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Early identifiers of learning disabilities in preschool children

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Early identifiers of learning disabilities in preschool children

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EARLY IDENTIFIERS OF LEARNING DISABILITIES IN PRESCHOOL CHILDREN

A Dissertation

Submitted

In Partial Fulfillment

of the Requirements for the Degree

Doctor of Education

Approved:

Ronald J. Anderson, Co-Chair

Marion R. Thompson, Co-Chair

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July 1988

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This manuscript is dedicated to the memory of my father Elmore Joseph Rebouche' and my mother Marjorie Curry Rebouche'.

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ABSTRACT

The study identified learning disability (LD) characteristics from the diagnostic reports of 46 preschool age children, 21 children re-evaluated once at school age, and 6 children evaluated twice. The children were identified as learning disabled between the ages of three and five and remained identified as learning disabled three to seven years later. The symptoms characteristic of preschool students and school aged learning disabled students were identified as characteristic of learning disabled if the symptoms appeared in 50 percent or more of the student records.

In the preschool age group, expressive and receptive language, in addition to fine and gross-motor deficits were the most frequent symptoms of learning disability. Also, attention span and activity deficits were observed to increase as students remained in programs, while motor and language symptoms were observed to diminish. Symptoms that persisted over time were behavior, attention span, and activity, in addition to preacademic/academic activity.

Children may exhibit different learning disability symptoms, depending upon their age and number of years of participation in learning disability programming. The frequency of behavior problems including attention span and activity deficits indicate that learning disability programs should contain a strong behavior management component.

CHAPTER 1

LEARNING DISABILITY CHARACTERISTICS IN A PRESCHOOL POPULATION

Introduction

Learning disability is one of the most complex of the major disabling conditions facing educators today. Because it is manifested by numerous symptoms, and since this multiple symptomatology has become characteristic of learning disabilities, the early identification of these symptoms is very important. Learning disability is a relatively new category of handicapping conditions in relation to other disabilities in special education. Along with its recency, learning disability frequently lacks specific diagnostic symptomology evident in other disabilities.

One of the major reasons for this lack of specific symptomatology, unlike other disability categories that have evolved as a result of specific symptomatologic concerns, is that the symptoms of learning disability appear to be more subtle. In disability diagnosis other than learning disability, identification is often achieved through clinically or medically based diagnostic procedures. Children identified as having mental and emotional disabilities frequently exhibit medically or psychiatrically verifiable symptoms. Down's Syndrome or childhood schizophrenia are examples of clinically recognized impairments. There are, however, few medically or psychiatrically verifiable symptoms related to the learning disability diagnosis (Torgesen & Wong, 1986).

Another reason for the multiple symptomatology is that, historically, the concept of learning disability evolved from theorists' research across numerous professional fields instead of one or two disciplines. For example, Gallagher (1966) credited development of the term 'learning disability' to professionals in the fields of neurology, psychology, speech pathology, ophthalmology, and remedial reading. In addition to trans-disciplinary contributions, transition across time has also had an effect on the definition of the term 'learning disability.'

Wiederholt (1974) delineated three historical phases from which the evolution of the concept of learning disabilities emerged. The first phase (foundation) appeared in 1902 and continued until 1926. Learning disability was first identified by neurologists and ophthalmologists who categorized its symptoms as visual-motor dysfunctions. The second phase (transition) existed from 1926 to 1963. During the transition phase, the learning disability was thought to be a neurological abnormality or minimal brain dysfunction (MBD). Symptoms of learning disabilities were most often linked to aberrant electro-chemical information processes within the brain. The transition phase was gradually replaced by the integration phase which began in 1963 and continued into the 1980's. The integration phase evolved as a result of contributions from the disciplines of psychology, speech pathology, and special education. As a result of the integration of numerous disciplines into the diagnostic process, the concept and term learning disability became an educational and medical disorder.

Learning disability symptoms became more clearly delineated during the integration phase, with the learning disability diagnosis determined by a team involving several educationally-related disciplines. The complexity of learning disability and its newness to the field of special education increased the need to communicate across professional disciplines. The expanding influence of this category of disabilities on special and general education has necessitated a more accurate identification of the disability.

Identification of Learning Disabilities

Identification of children as handicapped is a complicated process. The process usually involves a number of activities that are required to occur in a specified sequence by the statutes of Public Law 94-142 (1975). The required sequence is referral, assessment/evaluation, team staffing (to identify educational needs), determination of an appropriate educational program, and placement.

Schmidt (1981) stated that many preschool educators do not recognize learning disability as an appropriate diagnosis for young children. According to Schmidt, these educators have preferred to identify the children as high risk and adopt a wait and see attitude toward young children who exhibit developmental and/or learning deficiencies.

The primary problem with early identification, according to Myklebust (1971), has been that the diagnosis of learning disabilities is controversial even in elementary and secondary age students. Greater variance in student rates of physical and intellectual development in preschool aged children causes greater difficulty in

reliable assessment (Gallagher, 1966; Kirk & Kirk, 1971; Meyers & Hammill, 1976). In addition, due to children's rapid physical and mental development and their lack of exposure to a formal educational program, the discrepancy between ability and achievement is much narrower in the preschool than in the school aged population (Lerner, Mardell-Czudnowski, & Goldenberg, 1981). School officials, are often reluctant to defend the provision of special education services to an age group of children whose handicaps do not yet indicate a clear discrepancy between ability and academic achievement.

The current literature indicates the complexity of issues that surround the identification of preschool children as learning disabled. For example, Lerner, et al. (1981) stated that the methods used to diagnose learning disability are more complex than the assessment and diagnosis of other more clearly defined disabilities such as mental disabilities. In addition, according to Lerner, there are no clearly defined, static, or universally accepted definitions of learning disabilities.

Few researchers have attempted to develop and verify possible criteria for identifying preschool children as learning disabled. The number of subjects identified as learning disabled while in the preschool age range critically limits the population sample. The researchers who have studied young children have confined their subject population to those in kindergarten and/or first grade. Studies conducted to examine the problem of identifying learning disabilities in young children prior to the age of six are almost non-existent.

Justification for the Study

LaPolla, Amicucci, Cline, & Vaughn, (1982), addressed the concept of learning disability in the preschool aged group. His significant indicators were medically-defined and based on soft neurological signs. Horn and Packard (1985), in their meta-analysis, discovered a number of symptoms that they believed were characteristic of learning disability. Horn and Packard's focus, however, was in the kindergarten and first grade populations. Their results were almost the opposite of LaPolla's findings. The literature appears to lack a learning disability definition that recognizes preacademic rather than academic criteria. In addition, there is contradictory evidence in the school age literature regarding the causes and symptoms of learning disabilities. The studies in the currently available literature support only cursory assumptions regarding the appropriate preschool definition of learning disabilities. The LaPolla, et al. (1982), and the Horn and Packard (1985) studies of preschool learning problems were done by medical/clinical personnel. No studies were found in which educational professionals with preschool or early childhood experience researched the symptoms of learning disability.

In contrast to the majority of the studies now in the literature, the subjects for this study were children identified as learning disabled by specialists in assessment and educational remediation of learning disabilities in preschool aged subjects. In addition, literature in the area of early identification of learning disabilities indicates that researchers generally have examined one or two symptoms exclusive of combinations of symptoms. With a

sufficiently large subject population and assessment by a multi-disciplinary educational team symptoms may remain independent or cluster within or between symptom categories. It is possible that with appropriate subject population and research methods independent symptoms and/or clusters of symptoms could be identified.

Beers and Beers (1980) reported that, even though some states had been involved in early identification and intervention for five or more years, the incidence of learning disabilities had not been decreasing. Data from the U.S. Department of Education, cited in Lerner, Mardell-Czudnowski, & Goldenberg, (1987) indicates that, from the period of 1976-'77 until 1983-'84, the number of learning disabled subjects doubled from 797,212 to 1,811,451. Learning disabled children comprised 1.89% of the total school population in 1977-78, increased by 1983-'84 to constitute 4.63% of the total school enrollment. The rapid increase in number and percentage indicate the need for accurate selection and identification criteria. Lerner et al. caution that until early intervention is coupled with curriculum reform the learning disability diagnosis may promote a dumping ground for reading, emotional, and management problems. Emphasis is needed to determine the educational implications as well as the differential implications of diagnostic data in order to remediate learning disabilities (Keogh & Becker, 1973).

The benefits of early identification as well as the cautions against over-zealous identification must be weighed carefully as one attempts to determine characteristics of any handicapping condition. It is essential to keep these cautions in mind where diagnosing

learning disabilities since possibility for error is greater than for other more easily identified disabilities.

Statement of the Problem

Area Education Agency 7 (AEA 7) is one of the few intermediate educational units in Iowa that attempts early identification of learning disabilities in children. Early identification of learning disabilities in children is highly problematic due mainly to the lack of specified diagnostic symptoms. The lack of specific and observable symptoms creates several problems for special education personnel. The first of such problems is directly related to the precision with which learning disabilities are diagnosed in young children. If specific symptoms are difficult to identify it logically follows that assessment information gathered by professionals could be suspect as well.

Second, unreliable assessment information could easily be translated into inappropriate educational programs for young children with special learning needs. Inappropriate educational programs could have a negative impact on the child's ability to acquire necessary preacademic skills.

Finally, the cost of assessment is considerable. The lifelong cost to a child who is placed in an inappropriate program, however, due to erroneous assessment information and based on unclear disability symptoms can be more costly to the child than a few dollars in the short term.

The effect of appropriate learning disability symptom identification is directly related to research carried out in this

area. As a result it is particularly important to address the problem of identification of learning disability symptoms in young children.

Due to the lack of longitudinal research, it is not known if specific symptoms characteristic of learning disability exist at the preschool level. The literature does not indicate, in the absence of preschool symptoms, if other symptoms emerge later after the children reach school age. In addition there is no indication which symptoms will persist. There is speculation by some researchers that early language difficulties and/or perceptual dysfunction are indicative of later problems for some children in academic areas such as math, reading, and writing. Research that utilizes an early childhood population is needed to address this problem. Because AEA 7 has identified many children with academic difficulties the agency needs specifically identified preschool learning disability symptoms that have been evaluated and proven reliable. Specific symptoms are needed to prevent under-, over-, and mis-identification of learning disabled children.

Research Questions

The following research questions have been developed for the present study.

1. What are the symptoms professionals identified as characteristic of learning disabled preschool children?

2. Which social, cognitive, and discrepancy symptoms are characteristic of learning disabled preschool children?

3. What are the symptoms observed by professionals to be characteristic of school aged students identified as learning disabled in preschool?

4. Which social skills, cognitive, and discrepancy categories contain symptoms characteristic of school aged students identified as learning disabled in preschool?

5. What are the symptoms within the categories of social, cognitive, and discrepancy skills characteristic of school aged students identified as learning disabled in preschool?

6. Which symptoms are characteristic of learning disability at preschool and remain characteristic at school age?

7. Which symptoms are characteristic of learning disability at preschool but do not remain characteristic at school age?

8. Which symptoms are characteristic of learning disability at school age but are not characteristic of preschool aged children?

Assumptions

The assumptions of this study include the following:

1. The diagnostic procedures of the AEA 7 diagnostic teams followed the procedures outlined in The Iowa Preschool Criteria (Iowa Department of Public Instruction, (IDPI) 1985a).

2. The vision and hearing of students staffed as learning disabled was found to be or was corrected within normal limits.

3. Diagnostic reports of certified preschool staff contained descriptions of symptoms that supported the staffing team's diagnosis of learning disability in preschool aged children.

4. Certified teachers of preschool handicapped could select symptoms that were characteristic of learning disability from student placement and re-evaluation reports.

5. The symptoms most characteristic of learning disability were observed more frequently in the diagnostic reports of preschool children identified as learning disabled, at placement and at re-evaluation, than symptoms not characteristic of learning disability disabled children.

Limitations

The limitations of the study included: (a) sample size, (b) record content, and (c) diagnostic report.

Sample Size

The sample size for this study was large in comparison to other known samples available in the other Iowa AEAs. The placement sample of 46 students and the first re-evaluation sample of 21 students were believed to be of sufficient size to determine symptomatic trends. These trends, however, would have been enhanced if the same number of learning disabled students had been available during each of the three data collection phases. Only six student reports were available across all three evaluations.

The declining sample size across the two re-evaluation phases limited this study. The study began with 46 students identified as learning disabled in the AEA 7 preschool handicapped program. To ensure that students had spent at least three years in a learning disability program, the records of children identified earlier than 1985 were selected. Under optimal circumstances, each child

identified prior to 1985 would have had at least one three-year re-evaluation. To insure that students in this study were sufficiently learning disabled to require extended programming, children who were evaluated before the end of the three year federal minimum were not included in the re-evaluation phase. Twenty five students were either staffed and changed disability or were evaluated less than three years after placement. When the disability and three year span between placement and re-evaluation criteria were met only 21 records remained in the re-evaluation phase.

The second phase criteria required that the students remain in learning disability programming longer than three years, with at least two team evaluations occurring three or more years after the student's placement. Only six of the 21 students met this criteria and were in the program long enough to have the second re-evaluation. Because of the limited sample size, data collected from the second re-evaluation were used to verify trends from the earlier evaluations.

Record Content

The skill symptoms that were identified as characteristic of learning disability may have changed over time due to staff turnover or changing of agency policy and procedures. In addition, certain types of data are required under Public Law 94-142 (1975) to establish disability. There are, however, no requirements that staff conduct similar student evaluations or collect similar diagnostic information. Within disciplines, professionals did not necessarily use the same assessment instruments or assess the same skill areas. Certain skill areas may not have been assessed because of a child's age or grade

level. The lack of complete congruence between reports within disciplines and across age groups may be a limitation of the study. Since only data were included for which there was 100 percent agreement between reviewers, the study should be very descriptive of the symptoms displayed by students identified as learning disabled while in preschool in AEA 7.

Diagnostic Reports

There were many more psychology, speech, and strategist reports than hearing, occupational therapy, physical therapy, or nurse reports. Variation in the number of reports across disciplines resulted in some disciplines having a greater opportunity to contribute to the frequency that certain skill deficits were identified. The psychology and speech disciplines, for example, participated in almost all evaluations, and both disciplines often assessed language development. In order to negate the effects of disciplines identifying the same skill deficit multiple times and thereby inflating the frequency, each skill identified was made statistically equal to one. This uniform procedure eliminated the effects of a skill appearing as a symptom in more than one report.

Since some disciplines participated in a child's evaluations more frequently than others, some disciplines may have had more opportunity to identify certain symptoms more than others. Greater descriptive specificity for team assessment across all disciplines, therefore, might have been obtained if the subject population had been of sufficient number to allow the children to be selected on a one-to-one correspondence with all disciplines providing assessment. In

contrast, the lack of equally frequent involvement of all diagnostic disciplines in student evaluation may more nearly represent the reality of child assessment in public education settings.

