Test and the Bender Visual Motor Gestalt Test Recall.

The correlation for the LD and NLD groups (N = 64) combined between these two measures was .38 (Table 3). This value exceeded the value of .25 (df = 62) required to reject the null hypothesis

at the .05 level of significance.

When the LD and NLD groups were separated and the correlation coefficient computed, the values were .34 for the LD sample and .41 for the NLD sample. The correlation coefficient for the NLD sample was significant at the .05 level ("r" must equal or exceed .35 for 30df). When Fisher's "z" transformation was applied, the correlation coefficient score of "z" .31 was obtained. This score did not allow rejection of the null hypothesis. This meant that the two correlations were considered equivalent.

Table 4

Intercorrelations Among Raw Scores

on Two BVMGT Measures and the MFDT

	BVMGT-RS		BVMCTR-RS
	LD	.29	
	NLD	-.01	
	Total	.19	
	LD	.49*	.34
MFDT	NLD	.28	.41*
	Total	.40*	.38*

* $p < .05$

Ho:3: There is not a stronger relationship between the Memory-For-Designs Test and the Bender Visual Motor Gestalt Test Recall than between the Memory-For-Designs Test and the Bender Visual Motor Gestalt Test Copy.

The data for this hypothesis are reported in Table 5. This hypothesis was tested by the use of Hotelling's "t_{d_r}" procedure. The computed "t" value for these data was .14 which was less than the 2.00 required to reject the null hypothesis at the .05 level for 61 degrees of freedom.

The LD and the NLD groups were separated and the Hotelling "t_{d_r}" procedure to compare the correlated correlation coefficient was applied to each. These computations yielded "t_{d_r}" ratios of 1.16 for the LD group and -.82 for the NLD group. Both of these values were below the 2.00 required to reject the null hypothesis.

Table 5

Hotelling's "t_{d_r}" Test Between "r" of LD and NLD for Two BVMGT Measures and MFDT Scores

	LD	NLD	Total
Hotelling's "t_{d_r}"	1.16	-.82	.14

$p < .05$

Ho:4: There is no relationship between the number of learning disabled children placed by the team and those identified as learning disabled by the Bender Visual Motor Gestalt Test Recall.

Data for this hypothesis is reported in Table 6. Thirty-two of the sixty-four children sampled were identified as LD and thirty-two identified as NLD by the placement team criteria.

The criteria for identification of LD and NLD children according to the BVMGTR was one standard deviation below the mean for the total group (N = 64). The mean was 16.03, and the standard deviation was 4.56. Four children of the LD group and six children of the NLD group were identified as LD when this criterion was used. The data computed for the total BVMGTR sample (N = 64) of the Putnam City School District group was utilized as no standardized means and standard deviations were available.

When the standard error of percentage was computed for the total group, the obtained percentage to be significant at the .05 level must be 8.90%. The computed difference in percentages between the LD and NLD is 6.30%. No statistically significant difference was found which does not allow the null hypothesis to be rejected.

Ho:5: The Bender Visual Motor Gestalt Test Copy will not identify correctly a significant percentage of children identified by the placement team for learning disability placement and a significant percentage of children identified by the placement team who were not placed in a learning disability laboratory.

Data for this hypothesis was analyzed through the use of the standard error of percentages. As in the previous hypotheses, thirty-two children had been identified as LD and thirty-two as NLD by the placement team. The criterion for the number of LD and NLD children identified by the BVMGTC was analyzed through the utilization of two sources of data. The first source of data was

Table 6

Percentage of Children Identified

by the BVMGTR from Putnam City Data

V. Placement Team Criteria

	LD	NLD	TOTAL
N	32	32	64
BVMGTR Identified	4	6	10
% of N	12.5%	18.80%	15.60%

Calculated "$S_{E_{\%}}$" 8.90% $p < .05$

Table 7

Percentage of Children Identified

by the BVMGTC from Putnam City Data

V. Placement Team Criteria

	LD	NLD	TOTAL
N	32	32	64
BVMGTC Identified	8	5	13
% of N	25.00%	15.60%	20.30%

Calculated "$S_{E_{\%}}$" 9.86% $p < .05$

Table 8

Percentage of Children Identified

by Koppitz' BVMGTC Data

V. Placement Team Criteria

	LD	NLD	TOTAL
N	32	32	64
BVMGTC Identified	12	15	27
% of N	37.50%	48.00%	42.10%

Calculated "$S_{E_{\%}}$" 12.10% $p < .05$

the mean and standard deviation computed for the total group based on the Putnam City School District sample (N = 64). The mean was 4.25 and the standard deviation was 2.48. The second source of data was the stratified means and standard deviations developed by Koppitz (1975). (See Appendix A, page 81, for Koppitz' means and standard deviations according to age).

Any child who was one or more standard deviations below the mean score on the BVMGTC according to the Putnam City School District data or the DBTSS was identified as LD.

As reported in Table 7, eight of the LD children and five of the NLD children were identified as LD. The calculated standard error of percentage was 9.86%. The difference in percentages between the LD and NLD groups was 9.40%. The percentage is too low to be statistically significant at $p<.05$.

The second analysis which used Koppitz' data is reported in Table 8. The computed standard error of percentage was 12.10%. The difference in percentages between the LD and NLD groups was 10.5%, which was smaller than the value required to reject the null hypothesis at the .05 significance level.

Neither of these findings were statistically significant. Both were smaller than the amount required to reject the null hypothesis.

Summary

The statistical analyses of the hypotheses revealed that (a) the MFDT did not discriminate between the LD and NLD samples; (b) there was a tendency for higher BVMGTC scores to correspond

with higher MFDT scores; (c) when the BVMGTC and BVMGTR scores for the LD and NLD groups were separated and correlations were computed for each group, they were found to be equivalent, differing only by sample error; (d) results of the data failed to reject there was not a stronger relationship between the MFDT and the BVMGTR than between the MFDT and the BVMGTC; (e) the BVMGTR did not identify more children as LD than the placement team; and (f) the BVMGTC did not discriminate the LD child from the NLD child to a greater statistically significant degree than the placement team.

CHAPTER V

DISCUSSION

This chapter is divided into three sections. The first section contains conclusions drawn from the findings of the present study as they relate to the literature. The second section contains recommendations for future research. The summary of the study is contained in the third section.

Conclusions

One of the major concerns of this investigation was to determine if the MFDT would discriminate between the LD and NLD child. In this study, there was no discrimination. Studies conducted by Graham and Kendall (1946, 1960) and Garret, Price and Deabler (1957) have shown that performance on the MFDT significantly discriminated LD subjects from NLD subjects. The difference in the two studies might be based on a difference in sample and criteria used to discriminate between the two groups.

The MFDT does not provide stratified norms by age groups allowing for differences in motor development. The scores for children and adults are grouped together. Children would be expected to make more errors as their motor development would not be as mature as adults. A different set of test scores interpretation might result in different findings.

The MFDT was not part of the diagnostic battery used by the placement team to discriminate between the LD and NLD groups. The placement team criteria included academic and psychological testing scores. Walters (1961) found that the correlation between reading retardation and high scores on the MFDT significant at the .05 level. The inclusion of the MFDT as part of the criteria used by the placement team might affect the different diagnostic results of the identification process.

When the MFDT and the BVMGTC were correlated, a statistically significant correlation was found for the LD group. Quattlebaum (1968) obtained a correlation of .85 between the MFDT scores and BVMGTC scores. No subject scored in the critical range on one test and the normal range on the other. Anglin, Pullen and Games (1965) obtained a significant correlation between the MFDT and BVMGTC. The findings of this investigation support those reported by previous research. Visual motor skills were measured by both tests for the LD group.

No studies have been reported which correlated the MFDT and the BVMGTR. The results of the present investigation did indicate a significant correlation between the MFDT and BVMGTR for the NLD group, but not for the LD group. The NLD sample had poorer recall than did the LD sample. The reverse might be expected. Koppitz (1975) does state that it is not clear what the BVMGTR method measures. Persinger and Holmes (1978) reported the MFDT did diagnose memory deficits. Koppitz' (1975) research concluded that the degree of accuracy in copying the BVMGT designs is not

related to subsequent recall thereof.

Memory was measured by the MFDT and the BVMGTR. The type of memory that was measured was not determined. Brener (1940) and Cavanagh (1972) reported that geometric designs were the fourth most difficult type of material to recall from visual memory. It is unclear whether visual memory was measured in the present study, but if it was, the conclusion could be made that the LD sample had better visual memory than the NLD sample. However, the LD group may not do well on visual material that is at a higher level of difficulty (e.g., abstract words, words, sentences, etc.).

The relationship between the MFDT and the BVMGTR and between the MFDT and the BVMGTC were not found to be statistically significant. The present findings did not support Quattlebaum's (1968) findings of a .85 correlation between the MFDT and the BVMGTC. Previously mentioned was the lack of research between the MFDT and the BVMGTR.

Although no statistically significant relationships between the MFDT and the BVMGTR and between the MFDT and the BVMGTC were found in the present study, such relationships may exist. Both tests measure visual motor skills as reported by Koppitz (1975) and Graham and Kendall (1960). The MFDT and the BVMGTR both measure memory.

Graham and Kendall (1960) made a study of the MFDT as a copy test, but found the copying task too easy. They reported that the interaction of memory with other functions produced a higher level of difficulty. When Graham and Kendall (1946)

developed the MFDT, they did not include any curved lines because they were difficult to score objectively. The MFDT was developed as a test of visual memory.

The BVMGTC was standardized as a measure of visual motor development, not as a measure of visual memory. The nine designs on the BVMGTC consist of lines and curves. Bender (1938) included curves and circles in her test since a child's first scribblings consist of circles and wavy lines. Form perception, according to Koppitz (1975), is based to a great extent on cognitive processes. Results might be affected by the type of geometric designs reproduced. One set of designs may have a higher level of difficulty than the other. Both the MFDT and the BVMGTC measure cognitive processes. Types of cognitive process have not been clarified.

The cards for the MFDT were presented one at a time for five seconds and then removed. The subjects were then asked to immediately draw the design. The BVMGTC cards were presented as a copy task. The subjects looked at each card as long as they wanted. When all designs had been copied, they were asked to draw as many designs from memory as they could. The time lapse of more than five seconds from copy to recall on the BVMGTR might affect the quality of designs reproduced from memory. On the MFDT the subject had to remember one design at a time, whereas on the BVMGTR, the subjects were asked to recall all nine designs. Past studies by Mackworth (1973), Sperling (1960), and Harber (1969) reported that the amount of information a subject is asked to recall does affect the amount recalled.

This might be true in this study.