Summary

Learning disability, as a preschool disabling condition, has not been validated using the preschool aged group. Its complexity, multiple symptomatology, and relative newness to the other disability catagories indicates that more research is needed on the preschool aged group to add more specificity to the learning disability concept.

The creation of the AEAs provided a strong fiscal base for special education and the requirements of Public Law 94-142 (1975) made multi-disciplinary diagnosis mandatory. Emphasis on multi-disciplinary team involvement in the identification process brings a different perspective to the evaluation process from each discipline. Professional differences may occur based on the opinion of each team member regarding causation or observable conditions. Thus, the identification process may reflect neurological, maturational, genetic, nutritional or biochemical causes. In addition, other factors, such as variation among young children in rate of development and the type of disability model under which the multidisciplinary team functions, add to the complexity of early identification.

In the chapters that follow, literature concerning preschool handicapped will be reviewed, research method will be presented, data on preschool characteristics will be analyzed, results of the study will be reported, conclusions will be presented, and directions for future research will be suggested.

CHAPTER 2

REVIEW OF LITERATURE

Introduction

In this chapter the research literature related to early identification of handicapped children will be reviewed and the advantages and disadvantages of early identification will be discussed. In addition, learning disability causation theory, disability models, symptoms and definitions will be presented.

Caldwell (1970) reiterated the three distinct historical phases in the treatment of preschool special education children: (a) forget and hide, (b) screen and segregate, and (c) identify and help. Lindsay and Wedell (1982) stated that because of the "identify and help" orientation of society there is now a trend to move away from waiting until school age to identify children who fail to acquire basic educational skills. It is now becoming increasingly acceptable to identify symptoms such as language deficiencies before they emerge later as reading deficits and school failure.

Bloom's (1964, 1976) interpretation of the early intervention research indicated that environmental intervention during the crucial early childhood years can drastically affect intelligence and other mental growth factors. In the area of learning disabilities, however, efficacy research has been slow to document the value of early identification and the subsequent long-range effects of earlier educational intervention. A growing body of literature based on longitudinal research has begun to support the concept of early intervention in general at the preschool level and relates it to later

academic achievement (Bissell, 1973; Heber, Garber, Harrington, Hoffman, & Falender, 1972; Kirk, 1958, 1965; Kirk, Kliebahn, & Lerner, 1978; Lazar, 1979; Miller & Dyer, 1975; Moore, 1978; Weikart, 1970; Westinghouse Learning Corp. & Ohio University, 1969).

Early Identification

Advantages

Mercer, Algozzine, and Trifiletti (1979) stated the following three reasons for the importance of early identification:

1. The behavior of young children is easier to change than the behavior of older children or adults.

2. Personality characteristics related to later learning behaviors are established during the preschool years.

3. Families can begin to adjust to and accept a child's disability earlier.

Myklebust (1963) maintained that dyslexia was a basic language and learning disability. He asserted that identification of learning disorders could occur during the very early stages of language acquisition. Future reading problems, he theorized, could be predicted by the way a child learned to symbolize experiences through language development.

In a meta-analysis of 74 studies, Casto and Matropieri (1986) found support for immediate or short-term benefits of early identification and intervention with preschool children with learning problems. Their study also indicated that longer and more intense programs have a more effective educational impact on disadvantaged

children. Other research has pointed to possible disadvantages that may occur in attempting early identification.

Disadvantages

Keogh and Becker (1973) reported that with severely disabled children, early educational identification increases the potential benefits of intervention. Their study also indicated that early identification and intervention with these children may prevent the occurrence of other problems or conditions. Keogh and Becker, however, limited their support for early identification to children with physical, sensory, and gross developmental problems. They were cautious when extending early identification to children with less severe educational exceptionalities.

Keogh and Becker (1973) grouped the potential problems of early identification of learning disorders into three areas:

1. The validity of the measures used to identify and predict learning difficulties;

2. Understanding the implications of the diagnostic data as the implications relate to remediation; and

3. The possibility that the benefits of early identification would be offset by the negative or damaging effects of identification as a handicapped learner.

Mercer, et al. (1979), reported several disadvantages with early identification and subsequent intervention related primarily to misidentification or misdiagnosis. She stated that:

1. Tests or instruments related to early diagnosis are unreliable due to large variations in the rate at which young children

develop and acquire new skills. In addition, most standardized preschool tests have only a few items to measure whether or not a specific skill has been acquired at a given age.

2. Moderate or mild problems are more difficult to accurately diagnose than severe disabilities. Milder disabilities such as learning disabilities are more subject to misdiagnosis than other more severe handicapping conditions.

3. Large maturational or developmental differences occur in individuals early in life. It is difficult to determine if children are disabled or if a developmental delay that will disappear over time is being identified.

4. A child who is not disabled might be identified as handicapped, resulting in emotional difficulties for the child and the child's family.

Causation Theories

Diagnosing the causes of learning disabilities is a complex endeavor. The diagnostician is often faced with multiple symptoms that make it difficult to determine primary causation. A typical complex of symptoms according to Wiederholt (1974) include: (a) disorders of spoken language, such as expressive aphasia; (b) disorders of written language, such as letter or number reversal; and (c) disorders of perceptual and motor behavior, such as the inability to cross the body's midline. Recent theories have attempted to narrow and describe some of the causes.

According to Houck (1984), the following theories represent the most popular frames of reference for viewing the phenomena known as

learning disabilities: (a) neurological, (b) maturational, (c) genetic, (d) nutritional, and (e) biochemical.

Neurological Causes

Neurological causes of learning disabilities based on etiology may be viewed in two major subcategories. These subcategories are: organic causes manifested by subtle dysfunctions of sensory or neuronal processing or birth-related causes manifested by pronounced sensory or motor impairments and caused by known disease factors or birth trauma.

Organic Causes

The neurological damage theory states that learning disability stems from poor visual and/or auditory perception and poor motor coordination. The problems related to the preceding skill areas are thought to be caused by brain dysfunction.

Researchers have learned that deficiencies in perceptual processing can severely affect the way children perceive and cope with the environment. Considerable emphasis has been placed in the historical literature upon determining perceptual indicators of learning problems. Houck (1984) reported that in research begun in 1937, Strauss and Werner (1941, 1943) were the first researchers to attempt to establish correlations between Goldstein's research on learning behaviors of brain-injured soldiers and the learning behaviors of children (Gelb & Goldstein, 1924; Goldstein, 1939; Goldstein & Scheerer, 1941). These researchers reported that both populations manifested similar visual-motor impairments, figure-ground

problems, impulsive behavior, distractibility, and thinking and conceptual disorders.

Birth-Related Causes

Pasaminick and Knoblock (1960) and Knoblock and Pasaminick (1974) cited a number of birthing variables associated with later learning problems. Several examples are maternal symptoms of blood incompatibility, age, specific drugs, infections, cigarette smoking, and abnormally long and hard labor. They hypothesized that children with these or similar maternal symptoms in their background may be considered to be at high risk for learning problems. A slightly different approach toward the cause of learning disability is taken by researchers who believe that brain dysfunction is not caused by injury, trauma, or malfunction, but by maturational delay.

Maturational Delays

Research by de Hirsch, Janskey, and Langford (1966) documented the existence of delayed differentiation of the central nervous system or maturational delay. De Hirsch and Langford (1966) verified that children who manifest early language disorders eventually experience reading, writing, and spelling difficulties, and often demonstrate delayed cerebral dominance. Bender (1973) hypothesized that the characteristics which neurological researchers attributed to brain damage were normal in children at earlier stages of development. This dynamic line of research shows considerably better prognosis for change than the more static neurological damage theories (Houck, 1984). Another theory of the cause of learning disabilities relates to the learning skill problems associated with inherited tendencies.

Genetic Causes

De Quiros and Schrager (1978) reported that the case for genetically caused learning disabilities is supported from studies done by Skydsgaard (1942) and Hallgren (1950). Ingram and Barn (1961) linked a dominant gene to learning disabilities. In addition to Ingram's findings, other research has shown that some families do have familial patterns of learning disabilities (Bannatyne, 1971; Hallgren, 1950; Silver, 1971; Warren, Karduck, Bussaratid, Steward, & Sly, 1971; Wolf, 1967). There appears to be some evidence in this earlier published research that supports a genetic cause of learning disability but these findings remain inconclusive. The primary value of genetic research is its potential to prevent learning disabilities through genetic counseling of prospective parents. This line of research may also yield genetic indicators that can be used to assist in early identification of learning disability. Another theory of possible value purports that student learning disabilities are caused at an early age by infant nutritional deficiencies.

Nutritional Deficiencies

Nutritional theorists postulate that early nutritional deprivation may be related to later learning difficulties. Studies by Cravioto (1973) and post-mortem studies by Winick and Rosso (1969) revealed that malnourished children who died before the age of one had up to 60 percent fewer brain cells than their well-nourished counterparts.

From a slightly different perspective, Feingold (1976) proposed that much of the overactive behavior in young children related

directly to allergies to impurities such as food coloring, preservatives and other modern additives found in children's daily diets. Nutritional research primarily points to the need to recognize a critical learning period during which nutrition is vital to later educational development. Nutritional theories do not explain the many children who are identified as learning disabled who have no history of poor diet, vitamin deficiency, or malnutrition (Kershner, 1978). The full value of nutritional theory in the identification of preschool aged learning problems has yet to be fully established. Another theory of identification, cause, and possible remediation of learning disabilities focuses on medically prescribed biochemical intervention.

Biochemical Causes

The use of certain psychoactive drugs has been found to alter the performance of some children's nervous systems (Lambert, Windmiller, Sandoval, & Moore, 1976). For example, in a study of hyperactive children, 60 to 90 percent of the children studied displayed changes in observed behavior upon receiving psychoactive drugs (Whalen & Henke, 1976). The basis of observed biochemical differences in children with learning disability remains obscure. Children's reactions to psycho-active drugs, could not according to de Quiros and Schrager (1978), be reliably predicted and there were no definitive patterns of behaviors that validated the outcomes of drug treatment.

A study by Sandoval, Lambert, and Yandell (1976) further diminished the impact of potential biochemical indicators of learning disabilities by revealing that physicians depended more heavily on

intake histories to support a diagnosis than upon laboratory tests or brainwave analyses. The Sandoval et al. (1976) study disclosed problems such as constant or undirected activity, academic failure, or conflicts with peers and teachers as the symptoms physicians related to later learning disabilities. These same symptoms may also prove valuable to educators as they attempt to identify the causes and symptoms of learning disabilities.

The various theories described above suggest that symptoms could be categorized for purposes of identification. These categories include neurological, maturational, genetic, nutritional, and biochemical causes. Symptoms may act singly or in combination to identify etiologically or behaviorally induced learning disabilities. For this reason, learning disability symptoms may also seem to be present in more than one theoretical category. The preceding literature indicated the need to establish discrete symptomatological categories and criteria in order to obtain accurate and consistent research data. Identification of learning disability is based on two primary models: discrepancy and exclusionary.

Disability Models

Discrepancy Model

Identification of a learning disability within the discrepancy model depends upon a diagnostician's ability to measure or identify a significant discrepancy between the student's measured intellectual ability and a measure of academic achievement (Denhoff, Hainsworth, & Hainsworth, 1971). The discrepancy is usually measured using

standardized psychological tests and academic performance by standardized (norm-referenced) test instruments.

Academic tests measure the types of tasks and activities usually taught in a formal school setting. Accurately assessing the discrepancy between ability and performance in preschool children can be considerably more difficult than obtaining a similar measurement from older children. Older children often have had the benefit of formal schooling and the discrepancy model was developed for use with these individuals. As a result, preschool tests are used most often to identify pre-academic skills and measure intelligence without the benefit of items designed to measure school-related learning experiences.

Current trends in identifying learning disabilities in younger children depend less on discrepancies between intellectual and academic performance. Instead, attention has begun to focus on discrepancies between normal 'age appropriate' development and a child's current level of development. Kirk and Gallagher (1979) state that developmental discrepancies are often noted in the areas of perception, visual-motor ability, attention, or memory. They indicate that developmental discrepancies are most often noted in preschool children, while academic discrepancies are most often observed in school aged children. The second major diagnostic model is based on exclusionary measures.

Exclusionary Model

This learning disability category evolved to include special education deficiency areas that are primarily educational but that

emerge only after other disabilities have been eliminated. The category of learning disability has also evolved by default because other disability characteristics failed to explain many of the various school-related and discrepant learning problems experienced by children in educational settings. Learning disability can be classified under this exclusionary model since the major characteristics are not included in other disability categories. An example of exclusionary criteria is the requirement that a child be within the normal range of intelligence to be considered learning disabled. The criteria of normal intelligence excludes subjects with suspected mental retardation from being diagnosed as learning disabled (Iowa Rules of Special Education, (IDPI) 1985b; Kirk & Gallagher, 1979; National Advisory Committee on Handicapped Children, (NACHC) 1968).

The preceding diagnostic models have been invoked to address the problem of identification of children with learning disabilities. These models, however, have most often been applied to school aged children. The application of such models to preschool children thought to be learning disabled raises questions concerning the viability of early identification of these individuals using current models. For example, it may not be appropriate to apply the discrepancy model to preschool aged children and attempt to use academic achievement as the discrepancy measure. Unless eligibility criteria were established using developmental discrepancies, the diagnosticians' ability to collect appropriate data would be severely limited. Similarly, the exclusionary model may not be appropriate

since a number of disabilities frequently manifest symptoms in young children that are difficult to differentiate without the ability to include the effects of maturation. Early identification of children with learning disabilities does not appear to be fully achievable by conventional models described in the literature.

Although conventional diagnostic models for the early identification of learning disabilities in preschool children may be only marginally useful, it may be possible to identify symptoms that could lead to a tentative diagnosis.

Symptoms of Learning Disability

Strauss and Lehtinen (1947) helped establish a distinction between physiologically based learning problems and those problems that are the product of learned experiences. He used the terms "exogenous" for children with known neurological damage and "endogenous" for children without known neurological damage. This distinction is very important to the field of learning disabilities, since it aids in the differentiation of groups of children who do and who do not have a history of prenatal, perinatal, postnatal, or later nervous system damage.

Strauss and Lehtinen (1947) also found that children with exogenous characteristics and known neurological damage were more hyperactive, more perceptually disordered, more distractible, and emotionally more labile than comparable groups of endogenous children without known neurological difficulties. The distinction between exogenous and endogenous difficulties continues to be important because the professionals involved in the diagnosis and treatment of

learning disabilities often view prognosis and treatment methods as different, depending on the etiology of the disability.

Fuller, Gutherie, and Alvord (1983) proposed a neurological basis for learning disability identification in children who were born prematurely. Children surviving premature birth are high-risk candidates for learning disabilities and minimal brain damage (MBD). Lubchenco, Bard, Goldman, Coyer, McIntyre, and Smith (1974) found a 50 percent incidence of later learning difficulties in infants born prematurely. Richman and Harper (1980) found that significant differences in the low scores on verbal scale of the Wechsler Intelligence Scale for Children (Wechsler, 1974) and higher scores on the performance scale, when coupled with testing one year below age expectation on the Wide Range Achievement Test, (Jastak & Jastak, 1965) was predictive of later difficulties in reading and writing. Difficulties in the areas of reading, writing, or both may be symptomatic of learning disabilities.

Myklebust (1963) reported the following indicators that support identifying younger children as learning disabled: (a) visual perception disorders, (b) poor motor coordination, (c) poor visual-motor skills, and (d) language disorders. Myklebust also reported several indicators of brain pathology such as discrepant scores on psychological tests, e.g., Wechsler series. The most significant subtests were reported to be language facility, block design difficulty, object assembly difficulty, coding problems, and poor arithmetic performance. Poor achievement in academic subjects when compared to verbal IQ was also identified. Children at risk for

learning disabilities were also found to have difficulty with left and right discrimination, clumsy movements, difficulty dressing, and problems copying, recognizing, and matching shapes. Myklebust (1963) reported that learning disabled subjects often display psychological disturbances usually associated with cerebral palsy such as perseveration, short attention span, distractibility, and fluctuation in performance.

Horn and Packard (1985) conducted a meta-analysis of 58 published kindergarten and first grade studies that correlated kindergarten and first grade achievement with reading achievement in elementary school. They used predictors or symptoms selected from previous research as important underlying variables. They also identified several predictive categories in which the symptoms in each category lend credibility to early identification of learning disability.

Horn and Packards' (1985) early predictors of reading difficulties were kindergarten-identified problems due to: (a) attention and distractibility ($\underline{r}$ = 0.63), (b) internalizing behavior such as anxiety or depression ($\underline{r}$ = 0.59), (c) language variables ($\underline{r}$ = 0.92), including written expression ($\underline{r}$ = 0.58), oral expression ($\underline{r}$ = 0.44), or receptive language ($\underline{r}$ = 0.56), and (d) IQ measures ($\underline{r}$ = 0.53). The weakest predictors were: (a) neurological indicators ($\underline{r}$ = 0.41), cerebral dominance/handedness ($\underline{r}$ = 0.32), (b) sensory-motor indicators ($\underline{r}$ = 0.41), fine-motor ($\underline{r}$ = 0.46), and gross-motor skills ($\underline{r}$ = 0.32). Horn and Packard (1985) found the best predictors of later learning problems in young children were early problems with language development. Receptive language difficulty correlated better

as a predictor than did expressive difficulties. Attention and distractibility indicators as well as group and individual IQ indicators also correlated well with future learning problems. Somewhat weaker but still indicative of later learning difficulties were problems in fine-motor skill development. Some of the weakest predictors involved sensory integration or neurological data, such as gross-motor skills and measures of handedness and dominance.

LaPolla, et al. (1982) conducted a longitudinal research study covering seven years using a population of 50 children in the preschool age range of three years and three months to six years and two months. Using combined observations of professional psychological and occupational therapy staff, LaPolla, et al. were able to successfully identify potential learning disorders in preschool aged children. The learning categories or symptoms that were significant indicators of later difficulties were normal intelligence coupled with sensory-motor difficulties. The psychological variables used in the LaPolla's, et al. study to separate slow learning children from learning disabled children were: (a) intelligence, (b) behavior, (c) distractibility, (d) poor processing, and (e) speech difficulties. The occupational therapy criteria included difficulty with: (a) vestibular responsiveness, (b) tactile awareness, (c) developmental reflexes, (d) balance reactions, and (e) ocular control. Of 50 children followed over a seven year period, 46 subjects in Lapolla's, et al. study eventually were placed in learning disability classes. The LaPolla, et al. study yielded almost opposite conclusions from the Horn and Packard (1985) meta-analysis. LaPolla, et al. in contrast to

Horn and Packard (1985), found that weakness in the sensory integrative processes and the subsequent visual-motor problems, including figure-ground problems were considered to be the best indicators of later learning problems. Little evidence was found for the contribution of attention and distractibility, language variables, and IQ measures, which were the predominant indicators in the Horn and Packard meta-analysis.

Learning Disability Definitions

Most current definitions of learning disability in the literature are written to encompass a group of children with generally heterogenous learning problems. Few of the currently accepted definitions provide definitive guidelines for which children qualify and which children do not qualify as learning disabled. According to Kirk and Gallagher (1979), definitions may be classified into two broad categories: etiological—the disability is defined on the basis of biological origin or medically based cause and behavioral—such as descriptive symptoms or behaviors. Historically, medical definitions of learning disability have favored etiological factors while educational definitions have favored behavioral symptoms.

The following behavioral definition was drafted by the National Advisory Committee on Handicapped Children (NACHC, 1968) and was included in 1975 in Public Law 94-142 (1975) with only a few minor word changes.

> The term 'children with specific learning disabilities' means those children who have a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, which disorder may manifest itself in imperfect ability to listen, think, speak, read, write, spell,

> or to do mathematical calculations. Such disorders include such conditions as perceptual handicaps, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia. Such 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. (NACHC, 1968, p. 6)

It is evident through inspection of this definition that the majority of the areas in which a child may display learning deficiencies are areas that are only acquired after a child begins formal schooling at age six or seven. For example, acquisition of written language, reading, spelling, or mathematical skills would be normal school age accomplishments. Of the remaining skills listed in the definition only thinking skills, verbal or spoken language usage, and the ability to listen and interpret meanings accurately are subject to observation and measurement in the preschool aged group. The primary advantage in utilizing a behaviorally-based definition to diagnose a problem in a preschool or school-based setting is that a remedial plan can also be written to correct or alter the learning problem.

Preschool Learning Disabilities

Kirk's Definition

Kirk and Gallagher (1979) has proposed a definition of learning disability that is consistent with the federally-accepted definition. With two word changes, this definition could suffice to conceptualize learning disability at the preschool or preacademic level. By changing the word 'written' to 'symbolic,' the preschool diagnostician can substitute motor tasks for written tasks to determine how well a

child can interpret and follow verbal and non-verbal communication. Acceptance of other symbolic media in lieu of written responses opens the diagnostic process to interpretation of gestures, such as pointing, nodding, or changes in facial expression, or other methods that can convey meaning beyond the narrow interpretive medium of written expression. In addition, by shifting the discrepancy measure from 'academic' to 'preacademic' learning creates an opportunity to develop a separate but similar set of learning criteria that can be applied to early identification and diagnosis of preschool learning disabilities. The development of early childhood programs and curricula have resulted in the identification of a number of preacademic skills such as pre-writing, pre-reading, and pre-mathematics. Early identification of deficit behaviors in the preceding skill areas may avert problems that normally surface only after formal schooling is initiated. Matching geometric shapes or sorting by size, shape, or number are examples of these preacademic skills. Research indicates that after the child begins formal schooling at six or seven years of age these and similar preacademic skills are related to successful mastery of writing, reading, self-help, social, and fine and gross-motor, as well as mathematical skills (Adkins, Holmes, & Schnackenberg, 1971; Davidson, 1977; Jansky & de Hirsch, 1972; Mardell & Goldenberg, 1975; Matusiak, 1976).

For the purpose of this study, a modified version of Kirk's 1979 definition was utilized:

> A specific learning disability is a psychological or neurological impediment to spoken or [symbolic] language or perceptual, cognitive, or motor behavior. The impediment (a) is manifested

> by discrepancies among specific behaviors and achievements or between evidenced ability and [preacademic] achievement, (b) is of such nature and extent that the child does not learn by the instructional methods and materials appropriate for the majority of children and requires specialized procedures for development, and (c) is not primarily due to severe mental retardation, sensory handicaps, emotional problems, or lack of opportunity to learn. (Kirk & Gallagher, 1979, p. 285)

Operational Definitions

The operational definition is: 1. A specific learning disability is a psychological or neurological impediment to spoken or [symbolic] language or perceptual, cognitive, or motor behavior. The impediment (a) is manifested by discrepancies between specific behaviors, behavioral norms, and achievements or (b) between evidenced ability and [pre]academic achievement.

For the purpose of this study, the terms 'symptoms' and 'characteristics,' as they refer to the hierarchical sorting of the deficit skills identified in the study are defined in Webster's New Twentieth Century Dictionary (1979). See "Definitions" (Appendix B).

1. Symptom is the term used to reference a physical condition, educational need, or behavioral attribute that alone or in combination with other conditions, needs, or behavioral attributes, point to a broader or major category characteristic of learning disability.
2. Characteristic is the term used to identify a major category, a distinguishing trait, or quality peculiar to the diagnosis of learning disability.

Kirk's (Kirk and Gallagher, 1979) definition of learning disability has the potential to be applied to the preschool handicapped population as defined in the Iowa Criteria for Preschool Handicapped

(IDPI, 1985a) (Appendix A). In this study of the preschool population it was also necessary to accept the preacademic symptoms found in the placement data as equivalent to other later academic symptoms in the areas of reading, writing, math and language skills.

Summary

A consistent line of research in the early childhood and preschool handicapped literature supports the value of early identification and related educational intervention with moderately and severely disadvantaged and disabled preschool children. The literature is mixed, however, regarding the value of early identification of mildly disabled children. Mildly disabled children are categorized as generally lacking major sensory, physical, or mental impairments. Some professionals believe that the child-related stigma and resultant family trauma attached to a preschool child's diagnosis as disabled may outweigh the educational benefit.

Available research suggests that traumatic events, skill deficits, and behaviors may become symptoms of learning disability at preschool. Examples are: known neurological damage resulting in hyperactivity, perceptual disorders and increased emotionality; and premature birth, resulting in minimal brain dysfunction (MBD). In addition, a number of skill deficits are found in the literature that may be symptoms of future learning problems. Examples are disorders of visual-auditory perception, motor-coordination, visual-motor skills, language disorders, left and right discrimination, self-help skills, poor achievement, and psychological disturbances. Behavioral

concerns such as perseveration, short attention span, and distractibility may also be symptoms of learning disability.

The literature also indicates that the learning disability definition is still evolving. No definition has been established specifically for the preschool aged group. The Iowa Criteria for Preschool Handicapped (IDPI, 1985a), as a result of not having a preschool learning disability definition, extends the school age academic definition to the preschool population. Some of the problems associated with this attempt are the inability to apply the state discrepancy formula, the failure of standardized tests to document academic deficits, and lack of consensus within the various professional educational disciplines on the symptoms characteristic of learning disability.

CHAPTER 3

METHOD

Introduction

The purpose of this study was to identify symptoms characteristic of learning disabilities from the diagnostic records of learning disabled children. The children whose records were used in this study were identified as learning disabled between the ages of three and five and were still identified as disabled from three to seven years later.

The methods used to identify the learning disability symptoms characteristic of this population are presented in the population and instrumentation sections. The procedures involved are described in the pilot study section followed by confidentiality, reviewer qualifications, reviewer training, data collection, and data analysis.

In Iowa the definition of learning disability for the preschool age group is found in the manual "Iowa Criteria for Preschool Handicapped" (IDPI, 1985a), (Appendix A). This manual is furnished to all Area Education Agency (AEA) support staff serving preschool aged children by the Iowa Department of Education, Bureau of Special Education. The Iowa preschool criteria are:

> 1. Due to the academic nature of both the state and the federal definitions, a child under five years of age would rarely be diagnosed as learning disabled. The learning disability category should be used at the preschool level only when the diagnostic and developmental information provides a compelling basis for such a decision. All information and data used to arrive at the diagnosis must be documented in a written report.
>
> 2. School readiness skills include the following skill or developmental areas: fine-motor, gross-motor, perceptual, perceptual-motor, cognitive, social, receptive language, and

> expressive language. A preschool age child should demonstrate significant deficiencies in a cluster of these skill or developmental areas. The deficiencies must represent a severe discrepancy between the child's actual performance or development and his or her age and ability level, and present considerable risk to the development and learning ability of the child.
>
> 3. A child may not be identified as learning disabled if the documented deficiencies are primarily the result of a visual or hearing impairment, mental disability, behavior disorder, or environmental or cultural factors that would compromise the child's development.
>
> 4. The evaluation of school readiness skills should include standardized tests, developmental scales, informal assessment, non-standardized tests, and observation. (IDPI, 1985a, pp. 25-26)

The subjects in this study should have closely reflected the intellectual symptoms and readiness deficits as well as the methodology and diagnostic procedures of the Iowa preschool criteria. In addition, all subjects whose records were used in this study were evaluated and determined to be learning disabled by a multidisciplinary team.

Method

Population

The data for this study were obtained from the cumulative records of subjects identified as learning disabled from the student record files of AEA 7 (see Appendix C for AEA 7 description of function) in Cedar Falls, Iowa. These subjects were identified as learning disabled between the ages of three and five inclusive. Sociological data regarding the specific socioeconomic status of each family could only be inferred from the reports in this study. It was believed that the special education population mirrored the population of the AEA. The subjects came from a mixed population of rural and urban families.

Their family background varied from farmers, farmhands, welfare recipients, and laborers to factory workers, merchants, company supervisors, and university professors. The children involved in this study were considered representative of the early childhood population found in most moderate-sized towns in the midwest. The group of subjects was unique among other preschool subjects only because they were identified during preschool as learning disabled, remained disabled during the next three to seven years of their enrollment in elementary and middle school, and continued to receive special education services.

Age and Sex Characteristics

In the placement phase there were records from 36 male and 9 female students making a total of 46 records. In the re-evaluation phase there were records from 18 male and 3 female students. The ages of the children in the study varied from 2 years, 5 months to 6 years, 1 month at the time of placement. The frequency within each age range at placement was 3 students at 2 years, 9 students at 3 years, 14 students at 4 years, 20 students at 5 years, and 1 student at 6 years.

Size of Subject Pool

The group of children identified by AEA 7 staff, was collectively the largest subject pool of Iowa preschool children identified as learning disabled. The source of this data was the Iowa Department of Education annual reports of "Compiled Learning Disability Count(s) by AEA" (Appendix F). The learning disability counts are listed by age group and disability from 1978 through 1986 (Appendix F).