The percentage of children identified as LD and NLD by the BVMGTC and BVMGTR in comparison with the placement team criteria was not statistically significant. The placement team had available to them the complete diagnostic battery administered to each child. The BVMGTC and the BVMGTR were not part of the criteria used in determining placement. The decision for placement was based on potential as measured by an intelligence test in relation to actual functioning measured by academic testing (e.g., reading, mathematics, reading comprehension).

Inferior reproductions of the BVMGTC have been related to poor school achievement in children (Ames, 1969; Keogh, 1969; Koppitz, 1958, 1964, 1970, 1975). It has been used in diagnosing LD children (Barkley, 1949; Bender, 1964, 1975; Hanvik, 1953). Previous research has proved the BVMGTC is a reliable tool to use in the diagnosis of the child with academic problems. It does discriminate the LD child from the NLD child; therefore, it should continue to be used.

The placement team criteria was set forth in PL 94-142. Each district has its own set of criteria for severe discrepancy. The same study might be conducted in another school district and the results might be different.

The definition of LD needs to be clarified, as well as the term "severe discrepancy." It might be that some children have been mis-diagnosed.

Recommendations for Further Research

1. Koppitz (1975) stated ". . . it is not clear just what the Bender Test Recall method measures. . ." Kendall and Graham (1947) reported that the MFDT did measure memory. Some kind of memory was tested by both the BVMGTR and the MFDT. The subject for further research would be to find out what kind of memory is measured by both tests.

2. There is a need to establish statistically stratified means and standard deviations for the BVMGTR. If established, it could provide a solid testing device to do future research using the BVMGTR.

3. More research needs to be conducted using the BVMGTR with children as the subjects. Only four of the 13 studies reported in the Review of Literature concerned children.

4. When the BVMGTR was used as the criterion for the identification of the LD child, no statistically significant results were found. The placement team used as its criteria multidiagnostic tests. If the BVMGTR were used in conjunction with achievements (e.g., reading, spelling and mathematics) as criteria for the identification of the LD child, would it result in a significant correlation with the number of children identified as LD by the placement team?

5. Another question which might be answered through future research would be: Would the results be different if the MFDT were administered prior to the BVMGTC and BVMGTR?

Summary

This study was done to develop better utilization of the BVMGT as a diagnostic tool for the identification of the LD child. It was used as a test of visual memory. The MFDT, the BVMGTC and the BVMGTR were unable to discriminate between the LD and NLD child. Neither the BVMGTC nor the BVMGTR discriminated the LD child to a greater degree than the placement team criteria.

Future research recommendations regarding the results of this study are: (a) find out what type of memory the BVMGTR does measure; (b) the development of stratified means and standard deviations for the BVMGTR; (c) more research conducted using the BVMGTR with children as the subjects; (d) the use of other variables in conjunction with the BVMGTR for the identification of LD children; and (3) the most appropriate sequence for the administration of the MFDT and BVMGT.

References

Ackerman, P. T. & Others. Children with specific learning disabilities: Bender Gestalt Test findings and other signs. Journal of Learning Disabilities, 1971, 4, 437-446.

Ames, L. B. Children with perceptual problems may also lag developmentally. Journal of Learning Disabilities, 1969, 2, 205-208.

Anglen, R., Pullen, M., & Games, P. Comparison of two tests of brain damage. Perceptual and Motor Skills, 1965, 20, 977-980.

Armstrong, R. G. A re-evaluation of copied and recalled Bender Gestalt reproductions. Journal of Projective Techniques and Personality Assessment, 1965, 29, 134-139.

Attneave, F. Some informational aspects of visual perception. Psychological Review, 1954, 61, 183-193.

Bannatyne, A. D. A comparison of visuo-spatial and visuo-motor Memory-For-Designs and their relationship to other sensori-motor and psycholinguistic variables. Journal of Learning Disabilities, 1969, 2, 451-466.

Barkley, B. A note on the development of the Western Reserve Haptokinesthetic Gestalt Test. Journal of Clinical Psychology, 1949, 5, 179-180.

Beck, H. S. A comparison of convulsive organic, nonconvulsive organic and nonorganic public school children. American Journal of Mental Deficiency, 1959, 63, 866-875.

Bender, L. A Visual Motor Gestalt Test and its clinical use. New York: The American Orthopsychiatric Association, 1938.

Bender, L. Visual Motor Gestalt Test: Cards and manual of instructions. New York: American Orthopsychiatric Association, 1946.

Bender, L. Use of the Visual Motor Test in the diagnosis of learning disabilities. Journal of Special Education, 1970, 4, 29-39.

Bigham, J. Effect of serial position upon memory. Psychological Review, 1894, 1, 453-461.

Billingslea, F. Y. The Bender-Gestalt: An objective scoring method & validating data. Journal of Clinical Psychology, 1948, 4, 1-27.

Binet, A. & Henri, V. La mémoire des mots. L'Année Psychologique, 1894, 1, 1-23.

Blankenship, A. B. Memory span: A review of the literature. Psychological Bulletin, 1938, 35, 1-25.

Brener, R. An experimental investigation of memory span. Journal of Experimental Psychology, 1940, 26, 467-482.

Broadbent, D. E. Perception and communication. London: Pergamon Press, 1958.

Brown v. Board of Education of Topeka, 347 U.S. 483, 74 S. Ct. 686 98 L.Ed. 873 (1954).