Instrumentation

Skills List

The primary research instrument used in this study was a reference list of symptoms developed by this researcher (Preschool Learning Disability Skills List, Appendix E). The learning disability characteristics used to describe behavioral symptoms or preacademic indicators in this study were found in the Iowa Criteria for Preschool Handicapped (IDPI, 1985a). Additional characteristics identified in the pilot study needed to describe symptoms and indicators found in reports that were not covered in the Iowa Criteria for Preschool Handicapped were also included. The Iowa Criteria for Preschool Handicapped lists eight school readiness skills that are deficiency characteristics of children with learning disabilities. A child should demonstrate significant deficiencies in a cluster of the skills in order to qualify as learning disabled under the Iowa Criteria. These skills are: fine-motor, gross-motor, perceptual, perceptual-motor, cognitive, social, receptive language, and expressive language. It became apparent from the pilot study that additional skill categories were needed. The additional skill categories were needed because of the narrow focus of the Iowa Criteria for Preschool Handicapped, (IDPI, 1985a). It was discovered during the pilot study that numerous learning, behavioral, or medical symptoms identified in student records failed to fit the symptoms listed in the Iowa Criteria for Preschool Handicapped as characteristic of learning disability. In addition, the following skill categories were modified to add deficit skills identified from

the information obtained in the pilot study. The social category was expanded to include the sub-categories of (a) behavioral and emotional symptoms, (b) self-help indicators, and (c) attention span/activity level symptoms.

The cognitive skill category was expanded in line with the learning disability definition to include the sub-categories of memory, preacademic/concepts, and intelligence. Three additional categories found in the literature or observed in the pilot study reports were added. A discrepancy between skill categories was added that included discrepancy sub-categories of verbal and performance skills, receptive and expressive language skills, ability and achievement, and discrepancies between fine and gross-motor ability. Two new stand-alone categories were added: family concerns and health or medical concerns.

The Iowa Criteria for Preschool Handicapped (IDPI, 1985a) defines significant deficiencies as follows: "deficiencies must represent a severe discrepancy between the child's actual performance or development and his or her age and ability level, and present considerable risk to the development and learning ability of the child" (p. 26).

If a behavioral or preacademic symptom was listed in a diagnostic report as deficient for the purpose of this study, it was accepted as significantly discrepant from the student's chronological age, measured ability, or achievement. To train the teacher reviewers to sort learning disability symptoms into appropriate categories, each of the skill categories was defined by a list of example symptoms. This

list was used as a reference by each teacher reviewer for the duration of this study. The symptoms used as references were sufficiently precise that the teachers were able to recognize, sort, and record the symptoms in each of the skill categories. Teacher-expressed acceptance and understanding of the sorting procedure was considered sufficient since teacher expertise in recognizing symptoms from diagnostic reports was the independent variable in the study. The categories of suspected learning disability characteristics used in this research were defined as:

1. Perceptual skills. "A form of mental activity in which the meaning of present situations, objects, and events is determined, in part, by past learning" (Chaplin & Krawiec 1974, p. 146). Recall of geometric designs is an example of a perceptual skill. A perceptual skill, as described by Lowry (1970), is the ability to distinguish one sound from another in the English language. In addition, sensory-motor deficiencies of processing/interpreting information involving one or more of the five senses of sight, sound, smell, taste, and touch may be considered as perceptual dysfunctions (Lerner, et al. 1981).

2. Perceptual-motor skills. Skills that connect perceived events by means of motor responses. These skills can be identified by deficiencies in the areas of eye-motor coordination and position in space. Spatial relations are included in this skill category (Frostig & Horne, 1964).

3. Receptive language. The ability to receive and understand spoken language. An example of receptive language dysfunctions is

receptive aphasia or the inability to comprehend language through spoken and written symbols or follow verbal directions (Weisenburg, Roe, & McBride, 1936).

4. Expressive language. The ability to coherently speak the English language. An example of expressive language dysfunctions is expressive aphasia, or the inability to express spoken language or written language symbols, or ask or answer questions (Sabatino, et al., 1981).

5. Cognitive skills. "A collection of mental abilities related to thinking activities, such as knowing and recognizing ideas, remembering, problem solving, labeling and naming, understanding cause and effect relationships, drawing inferences, developing rules and generalizations, judgments or evaluations" (Lerner, et al., 1981, p. 156). Examples of cognitive skills are: (a) knowing and recognizing one's name or age, (b) the ability to follow two or three step commands, (c) relating snow or ice with the concept of cold, and (d) knowing to wear a coat when going outdoors in the winter. Overall, cognitive skills must be within the average range to qualify for a learning disability diagnosis.

6. Social skills. Social skills are evidenced by a child's ability to anticipate consequences or adjust behavior as a result of experience in specific social situations. Examples of social skills are the ability to read facial expressions or to behave appropriately in social situations. A child may also need to relate social relationships with social perception.

Social skill symptoms were divided into sub-categories: (a)

behavioral and emotional problems, such as aggressive, withdrawn or non-compliant behavior; (b) self-help skills, such as eating, or grooming; and (c) attention span or activity problems, such as hyperactive, flighty, or distractible behaviors.

7. Fine-motor skills. Fine-motor skills use fine muscle control to perform detailed tasks that usually require eye and hand coordination. These tasks are similar to dressing, lacing, tracing, paper-folding, and cutting with scissors (Lerner, et al. 1981).

8. Gross-motor skills. Gross-motor skills involve muscle tone, muscle control, and muscle strength. Difficulties in running, jumping, hopping, climbing, or descending stairs may indicate gross-motor deficiencies.

9. Family concerns. Family concerns relate primarily to the immediate child's family or home environment. The concerns are most evident from the child's social history; some symptoms are parental separation, divorce, death, or serious parental or sibling illness.

10. Health/medical concerns. Health or medical symptoms relate directly to the health or medical status of the student. These symptomatic concerns have sufficient importance to negatively influence the child's ability to learn. Examples of such symptomatology are birth defects, premature birth, and chronic colds or ear infections.

11. Discrepancy between skill categories. Learning disability diagnostic literature often emphasizes significant differences between cognitive and sensory-motor abilities. Examples of discrepancies referenced in the literature are verbal and performance IQ scores,

ability and achievement, fine versus gross-motor skills, and receptive and expressive language discrepancies.

Tracking Forms

In addition to the "Preschool Learning Disability Skills List" (Appendix E), other forms were used in this study to facilitate data collection and tracking. These forms were: "data form" (Appendix D), "Criteria for Recording Skills" (Appendix I), and a File Contents and Tracking form, "File Information" (Appendix J). The data form contained the skill categories of the Iowa learning disability definition (Iowa Criteria for Preschool Handicapped, cited in IDPI, 1985), plus additional categories that were indicated and added from the results of the pilot study. In addition, the form contained space for the following information: student identification code, reviewer's initials, student file number, and type of report (placement or re-evaluation) from which data was obtained. The reference list of terms was originated from common descriptors obtained during the pilot study review. The pilot review included records of ten subjects and the reference list of terms was updated prior to the review of the re-evaluation records. The original reference list of terms was available to the reviewers during training and as data were collected. In addition, the updated reference list was available during the review and collection of re-evaluation data.

Procedure

Pilot Study

Ten records of subjects identified as learning disabled while in preschool and who were no longer residents of AEA 7 were reviewed.

The preliminary review was conducted by the investigator and one teacher to determine the utility of the recording data sheets and to determine the approximate time required to review each student's records for learning disability symptoms. This pilot review was also used to determine if behavioral, medical, or preacademic symptoms identified in the discipline reports as characteristics of learning disability could be adequately sorted into the categories listed in the Iowa Criteria for Preschool Handicapped (IDPI, 1985a). The preliminary review of records also allowed an example list of terms (Learning Disability Skills List, Appendix E) to be developed. This list was used later by the teacher reviewers to increase inter-reviewer consistency in sorting learning disability symptoms into separate symptom categories.

Confidentiality

Permission for this study was given by AEA 7 (Appendix G) and the Human Subjects Review Committee of the University of Northern Iowa (UNI) (Appendix H). The confidentiality rights of the subjects were maintained by using the coding process approved by the AEA 7 Director of Special Education. The AEA 7 records staff and/or the current researcher copied and coded the personal identification data in each report. The subjects' last names and middle initials were obliterated, as were the names and the addresses of their parents. Other information, such as gender, age, grade level, and current disability was retained to be used as part of the current study. The results of the current research are reported based on the analysis of group data. No individual student record received attention.

Reviewer Qualifications

The data for this study were collected by four teachers employed by AEA 7 as early childhood special education teachers. The teachers were employed by the current researcher to review copies of each student's confidential reports. The teachers reviewed the reports after regular working hours. The four reviewers had the minimum qualifications of four years' teaching experience and Iowa Department of Education approval to teach preschool handicapped learning disabled children. This approval allowed these teachers to instruct learning disabled children in preschool multi-categorical special classes or in special home programs.

The subjects in this study had been previously screened in the areas of vision and hearing. State and federal laws require that vision or hearing deficiencies must be corrected before a learning disability diagnosis can be applied.

Training

Copies of coded files on eight subjects who were identified as learning disabled in preschool, but who were no longer in special education, were used as the pool of training material. Each reviewer independently recorded symptom data from four of the eight packets until inter-reviewer consistency was obtained. The review sequence followed is described in "Instructions for Reviewing Reports" (Appendix K). The reviewers were instructed by the investigator to: (a) use reference lists of categorical symptoms, (b) sort symptoms into categories, and (c) follow the review and recording sequence.

All four of the reviewers in this study were certified to teach preschool learning disabled children and had over four years of preschool special education teaching experience. No attempt was made to influence their personal or professional definition of learning disability. For the purpose of symptom identification, the reviewer's operational definition of a learning disability was less important than the teacher's ability to recognize staff-indicated symptoms from discipline reports and sort them into categories of deficit symptoms. The symptoms must have been identified by the diagnostic team in the discipline report. Since the instructions including the order and the method of review and recording were observed to be correct and were reported by the teachers to have been understood, no further training occurred until the re-evaluation phase.

The teacher/reviewers were brought together before the first group of student re-evaluation files were reviewed to answer questions regarding how certain school age academic indicators, such as reading, math, writing, and spelling, fit into the skill list. As a result of this meeting, an addendum was developed to attach to and expand the skill list. This addendum has been included as "Supplemental Skill List" (Appendix L).

Data Collection

The data reviewed consisted of the most recent discipline reports prior to the initial learning disability diagnosis or the re-evaluation to confirm the diagnosis. The reports were most frequently from a school psychologist, certified early childhood strategist, speech clinician, and either a nurse or a social worker. Diagnostic

reports from the support disciplines of educational consultant, occupational therapy/physical therapy, and medical, were also reviewed when available. Data reviewed were limited to the most current discipline reports to minimize the effect of time from the beginning to the end of the evaluation process. The symptoms were circled in the report and entered on the data recording sheet if they were identified as deficit. Each student's complete cumulative file was available to diagnostic staff but the teachers reviewed only the most current reports.

All hand-written reports were typed and proofread before they were used in the study to reduce the possibility of errors due to illegible text. After the reviewers were given the student's evaluative reports, the recording transparency sheet, and the example skill sheet, they were asked to record student symptoms or indicators in specific skill categories found in the Iowa Criteria for Preschool Handicapped (IDPI, 1985a) in addition to the categories added as a result of the pilot study.

Forty-six student records containing placement information were randomly sorted within four groups. Following the random sort, the four groups were assigned to each of the four teacher reviewers. For the purpose of analysis, each group of 46 files was grouped into four groups of ten and one group of six student files. Each teacher reviewer read at random 46 student files in groups of 10 and 6 at one-week intervals. The placement review phase required five weeks to complete. At the end of the fifth week, each of the four teacher

reviewers read at random 21 files in groups of 10 and 11. The first re-evaluation phase required two weeks to complete.

One additional group of six subjects who had been re-evaluated twice was randomized and assigned to the four teacher reviewers. The records from these six subjects were analyzed as one group during the third week of the re-evaluation phase. The placement and re-evaluation phases of data collection are described in the "flow chart" in Appendix M.

Data Analysis

Data obtained in this study were analyzed to determine if there were prominent trends in the frequency that:

1. Deficit learning symptoms appeared within skill categories found in preschool student placement diagnostic reports.

2. Similar deficit learning symptoms appeared within skill categories at placement and at re-evaluation.

3. Deficit learning symptoms appeared within skill categories in re-evaluation reports three to seven years after the student was identified as learning disabled.

4. Deficit learning symptoms at re-evaluation were consistent with those at placement.

Data Analysis Criteria

High frequency symptoms of learning disability characteristics are those identified:

1. high in more than 50 percent of student records,

2. moderate in 33 to 49 percent and,

3. low in 33 percent or fewer of the student records.

CHAPTER 4

RESULTS

The descriptive data for this study are presented in two forms: frequency, and percentages across all identified deficit skills. Results are presented in relation to the eight research questions. The data are shown in Tables 1 through 10. Data from the review of student evaluation and placement records are shown at the left of each table.

The data from first and second re-evaluations can be found in the middle and on the right of each table, except Table 2. Table 2 is arranged vertically from the most to least frequently observed deficit skill categories.

Summary in Relation to Research Questions

Question 1: What are the symptoms professionals identified as characteristic of learning disabled preschool children?

Table 1 shows the frequency of skill deficits at the time of initial evaluation and placement of three to five year old children by the AEA assessment team. Examination of Table 1 indicates over three-fourths of the children were diagnosed as having deficient expressive language. Fine and gross-motor deficits were also identified in nearly two-thirds of the children. Additionally, nearly two-thirds of the children were diagnosed as having receptive language deficits. Problems related to attention and activity, behavior concerns, and preacademic skill deficits were observed in more than half of the records.

Table 1

Deficit Skills Characteristic of Children Identified as Learning Disabled at Preschool Age Level

	SKILLS	Placement (N = 46) Freq.	%
HIGH	Expressive Language	36	78.3
	Gross-Motor	32	69.6
	Fine-Motor	30	65.2
	Receptive Language	29	63.0
	Attention & Activity	25	54.3
	Behavior	24	52.2
	Preacademic	24	52.2
MODERATE	Perceptual-Motor	22	47.8
	Medical	22	47.8
LOW	Perceptual	15	32.6
	Memory	7	15.2
	Family Concerns	6	13.0
	IQ Performance Discrepancy	5	10.9
	Self-Help Skills	4	8.7
	IQ Verbal Discrepancy	3	6.5
	Intelligence	2	4.3

Question 2: Which social, cognitive, and discrepancy symptoms are characteristic of learning disabled preschool children?

Table 2. shows that over three-fourths of the student records of three to five year old children were observed to contain a deficit in one or a combination of social subskills. Attention and activity deficits including the activity-behavior combination at placement were subskill deficits found in over half of the student records. When behavior, attention and activity, and attention and behavior were combined the subskill deficit total fell into the high range.