Case, R. A developmentally based theory and technology of instruction. Review of Educational Research, 1978, 48, 439-463.

Cavanagh, J. P. Relation between the immediate memory span and the memory search rate. Psychological Review, 1972, 79, 525-530.

Chi, M. T. H. Age differences in memory span. Journal of Experimental Child Psychology, 1977, 23, 266-281.

Coleman, E. B. Approximations to english. American Journal of Psychology, 1963, 76, 239-247.

Connor, J. P. Bender-Gestalt Test performance as a predictor of differential reading performance. Journal of School Psychology, 1969, 7, 41-44.

Critchley, M. Developmental dyslexia. London: William Heinemann, Ltd., 1964.

Cruickshank, W. M. Myths and realities in learning disabilities. Journal of Learning Disabilities, 1977, 10, 51-58.

deHirsch, K., Jansky, J.J., & Langford, W. S. Predicting reading failure. New York: Harper & Row, 1966.

Dempster, F. N. Memory span and short term memory capacity: A developmental study. Journal of Experimental Child Psychology, 1978, 26, 419-431.

Farnham-Diggory, S. The development of equivalence systems. In S. Farnham-Diggory (Ed.), Information processing in children. New York: Academic Press, 1972.

Federal Register (Part III). Washington, DC: Department of Health, Education and Welfare, January, 1975, 40(3).

Federal Register (Part II). Washington, DC: Department of Health, Education and Welfare, August, 1977, 42, (163).

Federal Register (Part III). Washington, DC: Department of Health, Education and Welfare, December, 1977, 42, (250).

Federal Register (Part IV). Washington, DC: Department of Health, Education and Welfare, May, 1977, 42, (86).

Frostig, M. The needs of teachers for specialized information in reading. In W. Cruickshank (Ed.), The teachers of brain-injured children. Syracuse, N.Y.: Syracuse University Press, 1966.

Frostig, M. & Horne, D. The Frostig program for the development of visual perception: Teacher's Guide. Chicago: Follet, 1964.

Frostig, M., Lefever, D. W., & Whittlesey, J. R. B. A developmental test of visual perception for evaluating normal and neurologically handicapped children. Perceptual and Motor Skills, 1961, 12, 383-394.

Frostig, M. & Maslow, P. Learning problems in the classroom. New York: Grune & Stratton, 1973.

Garrett, E. S., Price, A. C., & Deabler, H. L. Diagnostic testing for cortical brain impairment. American Medical Association Archives of Neurology and Psychiatry, 1957, 77, 223-225.

Garron, D. C. & Cheifetz, D. I. Comment on Bender Gestalt discernment of organic pathology. Psychological Bulletin, 1965, 63, 197-200.

Gavales, D. & Million, T. Comparison of reproduction and recall size deviations in the Bender-Gestalt as measures of anxiety. Journal of Clinical Psychology, 1960, 16, 278-280.

Getman, G. N. Visual success in reading. Journal of California Optometric Association, 1961, 29, 1-4.

Gilbert, G. A survey of referral problems in metropolitan child guidance centers. Journal of Clinical Psychology, 1957, 13, 13-41.

Goldstein, K. The modification of behavior consequent to cerebral lesions. Psychiatric Quarterly, 1936, 10, 586-610.

Goldstein, K. The organism. New York: American Book Company, 1939.

Goltesman, R. Follow-up of learning disabled children. Learning Disability Quarterly, 1979, 2, 60-69.

Goodstein, L. D., Spielberger, C. D., Williams, J. E., & Dahlstrom, W. G. The effects of serial position and design difficulty on recall of the Bender-Gestalt designs. Journal of Consulting Psychology, 1959, 23, 25-33.

Graham, F. K. & Kendall, B. S. Memory-for-Designs Test. St. Louis: Washington University, 1946.

Graham, F. K. & Kendall, B. S. Memory-for-Designs Test: Revised general manual. Perceptual and Motor Skills, 1960, 11, 147-188 (Monograph Supplement 2-VII).

Grundvig, J. L., Needham, W. E. & Ajax, E. T. Comparison of different scoring and administration procedures for the Memory-for-Designs Test. Journal of Clinical Psychology, 1970, 26, 353-357.

Haber, R. N. (Ed.). Information-processing approaches to visual perception. New York: Holt, Rinehart & Winston, Inc., 1969.

Hallahan, D. & Kauffman, J. Exceptional children: Introduction to special education. New Jersey: Prentice-Hall, Inc., 1978.

Hanvik, L. A. A note on rotation on the Bender Gestalt Test as predictors of EEG abnormalities in children. Journal of Clinical Psychology, 1953, 9, 399.

Head, H. Aphasia and kindred disorders of speech (Vol. I & II). London: Cambridge University Press, 1926.

Henderson, N. B., Butler, B. V. & Gaffeney, B. Effectiveness of the WISC and Bender Gestalt Test in predicting arithmetic and reading achievement for white and nonwhite children. Journal of Clinical Psychology, 1969, 25, 268-271.

Hovland, C. I. Human learning and retention. In S. Stevens (Ed.), Handbook of Experimental Psychology. New York: Wiley, 1951.

Howard, A. & Shoemaker, D. J. An evaluation of the Memory-For-Designs Test. Journal of Consulting Psychology, 1954, 18, 266.

Hunter, E. J. & Johnson, L. C. Developmental and psychological differences between readers and nonreaders. Journal of Learning Disabilities, 1971, 4, 572-577.

Hutton, J. B. Bender recall of children as related to age and intelligence. Perceptual Motor Skills, 1966, 23, 34.

Hyde, E. School psychological referrals in an inner city school. Psychology In The Schools, 1975, 12, 412-420.

Jacobs, J. Experiments on comprehension. Mind, 1887, 12, 75-79.

Kail, R. Use of strategies and individual differences in children's memory. Developmental Psychology, 1979, 15, 251-255.

Keller, J. E. The use of a Bender-Gestalt maturation level scoring system with mentally handicapped. The American Journal of Orthopsychiatry, 1955, 25, 563-573.

Keogh, B. K. The Bender-Gestalt with children: Research implications. Journal of Special Education, 1969, 3, 15-22.

Keogh, B. K. & Smith, C. E. Visuo-motor ability for school prediction: A seven year study. Perceptual Motor Skills, 1967, 25, 101-110.

Kephart, N. C. The slow learner in the classroom. Columbus, Ohio: Merrell, 1960.

Kerr, A. S. Determinants of performance of the Bender Gestalt Test and Raven's Progressive Matrices (1947) Test. Journal of Learning Disabilities, 1972, 5, 219-221.

Kirkpatrick, E. A. An experimental study of memory. Psychological Review, 1894, 1, 602-609.

Koppitz, E. M. The Bender-Gestalt Test and learning disturbance in young children. Journal of Clinical Psychology, 1958, 14, 292-295.

Koppitz, E. M. The Bender Gestalt Test for children: A normative study. Journal of Clinical Psychology, 1960, 16, 432-435.

Koppitz, E. M. Diagnosing brain damage in young children with the Bender Gestalt Test. Journal of Consulting Psychology, 1962, 26, 544-546.

Koppitz, E. M. The Bender-Gestalt Test for young children. New York: Grune & Stratton, 1964.

Koppitz, E. M. Brain damage, reading disability, and the Bender-Gestalt Test. Journal of Learning Disabilities, 1970, 3, 429-433.

Koppitz, E. M. The Bender Gestalt Test for young children: Volume II research and application, 1963-1973. New York: Grune & Stratton, 1975.

Larsen, S. C. & Hammell, D. D. The relationship of selected visual-perceptual abilities to school learning. Journal of Special Education, 1975, 9, 281-291.

Leibowitz, H. W. Visual perception. London: The Macmillan Company, 1965.

LaVor, M. L. Federal legislation for exceptional persons: A history. In F. J. Weintraub, A. Abeson, J. Ballard & M. L. LaVor (Eds.). Public policy and the education of exceptional children. Reston, Va.: The Council for Exceptional Children, 1976.

Li, A. K. F. Learning disabilities: A review essay. The Journal of Educational Thought, 1977, 11, 253-263.

Lippman, L. & Goldberg, I. Right to education: Anatomy of the Pennsylvania case and its implications for exceptional children. New York: Teachers College Press, 1973.

Louttit, C. M. & Browne, C. G. Psychometric instruments in psychological clinics. Journal of Consulting Psychology, 1947, 11, 49-54.

Mackworth, J. F. The duration of the visual image. Canadian Journal of Psychology, 1963, 17, 62-81.

Marks, M. R. & Jack, O. Verbal context and memory span for meaningful material. American Journal of Psychology, 1952, 65, 298-300.

McPherson, M. W. & Pepin, L. A. Consistency of reproductions of Bender-Gestalt designs. Journal of Clinical Psychology, 1955, 11, 163-166.

Mercer, L. D., Forgone, C. & Wolking, W. D. Definitions of learning disabilities used in the United States. Journal of Learning Disabilities, 1976, 9, 376-386.

Meyen, E. Exceptional children and youth: An introduction. Denver, Colo.: Love Publishing Co., 1978.

Miller, G. A. The magic number seven, plus or minus two: Some limits on our capacity for processing information. Psychological Review, 1956, 63, 81-97.

Miller, L. C. School behavior checklist: An inventory of deviant behavior for elementary school children. Journal of Consulting and Clinical Psychology, 1972, 38, 134-144.

Miller, L., Lender, R., Lowenfeld, R. & Turner, J. Reliability of Koppitz Scoring System for the Bender Gestalt. Journal of Clinical Psychology, 1963, 19, 211.

Mills v. Board of Education of District of Columbia, 348 F. Supp. 866 (D.D.C. 1972).

Nicholson, C. A., Jr. A survey of referral problems in 59 Ohio school districts. Journal of School Psychology, 1967, 5, 280-286.

Ohio State Law Review Journal, 1979, 40, 606-611.

Olin, T. D. & Reznikoff, M. A comparison of copied and recalled reproductions of the Bender Gestalt designs. Journal of Projective Techniques, 1958, 22, 320-327.

Orton, S. T. Word blindness in school children. Archives of Neurology and Psychiatry, 1925, 14, 581-615.

Orton, S. Specific reading disability, Strephosymbolia. Journal of American Medical Association, 1928, 90, 1095-1099.

Pascal, G. R. & Sutlell, B. J. The Bender Gestalt Test: Its quantification and validity for adults. New York: Grune & Stratton, 1951.

Peek, R. & Olson, G. W. The Bender-Gestalt recall as an index of intellectual functioning. Journal of Clinical Psychology, 1955, 11, 185-188.