The second highest deficit area was in cognitive skills. The subskills of preacademic combined with preacademic and memory appeared in more than half of the records. The discrepancy between verbal and performance intelligence scores was observed in less than one-fifth of the reports.

Question 3: What are the symptoms observed by professionals to be characteristic of school aged students identified as learning disabled in preschool?

At school age (students ages six to twelve), Table 3 shows that attention and activity skill deficits were found in an average of two-thirds of the student records. Perceptual-motor deficits also appeared in slightly less than two-thirds of the school aged student reports.

Preacademic/academic and behavior occurred more frequently at second re-evaluation. Expressive and receptive language as well as medical concerns were observed in fewer than half of the student records at first re-evaluation. Second re-evaluation data indicated a continuing decrease in frequency.

Table 2

Deficit Subskills Characteristic of Preschool Children Within the Categories of Social, Cognitive and Discrepancy Skills

SOCIAL SKILLS			COGNITIVE SKILLS			DISCREPANCY SKILLS		
Subskill	Freq.	%	Subskill	Freq.	%	Subskill	Freq.	%
Attention & Activity	12	26.1	Preacademic	19	41.3	Verbal & Performance IQ	8	17.4
Behavior	12	26.1	Memory	0	0.0	Recep. & Expressive Language	0	0.0
Self-Help	0	0.0	Intelligence	0	0.0	Ability & Achievement	0	0.0
Attention & Behavior	10	21.7	Preacademic & Memory	5	10.9	Gross & Fine Motor	0	0.0
Attention & Self-Help	2	4.3	Memory & IQ	1	2.2			
Attention, Behavior, Self-Help	1	2.2						
Soc. Skills Total	38	82.6	Cognitive Total	25	54.4	Discrepancy Total	8	17.4
No Social Skills	8	17.4	No Cognitive	21	45.6	No Discrepancy	38	82.6
Category Total	46	100.0	Category Total	46	100.0	Category Total	46	100.0

Question 4: Which social skills, cognitive, and discrepancy categories contain symptoms characteristic of school aged students identified as learning disabled in preschool?

Table 3

Deficit Skills Characteristic of School Aged Students Identified as Learning Disabled at Preschool Age

	SKILLS	Reeval. I (N = 21) Freq.	%	Reeval. II (N = 6) Freq.	%
	Attention & Activity	14	66.7	4	66.7
HIGH	Perceptual-Motor	12	57.1	4	66.7
	Preacademic/Academic and Behavior	10	47.6	4	66.7
	Expressive Language	9	42.9	2	33.3
MODERATE	Medical Concerns	8	38.1	2	33.3
	Receptive Language	7	33.3	2	33.3
	Memory	5	23.8	2	33.3
	Fine-Motor	8	38.1	1	16.0
	Gross-Motor	4	19.1	0	0.0
	IQ Verbal Discrepancy	2	9.5	0	0.0
LOW	Perceptual	1	4.7	1	16.0
	Self Help	1	4.7	0	0.0
	Family Concerns	1	4.7	2	33.3
	IQ Performance	1	4.7	0	0.0
	Intelligence	0	0.0	0	0.0

Table 4 shows that in six to twelve year old children social and cognitive skill deficits were identified by AEA 7 staff. The social and the cognitive skill deficits occurred most frequently. When the

first re-evaluation data are compared with the second re-evaluation data, social and cognitive deficits increase. In the discrepancy category at the school age level there were no deficits to report.

Table 4

Deficit Skills Between the Social, Cognitive, and Discrepancy Categories Characteristic of School Aged Students Identified as Learning Disabled at Preschool Age

	SKILLS	Reeval. I (N = 21) Freq.	%	Reeval. II (N = 6) Freq.	%
HIGH	Total Social Skills	16	76.2	5	83.4
	No Social Skills	5	23.8	1	16.7
	TOTAL	21	100.0	6	100.1*
	Total Cognitive Deficits	13	61.9	4	66.6
	No Cognitive Deficits	8	38.1	2	33.3
	TOTAL	21	100.0	9	9.9*
MODERATE AND LOW	Discrepancy No deficit skills observed				

*Percentage does not equal 100% due to rounding error

Question 5: What are the symptoms within the categories of social, cognitive, and discrepancy skills characteristic of school aged students identified as learning disabled in preschool?

Of the social skill deficits, Table 5 shows that when behavior, attention span and activity level, and attention and behavior are

totaled, they occurred in almost two-thirds of the records. Attention, activity, and behavior concerns were observed and recorded most frequently. In the cognitive skills category, preacademic and memory singly or in combination appeared in almost two thirds of the student reports.

Table 5

Deficit Skills Within the Social, Cognitive, and Discrepancy Categories Characteristic of School Aged Students Identified as Learning Disabled at Preschool Age

SKILLS	Reeval. I (N=21) Freq.	%	Reeval. II (N=6) Freq.	%
Social Skills				
Attention and Activity	5	23.8	1	16.7
Behavior	2	9.5	1	16.7
Self-Help	0	0.0	0	0.0
Attention and Behavior	8	38.1	3	50.0
Attention and Self-Help	1	4.8	0	0.0
Behavior and Self-Help	0	0.0	0	0.0
Attention and Behavior and Self-Help	0	0.0	0	0.0
Cognitive Skills				
Preacademic Concepts	8	38.1	2	33.3
Memory	3	14.3	0	0.0
Preacademic and Memory	2	9.5	2	33.3
IQ	0	0.0	0	0.0
Discrepancy				
No deficit skills observed				

Question 6: Which symptoms are characteristic of learning disability at preschool and remain characteristic at school age?

The data from Table 6 show that, between the ages of three and twelve, social deficits remained consistently high from placement through re-evaluation. Cognitive concept deficits were also observed

Table 6 also shows that perceptual-motor deficits increased in frequency from less than half in preschool children at placement to slightly more than two-thirds in school age students upon re-evaluation. Re-evaluation data indicated that expressive and receptive language deficits decreased from over three-quarters to only one-third of the student records. The second re-evaluation data (six students) indicated that the expressive and receptive language deficit skills continued to decrease. Medical problems continued as a moderate symptom of learning disability.

Question 7: Which symptoms are characteristic of learning disability at preschool but do <u>not</u> remain characteristic at school age?

Table 7 shows that at the time of initial evaluation and placement of three to five year old children, language deficits were identified most frequently. Receptive and expressive language deficits were found in an average of more than two-thirds of the preschool aged children. After the students reached school age language deficits were observed in fewer than half of the student records. Gross and fine-motor deficits found in over two-thirds of the student reports at placement diminished to one-third or less at school age. Other deficit skills were in the moderate or low Table 6

Table 6

Deficit Skills Characteristic of Learning Disability in Preschool Aged and School Aged Children

	SKILLS	Placement (N=46) Freq.	%	Reeval. I (N=21) Freq.	%	Reeval. II (N=6) Freq.	%
	Social Skills	38	82.6	16	76.2	5	83.4
HIGH	Cognitive	25	54.4	13	61.9	4	66.6
	Perceptual-Motor	22	47.8	12	57.1	4	66.7
	Expressive Language	36	78.3	9	42.9	2	33.3
MODERATE	Medical Concerns	22	47.8	8	38.1	2	33.3
	Receptive Language	29	63.0	7	33.3	2	33.3
	Fine-Motor	30	65.2	8	38.1	1	16.0
	Family Concerns	6	13.0	1	4.7	2	33.3
LOW	Perceptual	15	32.6	1	4.7	1	16.0
	Gross-Motor	32	69.6	4	19.1	0	0.0
	IQ Discrepancy	3	6.5	2	9.5	0	0.0

frequency range and remained there through subsequent re-evaluation(s).

Question 8: Which symptoms are characteristic of learning disability at school age but are not characteristic of preschool aged children?

Table 8 shows that several deficit skills noted in preschool declined. For example, expressive language, receptive language, and

Table 7

Deficit Skills Characteristic of Learning Disability at Preschool Age but Not at School Age

SKILLS	Placement (N=46) Freq.	%	Reeval. I (N=21) Freq.	%	Reeval. II (N=6) Freq.	%
Expressive Language	36	78.3	9	40.0	2	33.3
Gross-Motor	32	69.3	4	15.0	0	0.0
Fine-Motor	30	65.2	8	35.0	1	16.0
Receptive Language	29	63.0	7	30.0	2	33.3

gross and fine-motor skills in six to eight year old children declined from the high frequency range to moderate or low frequency range. Perceptual-motor skills in less than one-half of the student records at preschool increased to two-thirds. Perceptual-motor was the only deficit skill characteristic at school age that was not characteristic of learning disability in preschool children.

Table 9 shows the frequency and percentage of skill deficits noted in the reports of six students who had a second re-evaluation in addition to the evaluation at placement and the initial re-evaluation. Inspection of Table 9 shows that the social skills and cognitive deficits remained high from placement through re-evaluation. Attention and behavior was observed most frequently and increased from placement to first and second re-evaluation.

In the cognitive category preacademic concerns were stable in three of the student records but decreased at second evaluation. The decrease in preacademic concerns at second re-evaluation was offset by an increase in the subskill combination of memory and preacademic deficits.

Table 8

Deficit Skills Characteristic of Learning Disability at School Age but Not at Preschool Age

SKILLS	Placement (N=46) Freq.	%	Reeval. I (N=21) Freq.	%	Reeval. II (N=6) Freq.	%
Social Skills	38	82.6	16	76.2	5	83.4
Expressive Language	36	78.3	9	42.9	2	33.3
Gross-Motor	32	69.6	4	19.1	0	0.0
Fine-Motor	30	65.2	8	38.1	1	16.0
Receptive Language	29	63.0	7	33.3	2	33.3
Cognitive Skills	25	54.4	13	61.9	4	66.6
*Perceptual-Motor	22	47.8	12	57.1	4	66.7

*Symptom characteristic at school age but not at preschool age

Fine-motor deficits were found in four of the six students at placement, three first re-evaluation, and in one at second re-evaluation. Gross-motor deficits were observed in four then decreased to zero by second re-evaluation. Receptive and expressive language

deficits were found in three and five students. The language concerns had decreased by second re-evaluation.

Table 9

Data From Learning Disabled Students Evaluated Three Times

SKILLS	Placement (N = 6) Freq.	%	Reeval. I (N = 6) Freq.	%	Reeval. II (N = 6) Freq.	%
Social Skills						
Behavior	2	33.3	0	0.0	1	16.7
Self help	0	0.0	0	0.0	0	0.0
Attention & Activity	0	0.0	1	16.7	1	16.7
Attention & Behavior	2	33.3	2	33.3	3	50.0
Attention & Self-help	1	16.7	1	16.7	0	0.0
Subtotal	5	83.3	4	66.7	5	83.4
No Deficits	1	16.7	2	33.3	1	16.7
TOTAL	6	100.0	6	100.0	6	100.1*
Cognitive						
Memory	1	16.7	1	16.7	0	0.0
Preacademic	3	50.0	3	50.0	2	33.3
IQ	0	0.0	0	0.0	0	0.0
Memory & Preacademic	0	0.0	2	33.3	2	33.3
Preacademic & IQ	0	0.0	0	0.0	0	0.0
Memory & IQ	0	0.0	0	0.0	0	0.0
Subtotal	4	66.7	5	100.0	4	66.6
No Deficits	2	33.3	1	0.0	2	33.3
TOTAL	6	100.0	6	100.0	6	99.9*
Discrepancy						
Performance IQ	1	16.7	0	0.0	0	0.0
Verbal IQ	1	16.7	0	0.0	0	0.0
Subtotal	2	33.4	0	0.0	0	0.0
No Deficits	4	66.6	6	100.0	6	100.0
TOTAL	6	100.0	6	100.0	6	100.0
Fine Motor	4	66.7	3	50.0	1	16.7
Gross Motor	4	66.7	2	33.3	0	0.0
Family Concerns	0	0.0	0	0.0	2	33.3
Receptive Language	3	50.0	2	33.3	2	33.3
Expressive Language	5	83.0	4	66.7	2	33.3
Medical	3	50.0	3	50.0	2	33.3
Perceptual	2	33.3	0	0.0	1	16.7
Perceptual-Motor	1	16.7	3	50.0	4	66.7

*Percent did not equal 100 due to rounding error

Medical concerns remained stable in three of six students at placement and at first re-evaluation. By the second re-evaluation medical concerns were found to decrease. Table 9 also shows that perceptual-motor skills increased at the first re-evaluation, and the second and final re-evaluation.

Table 10 shows the skill symptoms identified in more than 50 percent of the records of learning disabled preschool children at placement and re-evaluation. Fine and gross-motor skills decreased

Table 10

Placement and Re-evaluation of 21 Children in Learning Disability School Aged Programs

SKILLS	Placement (N=21) Freq.	%	Re-evaluation (N=21) Freq.	%	Difference (N=21) Freq.	%
Fine-Motor	18	85.7	8	38.1	-10	-47.6
Gross-Motor	17	80.9	4	19.0	-13	-61.9
Expressive Language	17	80.9	9	42.9	-6	-38.0
Cognitive (Preacademic/ Academic)	13	61.9	10	47.6	-3	-14.3
Receptive Language	12	57.1	7	33.3	-5	-23.8
Social Skills (Behavior)	12	57.1	10	47.6	-2	-9.5
Medical	12	57.1	8	38.1	-4	-19.0
Perceptual-Motor	9	42.8	12	57.1	+3	+14.3
Social Skills (Attention and Activity)	8	38.1	14	66.7	+6	+28.6

Note: (Minus (-) equals decrease in symptoms and plus (+) equals an increase in symptoms from placement to re-evaluation.)

between placement and re-evaluation. In addition receptive and expressive language skills diminished from placement to re-evaluation. Cognitive (preacademic/academic) and social skills (behavior) decreased slightly from placement to re-evaluation. Conversely the social skills subcategory of attention and activity increased. Perceptual-motor concerns also increased in frequency.

CHAPTER 5

DISCUSSION

The findings of this study are summarized in the following chapter. The results are summarized relative to each research question. In addition, conclusions, implications, and recommendations are discussed. Finally, suggestions are made for future research.

Summary of Findings

Learning Disability Symptoms Identified at Placement

High frequency symptoms or learning disability characteristics, are symptoms that were identified in 50 percent or more of the student records. Expressive and receptive language, gross and fine-motor skills, preacademic, behavior, attention, and activity deficits were found to be symptoms characteristic of learning disabilities at the time of identification and placement. Expressive and receptive language skills were the symptoms most characteristic of learning disability in preschool children.