Pennsylvania Association for Retarded Children, Nancy Beth Bowman, et al v. Commonwealth of Pennsylvania, David H. Kirtzman, et al, 334 F. Supp. 1257 (E.D. Pa. 1971) and 343 F. Supp. 279 (E.D. Pa. 1972).

Persinger, B. D., Jr. & Holmes, C. B. Closure difficulty, figure-size expansion, and figure-size constriction on 240 Graham-Kendall Memory-for-Designs records. Perceptual and Motor Skills, 1978, 47, 343-347.

Quattlebaum, L. F. A brief note on the relationship between two psychomotor tests. Journal of Clinical Psychology, 1968, 24, 198-199.

Robbins, R. C., Mercer, J. R. & Meyers, C. E. The school as a selecting-labeling system. Journal of School Psychology, 1967, 5, 270-279.

Robinson, E. S. & Brown, M. A. Effects of serial position upon memorization. American Journal of Psychology, 1926, 37, 538-52.

Ruetter, E. E., Jr. The law of public education: Second addition. New York: The Foundation Press, Inc., 1976.

Sabatino, D. A. & Ysseldyke, J. E. Effect of extraneous background on visual-perceptual performance of readers and non-readers. Perceptual and Motor Skills, 1972, 35, 323-328.

Schulberg, H. C. & Tolor, A. The use of the Bender-Gestalt in clinical practice. Journal of Projective Techniques, 1961, 25, 347-351.

Shaw, M. C. & Cruickshank, W. M. The use of the Bender Gestalt Test with epileptic children. Journal of Clinical Psychology, 1956, 12, 192-193.

Shein, J. H. The concurrent validity of Bender Gestalt for differential assessment of organicity in children. (Doctoral dissertation, Fordham University, 1975).

Silver, A. A. Diagnosis of the various syndromes encountered in retarded pre-adolescent children. In the Pre-adolescent exceptional child. Woods Schools: Proceedings of the 35th Conference of the Child Research Clinic, 1953.

Snyder, R. T. & Pope, M. Original norms and scoring technique for evaluating visual memory by the Bender recall technique for ages 5-12. Proceedings: NASP Annual Convention, 1970, 1, 35-38.

Sperling, G. The information available in brief visual presentations, Psychological Monographs, 1960, 74 (11, Whole No. 498).

Stavrianos, B. K. Can projective test measures aid in the detection and differential diagnosis of reading deficits? Journal of Projective Techniques and Personality Assessment, 1971, 35, 80-91.

Stevens, G. D. & Birch, J. W. A proposal for classification of the terminology used to describe brain-injured children. Exceptional Children, 1957, 23, 346-349.

Stewart, H. F., Jr. A note on recall patterns using the Bender Gestalt with psychotic and non-psychotic patients. Journal of Clinical Psychology, 1957, 13, 95-97.

Strauss, A. & Lehtinen, L. Psychopathology and education of the brain-injured child. New York: Grune & Stratton, 1947.

Sunberg, N. D. The practice of psychological testing in clinical services in the United States. American Psychologist, 1961, 16, 79-83.

Tarnpol, L. Testing children with learning disabilities. In L. Tarnpol (Ed.), Learning Disabilities. Springfield, Ill.: Charles C. Thomas, 1969.

Thweatt, R. C. Prediction of school learning disabilities through the use of the Bender Gestalt Test: A validation study of Koppitz's scoring technique. Journal of Clinical Psychology, 1963, 19, 216-217.

Tolor, A. A comparison of the Bender-Gestalt Test and the digit-span test as measures of recall. Journal of Consulting Psychology, 1956, 20, 305-309.

Tomlinson, J., Acker, N., Canter, A. & Lindborg, S. Minority status, sex, and school psychological services. Psychology In The Schools, 1977, 14, 456-460.

Turnbull, H. & Turnbull, A. Free appropriate public education: Law and implementation. Denver, Colo.: Love Publishing Co., 1978.

Vaughn, R. & Hodges, L. A statistical survey into a definition of learning disabilities: A search for acceptance. Journal of Learning Disabilities, 1973, 6, 658-664.

Walters, C. E. Reading ability and visual-motor function in second grade children. Perceptual and Motor Skills, 1961, 13, 370.

Weiss, A. A. Reproduction from memory and frequency of recall of Bender-Gestalt figures in non-clinical subjects of different ages. The Israel Annals of Psychiatry and Related Disciplines, 1970, 8, 143-145.

Werry, J. S. & Quay, H. C. The prevalence of behavior symptoms in younger elementary school children. American Journal of Orthopsychiatry, 1971, 41, 136-143.

Wertheimer, M. Studies in the theory of Gestalt psychology. Psychologische Forschung, 1923, 4, 300.

Wielderholt, L. Historical perspectives on the education of the learning disabled. In L. Mann & D. Sabatino (Eds.), The Second Review of Special Education. Philadelphia: Journal of Special Education Press, 1974.

Wernicke, C. The symptom-complex of aphasia. In A. Church (Ed.), Diseases of the nervous system. New York: Appleton, 1908.

Whipple, C., Jr. & Waterman, D. Contemporary psychological and educational assessment: A guide for the school psychologist and clinician. Dubuque, Iowa: Kendall/Hunt Publishing Co., 1977.

PILOT STUDY

Bender Visual Motor Gestalt Test Copy
Mean Scores and Standard Deviations

Category	Number	Total Raw Score	Mean	Standard Deviation
LD	5	25	5.0	0.632
NLD	5	22	4.4	2.576

Bender Visual Motor Gestalt Test Copy
Mean Scores and Standard Deviations

Category	Number	Total Raw score	Mean	Standard Deviation
LD	5	83	16.6	2.727
NLD	5	80	16.0	2.756

NORMATIVE DATA FOR DEVELOPMENTAL BENDER TEST SCORING SYSTEM
Distribution of Bender Test Mean Scores
and Standard Deviations

	1964 Normative Sample*			1974 Normative Sample†		
Age Group	N	Mean	SD	N	Mean	SD
5-0 to 5-5	81	13.2	3.8	47	13.1	3.3
5-6 to 5-6	128	10.2	3.8	130	9.7	3.4
6-0 to 6-5	155	8.0	3.8	175	8.6	3.3
6-6 to 6-11	180	6.4	3.8	60	7.2	3.5
7-0 to 7-5	156	5.1	3.6	61	5.8	3.3
7-6 to 7-11	110	4.2	3.4	47	4.6	2.8
8-0 to 8-5	62	3.4	3.1	53	4.2	2.5
8-6 to 8-11	60	2.7	2.8	60	3.0	2.5
9-0 to 9-5	65	2.2	2.5	78	2.8	2.2
9-6 to 9-11	49	1.8	2.2	47	2.3	2.1
10-0 to 10-5	27	1.5	1.8	76	1.9	1.9
10-6 to 10-11	31	1.2	1.5	68	1.8	1.8
11-0 to 11-11				73	1.4	1.4

*N = 1104, socio-economic cross section; 98% white, 2% non-white.
†N = 975, socio-economic cross section; 86% white, 8.5% black, 1% oriental, and 4.5% Mexican-American and Puerto Rican.

From: Koppitz, E., The Bender Gestalt Test for Young Children: Volume II Research and Application, 1963-1973. New York: Grune & Stratton, 1975, page 185.

APPENDIX A

RAW DATA LEARNING DISABILITIES

Subj.	C.A.	Sex	Grade	BVMGTC Time Min.Sec.	BVMGTC Raw Score	BVMGTR Time Min.Sec.	BVMGTR Raw Score	BVMGTR No. Recalled	MFDT Raw Score
1.	9.11	F	4.6	4 : 14	5	3 : 35	11	8	4
2.	9.09	M	3.6	5 : 03	11	1 : 48	19	5	14
3.	9.06	M	3.6	3 : 15	4	1 : 28	24	2	7
4.	8.08	M	2.7	7 : 31	3	2 : 08	27	3	16
5.	9.04	M	3.3	5 : 45	3	3 : 21	9	6	20
6.	8.08	M	3.7	2 : 02	4	1 : 42	13	5	3
7.	10.06	M	5.7	4 : 02	3	2 : 41	14	6	6
8.	8.05	M	1.7	4 : 12	4	1 : 56	16	5	3
9.	9.07	M	4.7	4 : 42	3	2 : 40	15	6	2
10.	10.02	M	3.7	4 : 56	3	2 : 05	14	5	4
11.	10.04	M	5.1	9 : 16	6	5 : 35	14	5	9
12.	10.04	M	5.1	4 : 58	3	3 : 56	10	7	3
13.	9.04	M	3.7	3 : 11	5	1 : 36	14	6	22
14.	10.04	M	4.5	3 : 24	1	2 : 30	11	6	0
15.	8.10	M	3.8	5 : 20	7	3 : 02	16	6	5
16.	10.08	M	5.7	6 : 10	2	2 : 12	12	6	0
17.	10.03	F	4.2	5 : 20	2	1 : 52	19	4	3
18.	10.09	M	4.6	3 : 23	2	1 : 50	12	6	2
19.	10.01	M	3.5	3 : 11	6	3 : 00	8	7	2
20.	9.10	M	3.7	3 : 24	5	1 : 02	18	4	5
21.	8.07	F	3.1	5 : 10	7	2 : 03	13	6	7
22.	11.01	M	5.6	3 : 15	2	2 : 30	6	8	3
23.	9.04	M	2.6	4 : 46	2	4 : 17	7	7	4
24.	9.04	M	3.8	5 : 00	2	2 : 03	18	4	5
25.	10.02	M	4.8	5 : 00	1	3 : 32	16	6	1
26.	10.02	M	4.8	9 : 40	3	5 : 18	16	5	1
27.	9.11	M	3.7	6 : 05	5	1 : 05	23	2	10
28.	11.02	F	5.2	6 : 31	9	3 : 28	18	6	19
29.	11.01	M	5.8	3 : 05	3	1 : 42	7	7	0
30.	8.08	M	3.0	12 : 50	0	5 : 42	13	5	8
31.	8.09	M	2.8	4 : 12	7	1 : 03	26	2	11
32.	11.08	M	5.6	3 : 42	2	1 : 52	18	5	1