Myklebust (1960, 1963) observed that early deficits in language (receptive and expressive) were symptomatic of later learning problems. Horn and Packard (1985) also identified language as the most frequent indicator of later learning problems. They found that receptive language deficits correlated better as predictors than expressive language deficits. In the present study expressive language was identified more often than receptive language as a learning disability characteristic. The variations in the ages of the children in this study and in Horn and Packards' study may account for this difference. Most of Horn and Packards' subjects were five and

six year-olds. Receptive deficits should be easier to measure and should, therefore, be identified more frequently in five and six year old children than in three through five year old children.

Motor skills deficits were high frequency symptoms of children with learning disabilities in the present study. This finding supports Myklebust (1963) who identified poor motor coordination as predictive of later learning problems. AEA 7 diagnostic staff identified both fine and gross-motor difficulties in their diagnoses.

The high frequency of observation of delayed development in language and motor areas may be due to the early emergence of these skills in the normal sequence of physical development. Delays in language and motor development would be noticed earlier than other later developing skills. In this study a child delayed in language, motor development, or both appears at high risk for identification as learning disabled.

Behavior concerns (tantrums, non-compliance, aggression, or withdrawal symptoms) and attention and activity deficits (noisiness, hyperactivity, excitability) were found in slightly more than 50 percent of the learning disabled preschool students. Myklebust's (1963) and Horn and Packards' (1985) findings appear to be supported by the behavioral variables identified by this study. These concerns were often initially identified by referents as the primary reason for requesting evaluation and special education programming. Due to the stressful nature of coping with active and acting-out children a higher incidence of children with activity problems may reach referral sooner and subsequently become identified as learning disabled

earlier. Children with delayed development may not be identified as early due to the difficulty in observation of other less subtle abnormalities.

Preacademic skill deficits (identifying colors, shapes, body parts, and counting) were found in 52.2 percent of the student records. Myklebust (1963) reported one of the few studies involving the evaluation of preschool handicapped children that included preacademic skill deficits. Myklebust reported that difficulty recognizing and matching shapes was indicative of learning problems. The evidence of preacademic symptoms in only slightly more than half of the student records may have been due to the staff's need to conduct formal testing to identify such skill deficits. Many three to five-year-old children are often not prepared to respond to formalized testing procedures such as intelligence, achievement, or readiness tests. Many of their skills, therefore, must be inferred from parental reports and observation. More preacademic deficits may be identified as children grow older and are developmentally ready to respond to adult direction. Perceptual-motor and medical concerns approached the 50 percent criteria, but were not considered strong symptoms in the absence of other high incidence deficits, such as receptive and expressive language and fine and gross-motor skills.

Social, Cognitive, and Discrepancy Identification and Placement Categories

The social and cognitive skill categories contained frequent symptoms of learning disability in preschool aged children. In the social skills category (behavior/emotional, self-help, and attention

span/activity level), over 50 percent of the students evidenced a consistent pattern of social skill difficulties in the areas of behavior and/or activity and attention span. This pattern supports Myklebust's (1960, 1963) studies and, with the exception of the self-help category, the research by Horn and Packard (1985). These researchers emphasized the importance of attention span and activity concerns as indicative of later learning problems. The social skills category contains those skills that appear to attract attention because the child's behavior deviates from social norms. Behavior which is not socially acceptable is observed quickly. This may be the reason that the social skill category was identified most frequently.

In the area of cognitive skill (memory, preacademic skills, and intelligence) deficits were referenced in the diagnostic reports of over 50 percent of the students. The cognitive area appeared as a learning problem that often accompanied the higher frequency deficient language and motor skills. Memory and intelligence were seldom identified as deficient.

According to the Iowa Criteria for Preschool Handicapped (IDPI 1985a), a child with a cognitive deficiency in the areas of memory and preacademic concepts would qualify for a learning disability diagnosis. A child with a measured deficit in intelligence commensurate with his/her functional achievement in memory and preacademic concepts would not qualify for a learning disability diagnosis and intelligence must, by definition, be average or above to be diagnosed as learning disabled. The findings of this study did not result in intelligence being referenced as a deficit concern in

the cognitive skills category. Intelligence (IQ) was the only subskill in this study excluded from frequent observation by the learning disability operational definition. This and the difficulty in obtaining accurate achievement data on young children may have caused cognitive skills to be second to social skill deficits as possible symptoms of learning disability.

In regard to discrepancy in skills, no discrepancies were identified in the diagnostic staff reports. The Iowa definition of learning disabilities (IDPI, 1985a) and the diagnostic literature reference differences in pairs of skill symptoms (verbal and performance IQ) as characteristic of learning disability. The deficit skill pairs in this study were fine and gross-motor, receptive and expressive language, ability and achievement, and verbal and performance intelligence discrepancies. The Iowa definition references the need to document existence of "a severe discrepancy between current achievement and intellectual functioning" to apply the learning disability diagnosis. (Criteria for Preschool Handicapped, IDPI, 1985a, p. 23). Richman and Harper (1980) referenced differences between the verbal and performance items on the Wechsler Intelligence Scale for Children (WISC) (Wechsler, 1974) as symptomatic of learning disability. This discrepancy was seldom observed in the diagnostic reports. A verbal/performance spread was observed in fewer than 20 percent of the placement reports.

The limitations in the diagnostic instruments may have prevented the identification of discrepancies between pairs of deficit skills and between verbal and performance subtests on the WISC (Wechsler,

1974). In addition, preschool children may lack the physical maturity to allow developmentally-related discrepancies to become discernable. A diagnostic orientation peculiar to the AEA 7 staff who may not be testing/evaluating to detect these differences may be a contributing factor to this finding. Finally, these discrepancies may not exist or be relevant to the diagnosis of preschool learning problems.

Learning Disability Symptoms Persisting to School Age

Attention, activity, and perceptual-motor deficits were high frequency symptoms characteristic of six to ten-year-old learning disabled children. Compared to the incidence of occurrence in preschool, school aged students exhibit more deficits of attention and activity, perceptual-motor concerns, preacademic/academic deficits, and behavior problems. Attention and activity and perceptual-motor concerns appeared with high frequency in the student records. As children reached six to ten years of age symptoms maintained or gained in frequency upon re-evaluation.

Attention and activity symptoms were noted in two-thirds of the school aged students' records. The evidence of attention and activity symptoms in school age children may be indicative of an organic or neurological base as proposed by Strauss and Lehtinen (1947) and Fuller, et al. (1983). Such symptoms may be less responsive to instruction.

Perceptual-motor deficits, noted in 57.1 percent of the records, may be the result of difficulty in transcribing academic tasks from printed media to the student's paper or work sheet which is a common requirement for children in elementary school. Also, the academically

related tasks of reading, writing, and mathematics require mastery of many perceptual-motor skills that may not have been acquired by learning disabled six to ten-year-old children. Preacademic/academic concerns and behavior were observed in slightly less than 50 percent of the students' re-evaluation records. This drop to below the 50th percentile may be an artifact of the study and the criteria. Additional re-evaluation data indicate that academic concerns may, in fact, increase at school age.

Learning Disability Symptom Categories Persisting to School Age

The social and cognitive areas produced the most frequent symptoms characteristic of learning disability in school aged children. Social and cognitive skill deficits, present at placement, increased in frequency at school age. For example, at school age, the social and cognitive deficit areas appeared in the records of more than 75 and 60 percent of the students' records respectively.

Social skills (behavioral/emotional problems, self-help, attention span/activity level) were symptoms identified with high frequency. This study supports Myklebust's (1963) findings regarding psychological disturbance, short attention span, and distractibility, as symptomatic of children at risk for learning disability. The high frequency of this category relative to the cognitive (memory, preacademic concepts, intelligence) and discrepancy (gross and fine-motor) categories may be due to lack of tolerance for behaviors that are discrepant from a teacher's expectations. Children who exhibit these behaviors may remain in special education longer if the behaviors violate teacher's expectations. Cognitive skill deficits

also symptomatic of learning disability at school age may be important as a symptom of learning disability due to the increased emphasis placed on cognitively related activities (reading, writing, mathematics, and memorization). Many regular education teachers may accept students who have difficulty learning in certain areas (math facts or low reading skills). Teachers may, however, be reluctant to teach children with both cognitive and social deficits. Children in this study who were diagnosed and placed in learning disability programs often exhibited combinations of social skill and cognitive symptoms.

Symptoms Within Skill Categories Persisting to School Age

Among school aged children, some subskills were observed to occur more frequently than other subskills, and were often identified as learning disability symptoms within the skill categories of social, cognitive, and discrepancy concerns. The social skills category included attention and activity; behavior; self-help; attention and behavior; attention and self-help; behavior and self-help; and attention, behavior, and self-help. These social skill deficits were found in more than 75 percent of the student records.

Within the social skills category, the subskill deficits that contributed most to the learning disability identification were attention and activity in addition to attention and behavior. These two subskill deficits accounted for over 60 percent of the skill deficits in the social category. The two preceding subskill deficits in combination may be highly indicative of learning disability. Attention, activity, and behavior appear to interact as symptoms.

When attention deficit factors are noted in the re-evaluation of six to ten-year-old children behavior problems and activity concerns may also be present. The combination of attention, activity, and behavior as indicators of learning disability is consistent with the research of Myklebust (1963) and Horn and Packard (1985).

In the area of cognitive skills (preacademic concepts, memory, preacademic and memory, intelligence), cognitive subskill deficits were observed in more than 60 percent of the student records. The subskills found to be the most indicative of learning problems when combined were preacademic concepts and memory deficits. This combination accounted for over 50 percent of the deficit cognitive skills. Therefore, the combination of preacademic concept and memory deficits may be symptomatic of learning disability. The data from this study indicate that cognitive and memory deficits, in combination with attention, activity, and behavior concerns may be symptomatic of the need for learning disability programming over an extended period.

Symptoms at Preschool and at School Age

Social and cognitive skill deficits were highly characteristic of learning disability in three through five year old children and continued to be characteristic in six through ten year old children. Social skill deficits (attention and activity; behavior; self-help; attention and behavior; attention and self-help; behavior and self-help; and attention, behavior and self-help) were observed in more than 80 percent of the student records at placement and in over 75 percent of the records at the first re-evaluation.

The occurrence of the symptoms in the three to ten year age range may be due to a higher incidence of organic or neural dysfunction in the severe or chronic learning disabled student. Strauss and Lehtinens' (1947) early research indicated that students with a known neurological dysfunction are more difficult to treat. Children with skill deficits that cause them to continue in learning disability programs beyond three years may have a neurological basis. In addition, the same social skill deficits that cause children to be placed in learning disability programs at preschool may persist into school age as social deficits. If learning disabled students do not respond or are not taught effectively within the learning disability program social skill symptoms may continue.

Cognitive skill deficits (preacademic concepts, memory, preacademic and memory, intelligence) were found in 54.4 percent of the student records at placement and 61.9 percent of the records at re-evaluation. These skills, therefore, occurred more frequently as children grew older and remained in special education. This increase may have been observed because instructional emphasis changes from mastery of developmental skills to the mastery of academic concepts. Expectations may also narrow from a preschool emphasis on overall growth and development to an elementary school emphasis on academic skills.

The combination of social and cognitive skill deficits may interact and exacerbate the problem areas they represent. The combination of these two symptoms in a student at placement may be highly indicative of recurrent learning disability problems.

.Symptoms at Preschool but not at School Age

Certain symptoms were observed to be highly characteristic (found in 50 percent or more of the student records) of learning disability at preschool but did not remain characteristic of school age learning disabilities. Deficit language and motor skills decreased in frequency as children remained in learning disability programs for three or more years.

Expressive and receptive language (78.3 and 63.0 percent, respectively) were highly symptomatic of learning disability in three through five year old preschool children but became moderate to low frequency deficits (less than 50 percent of the records) in school age children. This finding is consistent with the research by Myklebust (1960) and Horn and Packard (1985).

The decreased frequency of expressive and receptive language symptoms as six to ten year old children were re-evaluated after three or more years in special education may be due to maturation and/or instruction. Language deficits as one of the earliest developmental symptoms is one of the earliest skills acquired by all children including children with learning disabilities. Language may also be most responsive to instruction and stimulation from the environment since 'school in language development' is in session as long as children are around other children or adults. Additionally, language development in children is marked by a number of stages thus allowing easier identification and remediation.

Gross and fine-motor skill deficits were highly symptomatic at preschool (69.3 and 65.2 percent, respectively). Motor concerns were

no longer learning disability symptoms at re-evaluation three or more years later. This decrease may be due to a combination of maturational and instructional factors. Motor concerns in three to five year old children like language, are very early indicators of growth and development. Concerns about first gross then fine-motor skills may be detected early and effective intervention begun. Also, natural physical development may remediate motor deficits in learning disabled preschool children but more slowly than in non-disabled children. As children enter elementary school programs curriculum emphasis changes from fine and gross-motor activities to promote overall development to perceptual-motor tasks to develop academic skills. Finally, teachers and diagnostic staff may not look for or test as frequently motor skills because their focus is on academic tasks.

Symptoms at School Age but not at Preschool

Perceptual-motor deficits were highly characteristic symptoms of learning disability at school age but were not highly characteristic in the preschool age group. Perceptual-motor concerns were observed more frequently after children spent three or more years in special education. This may have resulted from one of several factors.

Perceptual-motor tasks are difficult to test in three to five-year-old children. LaPolla, et al. (1982), for example, found that visual-motor concerns and figure-ground difficulties were most predictive of learning disability in the preschool aged group. The findings of the current study did not support the perceptual-motor symptoms identified by LaPolla, et al. as highly symptomatic of

learning disability at the preschool level. Perceptual-motor symptoms were, however, highly evident upon re-evaluation in the six to ten year old age group. The discrepancy between placement and re-evaluation may have occurred because of the relative difficulty in testing for these skill deficits in the preschool age group. All children in the LaPolla, et al. (1982), study were evaluated by an occupational therapist. Occupational therapists are not routinely involved in preschool referrals in AEA 7. The fact that perceptual-motor concerns became characteristic of learning disability at school age may point to the need to increase the occupational therapists' involvement in the identification process at preschool. Also, the increased emphasis that the elementary school curriculum places on mastery of perceptual-motor skills in order to read, write, and perform mathematical operations may result in more emphasis on testing for perceptual-motor deficits.

Students Evaluated Three Times

The primary analysis of data from this study included 46 students identified and placed in a learning disability program and a subset of 21 of the same students who were re-evaluated, staffed as learning disabled, and remained in learning disability programs. Six of these students participated in the placement evaluation and two re-evaluations. The data on these six children were analyzed to determine if placement and first re-evaluation skill deficits increased or diminished as children continued in learning disability programs.