APPENDIX A

RAW DATA NON-LEARNING DISABILITIES

Subj.	C.A.	Sex	Grade	BVMGTC Time Min.Sec.	BVMGTC Raw Score	BVMGTR Time Min.Sec.	BVMGTR Raw Score	BVMGTR No. Recalled	MFDT Raw Score
1.	8.08	M	3.1	5 : 47	1	1 : 58	23	4	3
2.	11.11	M	6.8	6 : 19	0	1 : 46	23	3	10
3.	10.02	M	4.6	1 : 29	2	1 : 29	18	4	0
4.	9.05	M	3.8	4 : 23	4	2 : 01	12	7	10
5.	9.04	M	4.0	5 : 10	4	3 : 12	14	6	8
6.	9.01	M	3.8	5 : 15	5	2 : 10	20	4	4
7.	9.07	F	4.4	5 : 30	3	2 : 49	16	5	9
8.	9.10	F	3.6	2 : 53	7	2 : 39	14	6	2
9.	8.08	F	3.8	3 : 04	5	2 : 13	12	7	4
10.	10.02	M	4.8	3 : 10	4	1 : 38	19	4	9
11.	9.09	M	3.5	4 : 10	3	2 : 33	15	7	15
12.	8.05	M	2.8	5 : 27	8	2 : 27	21	3	18
13.	10.02	F	4.6	3 : 42	7	2 : 14	17	5	5
14.	9.03	F	3.5	4 : 36	3	1 : 33	17	4	5
15.	9.00	M	4.2	5 : 57	10	1 : 31	17	5	7
16.	9.08	M	3.6	2 : 56	4	1 : 22	16	6	4
17.	9.04	F	3.8	3 : 53	5	1 : 22	16	5	17
18.	8.10	M	3.1	6 : 43	3	1 : 38	18	4	9
19.	10.01	F	4.6	3 : 14	9	2 : 03	20	4	11
20.	8.07	F	3.6	5 : 49	5	5 : 49	19	4	12
21.	8.06	M	3.7	4 : 57	6	2 : 18	23	3	14
22.	9.00	M	4.2	4 : 06	5	2 : 07	15	5	3
23.	10.00	F	3.6	4 : 31	5	2 : 03	16	6	7
24.	11.00	F	5.7	2 : 33	9	1 : 42	14	6	6
25.	8.10	M	3.5	6 : 30	8	3 : 07	16	6	7
26.	10.07	M	5.7	4 : 42	5	4 : 42	12	6	6
27.	8.09	F	2.6	2 : 34	7	0 : 58	23	3	22
28.	10.07	M	6.5	8 : 10	0	4 : 25	12	6	1
29.	8.11	M	3.6	4 : 16	3	2 : 32	16	6	0
30.	8.10	M	3.6	4 : 57	3	3 : 20	23	3	13
31.	9.03	F	3.6	6 : 29	2	2 : 11	19	5	3
32.	10.01	M	4.4	6 : 08	2	3 : 17	13	7	8

MEMORY-FOR-DESIGNS TEST
SCORING SHEET

Name_____ Catg.L__N__D.O.B._____ DATE_____ C.A._____

C.A._____ M__F__Grade_____ Examiner_____ Total_____ Range_____

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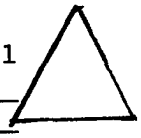

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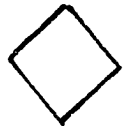

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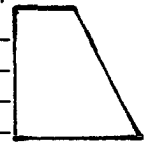

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Design 6
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Design 7
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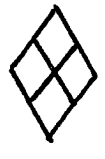

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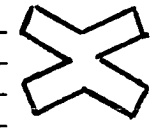

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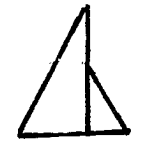

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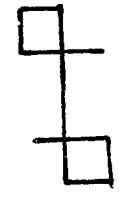

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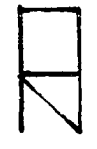

Design 15
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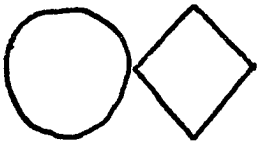
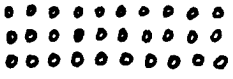
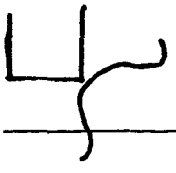
KOPPITZ SCORING SYSTEM FOR THE BENDER GESTALT

NAME _____ DATE _____ AGE _____ TEACHER _____

EXAMINER _____ D.O.B. _____ GRADE _____ SCHOOL _____

DESIGN	SECS	COPY	ORDER RECALLED	RECALL
		1a. Distortion * _____ 1b. Disproportion *7 _____ 2. Rotation *9 _____ 3. Integration *7 _____		1a _____ 1b _____ 2 _____ 3 _____
		4. Distortion * _____ 5. Rotation ** _____ 6. Perseveration**8 _____		4 _____ 5 _____ 6 _____
		7. Rotation *9 _____ 8. Integration **6 _____ 9. Perseveration**8 _____		7 _____ 8 _____ 9 _____
		10. Distortion *7 _____ 11. Rotation *8 _____ 12a. Integration *6 _____ 12b. Continuous Line** _____		10 _____ 11 _____ 12a _____ 12b _____
		13. Rotation ** _____ 14. Integration * _____		13 _____ 14 _____
		15. Distortion *9 _____ 16. Rotation * _____ 17a. Integration _____ 17b. Continuous line** _____		15 _____ 16 _____ 17a _____ 17b _____
		18a. Distortion * _____ 18b. Straight Lines** _____ 19. Integration _____ 20. Perseveration**8 _____		18a _____ 18b _____ 19 _____ 20 _____
		21a. Disproportion *8 _____ 21b. Distortion _____ 22. Rotation *7 _____ 23. Integration *7 _____		21a _____ 21b _____ 22 _____ 23 _____
		24. Distortion *7 _____ 25. Rotation ** _____		24 _____ 25 _____
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