The second evaluation data suggest that the social skills, the cognitive category and the perceptual-motor skill deficits will remain characteristic of learning disability from preschool to school age. Language and motor concerns appear to progressively diminish as symptoms as students either mature, receive instruction, or both in learning disability programs. The data followed the similar trends as the data from the placement and first re-evaluation part of the study.

Placement and Re-evaluation of Children in School Aged Programs

In order to verify the trends in the data a retrospective analysis was performed. The focus of this analysis were the 21 students who remained in learning disability programs. The data on the 21 students were compared and contrasted to determine if the trends that were observed in the placement data remained consistent. The results of this analysis indicate that the trends were supported.

Motor and language skill deficits occurred frequently at placement and declined at re-evaluation. These results reinforce the supposition that language and motor concerns are some of the earliest concerns remediated in preschool aged children.

Social skills deficits (behavior) and cognitive deficits (preacademic/academic) remained fairly constant. The skill deficits remained characteristic of the learning disabled students at preschool and at school age. These results indicate that preacademic/academic skills and behavior concerns continue to be manifest as children receive learning disability instruction.

Social skill deficits such as attention and activity concerns as well as perceptual-motor concerns appear to increase as deficit

concerns as children receive learning disability instruction. These data indicate that in response to the increased academic demands of elementary programs including the requirement to acquire reading, writing, and mathematics skills these symptoms become more characteristic of learning disabled children at re-evaluation.

Conclusions and Implications

Identification

The results of this study indicate that delayed language development is the primary characteristic of learning disability in three through five year old children. In order of decreasing frequency the language symptoms were expressive and receptive delays. These delays, however, often occurred together. Speech therapy is available to students with speech and language deficits; it was therefore unlikely that children with only language symptoms would receive a learning disability diagnosis. Diagnosticians may need to look beyond language symptoms to justify the learning disability diagnosis and identify other skill deficits.

Children may often display deficit characteristics such as fine and gross-motor delays in addition to or instead of language deficits. These delays may be indicated by difficulty completing fine and gross-motor tasks, such as sorting, stacking or dressing in fine-motor; or hopping, skipping or running in gross-motor areas. At school age motor and language characteristics became less frequent.

The rate of language acquisition and the rate and age at which motor skills develop were identified by the AEA 7 staff as the earliest preschool indicators of learning disability. Evaluators

should be aware of the influence that normal maturation and development may have on language and motor factors. Language and motor skill deficits may be observed in the three through five age range, and then decline in frequency due to the student's increased maturity and the effect of instruction at the time of school aged assessment. In addition, the existence of language and motor problems as characteristics of learning disability may be a developmental artifact in some children since these two symptoms begin to diminish after children mature and receive instruction.

Language and motor symptoms may be important as early learning disability characteristics, even though they diminish in frequency over time. They may indicate a predisposed weakness toward other more lasting symptoms such as cognitive and social skill deficits. Early language and motor concerns may be the precursors of speech and fine-motor difficulties that result in difficulty in reading, writing, and mathematics. These academic areas that prove most frustrating to children with learning disabilities may exacerbate deviant social characteristics. Early detection and remediation of the language and motor symptoms may be a highly effective means of preventing a later and more serious learning disability.

At time of evaluation and/or re-evaluation, children displaying academic/preacademic, language, or motor deficiencies, coupled with behavioral or attention and activity problems may be more at risk as problem learners. These children should be considered for priority placement or for continuation in a learning disability program.

Instruction

The instructional implications of this study are that motor, language, and perceptual skills appear to respond early to program placement/instruction. Perceptual skill deficits become less evident as basic shape, color, size matching, and recognition activities decrease. Other symptoms of learning disability such as preacademic/academic, attention span and activity, and behavior, continue as problems. Second re-evaluation data indicate that these learning problems may actually increase in frequency as students age and continue in learning disability programs. Children without handicaps acquire language and motor skills that are not necessarily taught. In children who are disabled the acquisition of language and motor skills may be the most amenable to the combination of normal development and structured teaching.

At school age, as students stayed in learning disability programs and were subsequently re-evaluated, the frequency with which cognitive skills were identified as symptoms of learning deficits decreased. This decrease was slight and second re-evaluation data indicated that deficit cognitive skills may actually increase as academic concerns. If the frequency of social and cognitive learning problems increases from identification and placement to re-evaluation, the increase indicates that learning problems may escalate in response to educational demands.

Observable cognitive/academic deficiencies appear to be concurrent with behavioral and activity and attention span symptoms as characteristic of learning disability. Other developmental symptoms,

such as language and motor deficits, diminished as characteristic of learning disability. It may be implied from this study that, in AEA 7, language and motor difficulties most often meet the eligibility criteria necessary for professional staff to diagnose and place children in learning disability programs. Cognitive concerns such as preacademic deficits and reading, writing, and math, in addition to social skill deficits like misbehavior and short attention span keep them there.

Program Design

Because of frequent social skill (behavior, self-help, attention and activity) deficits in student records at placement and at re-evaluation, a major component of learning disability programs should plan to address the students' emotional and behavioral needs. These needs appear to become more instead of less prevalent as children remain in learning disability programs.

Discrepancy Criteria

This study indicates that during placement evaluation and diagnosis by AEA 7 staff skill discrepancies were not found to be characteristic of learning disability. The discrepancy criteria could have been eliminated from the list of deficit skills since discrepancy criteria were rarely observed in the population in this study. The lack of observed discrepancy among skill pairs such as fine and gross-motor indicates that there may be an over-reliance on discrepancy criteria as a practice to identify learning disability symptoms. It appears that when applied to the preschool population discrepancy criteria may be over-emphasized as a learning disability symptom.

Suggestions for Future Research

1. Follow children identified in this study and review their subsequent re-evaluation records to determine if further changes in learning disability symptoms occur over time.

2. Review the data to determine the skill deficit domains identified by the various support disciplines. This type of study may reveal information regarding the consequences of less than full team evaluations or specific team configurations on learning disability identification.

3. Replicate the study using only the student needs section of each discipline report that contain the actual skill deficits that staff recommend for Individualized Educational Plan (IEP) development and remediation. Equivalent information about the frequency of learning disability skill deficits may be obtained with less reviewer effort.

4. Replicate this study in another Iowa AEA with a similar group of students with learning disabilities. A replication could validate the trends found in the current study.

5. Replicate the study following other disability categories across one or more evaluations after identification in preschool. Compare the results to determine if other disability categories evidence similar or dissimilar skill deficits.

6. Gather additional data on the students who continue in learning disability programs and are subsequently re-evaluated two or more times. Compare the data from second and third re-evaluation with placement data to determine if there is a correlation between delayed

language and motor skills at preschool and reading, writing, or mathematics deficits among students with chronic learning disabilities.

Summary

The placement phase of this study indicated that the typical preschool aged child identified as learning disabled may evidence delayed expressive and receptive language skills; may also have concomitant motor delays; and may evidence social skill symptoms that are noticeably different from the norm for his/her age group. In addition, the child may lack proficiency in some areas of preacademic skill development. When the symptoms of perceptual-motor, behavior, attention and activity, and academic deficits, are observed singularly or in combination, preschool age children may be at risk for learning disabilities. The re-evaluation phases of this study indicated that, as children stay in learning disability programs, the earlier symptoms characteristic at preschool change from developmental language and motor to cognitive, behavioral, and perceptual-motor.

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APPENDIX A

Learning Disability (LD)

670--12.3(281)

The Iowa Preschool Criteria (1985) contains the following definition of a learning disability:

A. Definition from Iowa Rules of Special Education
"Learning disability" is the inclusive term denoting the inability to learn efficiently, in keeping with one's potential, when presented with the instructional approaches of the general education curriculum. The ability to learn efficiently is manifested as a disability in an individual's reception, organization, or expression of information relevant to school function. The disability is demonstrated as a severe discrepancy between an individual's general intellectual functioning and achievement in one or more of the following areas: school readiness skills, basic reading skills, reading comprehension, mathematical calculation, mathematical reasoning, written expression and listening comprehension. A learning disability is not primarily the result of sensory or physical impairments, mental disabilities, behavioral disorders, cultural or language difference, environmental disadvantage, or a history of an inconsistent educational program. The following criteria shall be applied in identifying a pupil as learning disabled and in need of special education.

1. Hearing sensitivity must be within normal limits unless the hearing loss is temporary or not educationally relevant, such as a high frequency loss above the speech range.

2. Vision must be within normal limits after correction unless the impairment is temporary or not educationally relevant. (p. 22)

3. Intellectual functioning must be at or above one standard deviation below the mean as measured by an instrument recognized as a valid measure of intellectual functioning. A total or full-scale score shall be used in applying the intellectual criterion. In cases where measured intellectual functioning does not meet this criterion, but the results are suspect and the pupil's level of intellectual functioning is believed to be within the stated criterion, the individual responsible for assessing intellectual functioning shall state in writing the specific data which support that conclusion.

4. A severe discrepancy between current achievement and intellectual functioning exists when a pupil has been provided with learning experiences that are appropriate for the pupil's

APPENDIX A (continued)

age and ability levels, and obtained scores in the achievement area(s) of concern are below the pupil's present grade placement and are more than one standard deviation below the mean on the distribution of achievement scores predicted from obtained intellectual functioning scores. In establishing the difference of one standard deviation, the effects of regression toward the mean and errors of measurement must be applied. If the technical data necessary to account for the effects of regression are not available, the discrepancy between the obtained achievement and intellectual functioning standard scores must be at least two standard errors of measurement for the difference. (p. 23)

If norm-referenced tests are not available in a particular achievement area, the diagnostic-educational team shall state in writing the assessment procedures used, the assessment results, the criteria applied to judge the importance of any difference between expected and current achievement, and whether a severe discrepancy is present that is not correctable without the provision of special education.

In cases where a pupil's obtained scores on norm-referenced tests are not severely discrepant from intellectual functioning, but the results are suspect and the diagnostic-educational team believes that the pupil's current achievement is severely discrepant, the team shall state in writing the specific non norm-referenced data, including a description of the assessment procedures used and the criteria applied to determine the presence of a severe discrepancy, which supports the team's conclusion. In such cases, a copy of the supportive documentation will be reviewed and maintained by the director.

5. A member of the diagnostic-educational team must observe the pupil's performance in the general education classroom setting for school-aged pupils or in the home or center-based setting for preschool pupils. The primary purposes of the classroom observation are to seek evidence for the existence of a learning disability and to determine the degree to which the disability, if any, affects learning. The individual responsible for the observation must be someone other than the pupil's classroom teacher who is trained to use observation as a diagnostic procedure. (p. 24)

6. The severe discrepancy between achievement and intellectual functioning must not be primarily attributable to behavioral disorders, chronic health problems, physical impairments, environmental disadvantages, cultural or language difference or a history of an inconsistent educational program.

APPENDIX A (continued)

7. The degree of the achievement-intellectual functioning discrepancy may decrease as a pupil receives special education, progresses academically and maintains that progress. Consideration of these factors will be used to determine a pupils' movement along the continuum of special and general education options, and in targeting appropriate transfer from a special education instructional program. A pupil who attains an achievement level commensurate with expected performance, given current grade level placement and intellectual functioning, and is able to maintain satisfactory educational performance in the general classroom setting shall be transferred from the special education instructional program.

B. Criteria

(1) Due to the academic nature of both the state and federal definitions, a child under five years of age would rarely be diagnosed as learning disabled. The learning disability category should be used at the preschool level only when the diagnostic and developmental information provides a compelling basis for such a decision. All information and data used to arrive at the diagnosis must be documented in a written report. (p. 25)

(2) School readiness skills include the following skill or developmental areas: fine-motor, gross-motor, perceptual, perceptual-motor, cognitive, social, receptive langauge, and expressive language. A preschool age child should demonstrate significant deficiencies in a cluster of these skills or developmental areas. The deficiencies must represent a severe discrepancy between the child's actual performance or development and his or her age and ability level, and present considerable risk to the development and learning ability of the child.

(3) A child may not be identified as learning disabled if the documented deficiencies are primarily the result of a visual or hearing impairment, mental disability, behavior disorder, or environmental or cultural factors that would compromise the child's development.

(4) The evaluation of school readiness skills should include standardized tests, developmental scales, informal assessment, non-standardized tests, and observation. (p. 26)

C. Suggested Assessments

1. Assessment of intellectual functioning and general cognitive development (See assessments listed under mental disabilities section C(1).

APPENDIX A (continued)

2. Assessment of school readiness skills.
   a. Basic School Skills Inventory.
   b. Boehm Test of Basic Concepts.
   c. Brigance Diagnostic Inventory of Early Development.
   d. CAPER-continuum of Assessment Programming Evaluation Resources.
   e. Kaufman Assessment Battery for Children - Achievement Scale.
   f. Learning Accomplishment Profile - D.
   g. Marshalltown Behavioral Development Profile.
   h. School Readiness Survey.
   i. Test of Early Language Development.
   j. Test of Early Mathematics Ability.
   k. Test of Early Reading Ability.
   l. Woodcock-Johnson Psychoeducational Battery - Tests of Achievement.

D. Prior to placement in a preschool handicapped center based or home instruction program, the following assessments must be completed:
   Adaptive behavior.
   Communication.
   Health/family history.
   Hearing screening.
   Intellect.
   Motor screening.
   Vision screening. (p. 27)

APPENDIX B

Definition of Terms

CHARACTERISTIC - noun - syn. distinction, peculiarity, idiosyncrasy, singularity, specialty, individuality. 1. that which constitutes a character; that which characterizes; a distinguishing trait, feature, or quality; a peculiarity.

SYMPTOM - noun - syn. indication, mark, sign, token.
1. in medicine, any condition accompanying or resulting from a disease and serving as an aid in diagnosis; a perceptible change in the body or its functions which indicates disease.
2. a sign or token; that which indicates the existence or occurrence of something else.

Websters New Twentieth Century Dictionary. (1979). G. and C. Merriam Co.: Springfield, MA.

APPENDIX C

AEA Definition

An Area Education Agency (AEA) is an educational unit intermediate to the Iowa Department of Education and the Local Education Agency (LEA). There are 15 AEAs in Iowa with boundaries identical to the state's Vocational Technical Schools. Each AEA covers a sufficient tax and population base to provide special education services to all disabled within its geographic boundaries. AEA 7 is unique among the 15 Iowa AEAs in that most school districts provide their own instruction, including learning disability programs, and contract with the AEA's for diagnostic and consultative (support) services. The LEA's in AEA 7 contract all special education programs and services from the AEA. The administrative staff have access to diagnostic and program data on all disabled children in AEA 7.

APPENDIX D

The Data Sheet 1-88

INITIALS ______
ID# ______

	PSYCHOLOGY	STRATEGIST	SPEECH	NURSE/SW	OT/PT	HEARING	OTHER CON/MED
SOCIAL SKILLS Behav/Emot. B Self-help S Attn & Active A							
COGNITIVE SKILLS Memory M Concept C IQ IQ							
DISCREPANCY (+next to strong skill) vb--pf gm-fm ab--ach re-exp							
FINE MOTOR							
GROSS MOTOR							
FAMILY CONCERNS							
LANGUAGE (Receptive)							
LANGUAGE (Expressive)							
MEDICAL							
PERCEPTUAL SKILLS							
PERCEPTUAL MOTOR SKILLS							

APPENDIX E

Preschool Learning Disability Skills List

1. SOCIAL SKILLS
   Behavior/Emotional problems (B) -- tantrums, non-compliance, aggressive, withdrawn, shy
   Self-help (S) -- toileting, dressing, grooming, eating, self feeding, drooling, bedwetting
   Attention Span/Activity Level (A) -- hyperactive, distractable, noisy, excitable, Attention Deficit Disorder (ATD), out of seat behavior

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2. COGNITIVE SKILLS
   Memory (M) -- long-term memory, short-term memory, auditory memory and visual memory
   Concepts & pre-academic skills (C) -- knows, names, recognizes, or sorts by: colors, shapes, letters, numbers, body parts, classification, function, design, size, number, direction
   Intelligence (IQ) -- Verbal IQ, Performance IQ, Full Scale IQ

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3. DISCREPANCY BETWEEN CATEGORIES:
   Note: Place cross (+) next to stronger (V+-P) or (V-+P)
   Verbal and Performance IQ (V--P)
   Receptive and Expressive Language (R--E)
   Ability and Achievement (Ab--Ach)
   Gross and Fine-Motor Ability (Gm--Fm)

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4. FINE-MOTOR SKILLS

Bead stringing	Hand Dominance
Handwriting	Lacing
Pre-handwriting	Cutting/Scissors
Drawing	Puzzles
Stacking	Painting
Drooling	Folding
Peg Boards	

   Cutting designs: circle, curve, angles, staying on or within lines.

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5. GROSS-MOTOR SKILLS
   Gait/Ambulation: climb, walk, hop, skip, jump
   Balance/Equilibrium
   Bouncing a Ball
   Clumsy

---

6. FAMILY CONCERNS

Separation	Divorce
Marital conflicts	Remarriage
Parent or sibling illness	Single Parent
Disagreement on discipline or child rearing practices	

APPENDIX E (continued)

7.	RECEPTIVE LANGUAGE SKILLS	
	Language Development	Direction Following
	Auditory Processing	Points to Objects on Command
	Vocabulary Recognition	Imitating Words and Sounds
	Receptive Vocabulary	
8.	EXPRESSIVE LANGUAGE SKILLS	
	Expressive Vocabulary	Oral Vocabulary
	Use of Pronouns	Speech Development
	Answering Questions	Sentence Length
	Recitation/Singing	Articulation
	Voice quality & amplitude	Aphasia
9.	HEALTH/MEDICAL	
	Complicated pregnancy	Premature Birth
	Special Diet	Tubes-in-ears
	Medical Disabilities	Birth Defects
	On regular or long-term medication use	
	Chronic: allergies, colds, ear infections, sinus	
10.	PERCEPTUAL SKILLS	
	Visual Channel	Auditory Channel
	Visual Discrimination	Auditory Discrimination
	Visual Association	Auditory Association
	Discriminating same and different	
	Matching: colors, shapes, letters, objects	
11.	PERCEPTUAL-MOTOR SKILLS	
	Position-in-space	Visual-motor integration
	Eye-hand coordination	Visual/eye tracking: uneven, jerky
	Copy Designs	
	Left or right dominance/handedness	

Compiled Learning Disability Count by AEA (1978 through 1986*)

Year	1978	1979	1980	1981	1982	1983	1984	1985	1986	'78 - '86
AEA 1	1	2	4	2	11	5	4	1	3	33
2	2	2	4	3	0	1	0	2	1	15
3	5	3	4	2	3	1	0	2	2	22
4	2	0	3	5	5	7	11	17	10	60
5	6	14	2	0	7	6	6	1	2	44
6	15	21	25	8	14	14	18	7	3	125
7	14	7	22	17	25	35	49	24	29	222
8	7	9	6	5	0	0	1	0	0	28
9	7	9	6	5	0	0	1	0	0	28
10	18	14	20	4	2	2	1	1	5	67
11	8	9	18	5	1	7	9	3	4	64
12	9	6	7	14	13	12	17	8	11	97
13	0	0	7	0	1	4	6	3	3	24
14	13	10	13	8	10	15	15	3	6	93
15	2	19	1	0	1	2	4	2	1	32
16	1	0	1	2	1	0	0	1	1	7
Total	103	116	137	75	94	111	141	76	80	933

*Department of Education, Bureau of Special Education, Part B, CHA: PL 94-142. Ages 3-5 Child Count.

APPENDIX G

AEA Approval Letter

DATE: March 5, 1987

TO: Rich Rebouche

FROM: Leo Ogden

RE: Research Proposal

This memo is to confirm our discussion this morning regarding procedures for maintaining the confidential nature of the students records you will be taking data from for the proposed research project.

You will be responsible for identifying the documents which you wish to utilize. One of the secretarial staff from Records will then review each document, eliminating all student and parent names, plus other references which might identify a specific student. The documents will be coded with the first character of first and last name only. It is my understanding that the documents will include items which would generally be characterized as discipline reports, staffing forms, annual review forms, and medical reports.

Since these activities will undoubtedly consume some unspecified staff time from both "Records" and Word Processing, I did talk with Gayle and Judy O., indicating the Special Education Division's interest and intent to be supportive of the research. It would be inappropriate for me to interject myself in their "shop", so you should work out cost reimbursement with them.

The division would want a copy of the research document when the project is completed. If I can be of further assistance, please advise.

LO/jas

cc: Judy O.
Gayle

APPENDIX H

UNI Approval Letter

May 5, 1987

Richard A. Rebouche
Department of Special Education
University of Northern Iowa

Dear Mr. Rebouche:

Your project, "Early identification of learning disabilities in a preschool population", which you submitted for human subjects review on April 15, 1987, has been determined to be exempt from further review under the guidelines stated in the UNI Human Subjects Handbook. You may commence participation of human research subjects in your project.

Your project need not be submitted for continuing review unless you alter it in a way that increases the risk to the participants. If you make any such changes in your project, you should notify the Graduate College Office.

If you decide to seek federal funds for this project, it would be wise not to claim exemption from human subjects review on your application. Should the agency to which you submit the application decide that your project is not exempt from review, you might not be able to submit the project for review by the UNI Institutional Review Board within the federal agency's time limit (30 days after application). As a precaution against applicants' being caught in such a time bind, the Board will review any projects for which federal funds are sought. If you do seek federal funds for this project, please submit the project for human subjects review no later than the time you submit your funding application.

If you have any further questions about the Human Subjects Review System, please contact me. Best wishes for your project.

Sincerely,

Ruth Ratliff
Assistant to the Dean
for Faculty Services

cc: Dr. John C. Downey
Dr. Ronald Anderson
Dr. Marion Thompson

APPENDIX I

Criteria for Recording Skills

1. First review all reports in placement file. (Review all portions of each report, including historical data, body of report and summary and/or recommendations).

2. Return to first report in placement file and if the evaluator from the context of the statements about the child clearly means that a skill deficit is educationally significant, the deficit skill should be circled.

3. Circle (0) as deficit skills the skills listed in the report proceeded by a qualifier such as below average, below normal, poor, significantly delayed, deficient, has a problem(s), needs improvement, needs help with, etc. Also, circle and report any skill one year or more below child's chronological age and any parent concern indicated as also a concern of the examiner.

4. Underline as average or above average those skills preceded by a qualifier such as strength, at or above age level, normal, or above average.

5. Proceed through the file in the order that the discipline appears on the recording sheet: psychologist, strategist, speech therapist, nurse/social worker, ot/pt, hearing, other.

6. In the needs area, summary, or recommendations section of the discipline report; review, record and circle (0) deficit skills or needs listed at the end of the report.

7. Record the subcategorical abbreviations: M, C, IQ, B, S, A, Discrepancies: V--P, Ab--Ach, Gm--Fm, and R-E in the appropriate quadrant on the transparency sheet.

8. Place a circle (0) for each weak area in the appropriate quadrant on the transparency sheet.

APPENDIX J

File Information

Student Folder No. _____

Student Code No. _____

Random Group Assignment: A B C D E

SEQUENCE

Placement _____.
1st Re-evaluation _____.
2nd Re-evaluation _____.

REPORTS IN FILE

Psychology _____.
Strategist _____.
Speech _____.
Nurse _____.
Social Work _____.
OT _____.
PT _____.
Hearing _____.
Consultant _____.
Medical _____.
Eval. Center _____.
Other Ident. _____.

REVIEWER CODE COLOR AND NAME:

	Brown	Blue	Green	Red
Assign:	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

1. Date Due _____.
2. Date Due _____.
3. Date Due _____.
4. Date Due _____.
5. Date Due _____.

( ) Reviewer's first name

APPENDIX K

Instructions for Reviewing Reports

1. Open packet and keep all reports in order.

2. Check the contents of each packet against the check list on the front of each folder. Contact me right away if you find a discrepancy in what is listed on the front of the file and contents.

3. Review the reports in the order indicated by the circled numbers on the front of each folder. (The reports are assigned for review in random order to negate the effects of time, practice and/or fatigue. Also each reviewer has a different set of reports.)

4. Upon reviewing and recording the symptom data from all reports, return the file with the contents intact.

5. Try to review the files in the early part of the week to minimize fatigue.

6. Notice the date stamped on the front of the file, this is the date each set of data is due to be returned.

7. I have separate data packets for each teacher therefore as soon as one packet is turned in I can exchange it for another. Reports do not have to be held for the full week if you finish early.

8. Please call me if you have questions during evenings or weekends at XXX-XXXX.

Thanks for your help and Good Luck!!

APPENDIX L

Supplemental Skill List
(Re-evaluation Phase)

Cognitive Concepts:

1. Knowledge
2. Skills
3. Spelling
4. Academic progress
5. Structural analysis
6. Reading
7. Learning new tasks
8. Language arts
9. Inferential thinking

Social Skills:

Behavior -
1. Interpersonal relationships
2. Struggles with tasks
3. Risk-taking
4. Self-concept
5. Adjusting to new situations

Attention Span and Activity Level -
1. Task completion
2. Ability to organize
3. Switches from task to task
4. Work habits

Receptive Language:

1. Listening skills
2. Auditory vocabulary

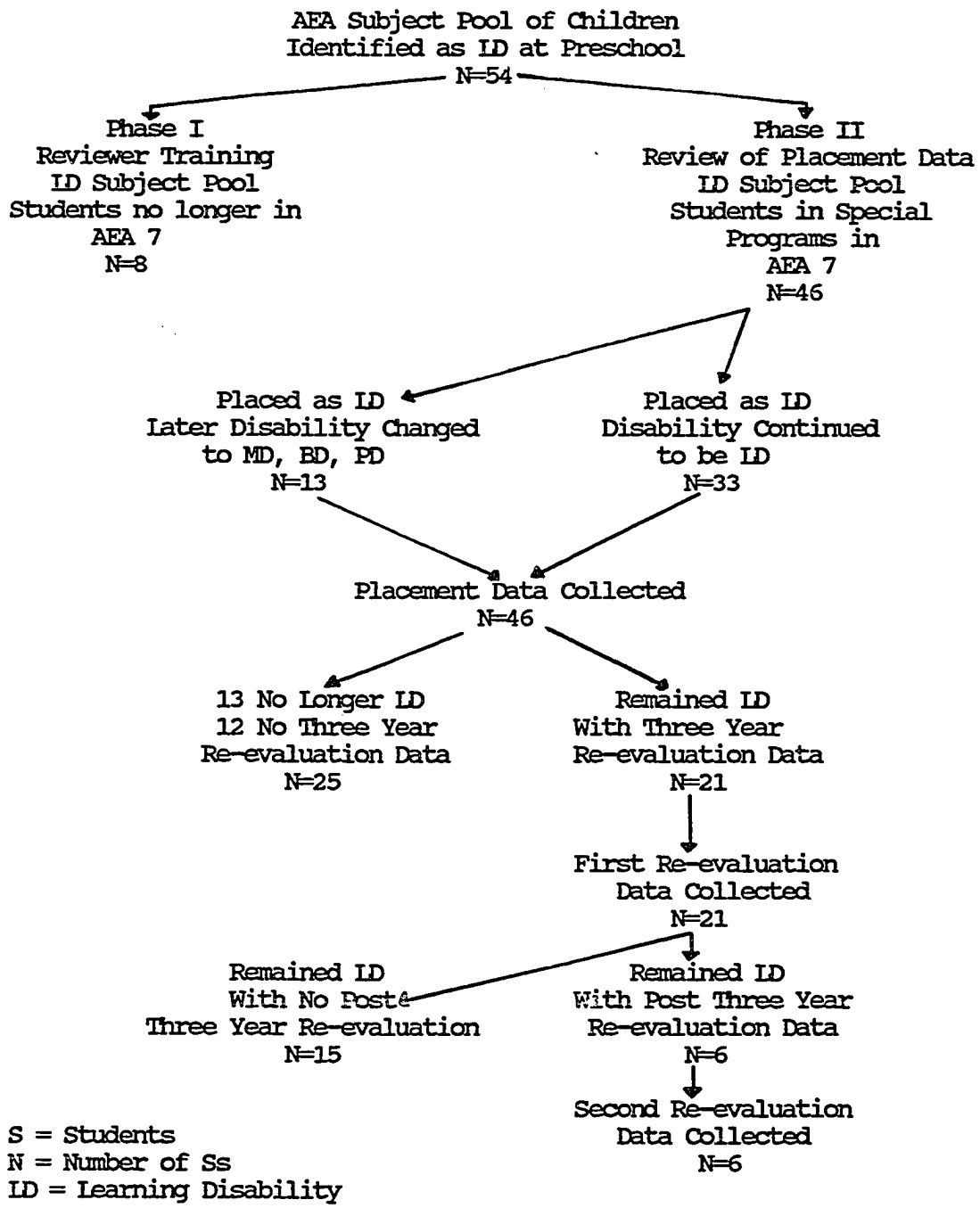
Fine Motor Skills:

1. Writing

APPENDIX M

Flow Chart

Learning Disability (LD) Characteristics
in a Preschool Population



S = Students
N = Number of Ss
LD = Learning Disability