Families And Learning In Classified And Non-Classified First Graders

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FAMILIES AND LEARNING IN CLASSIFIED AND NON-CLASSIFIED FIRST GRADERS

BY

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Submitted in partial fulfillment of the
Requirements of the Degree
Doctor of Philosophy
Seton Hall University

2002
ABSTRACT

FAMILIES AND LEARNING IN CLASSIFIED AND NON-CLASSIFIED FIRST-GRADERS

The prevailing models of causality in the field of learning disability (LD) are genetic, neurological and information processing deficiencies within the child's cognitive abilities. Alternatively, it has not been empirically established that family interactional variables can affect developmental learning of a LD child. This causal comparative study compared the effects of the family learning environments of LD versus non-LD first-graders upon the child's visual-motor, academic, adaptive, and social development over four months. It employed the ecosystemic model which accepts a possible genetic basis for cognitive/behavioral deficits, but further implies these deficits may increase within a negative family/child interactional spiral over time. Differences between LD and non-LD families on structure and interactional variables were examined. Eighty families and 80 first-graders from three northeastern school districts were assessed with: (a) The McMaster Family Assessment Device (FAD) (Epstein, Baldwin, and Bishop, 1983); (b) Bender Gestalt Test (Bender, 1946); (c) the Draw-a-Man Test (Harris, 1963); and (e) the FAD Family Information Form (Brown University Family Research Program, 1995). Confirmatory evidence was found in three areas. First, six of seven hypotheses supported the ecosystemic view that families may influence their LD children's developmental learning interactionally over time. Lower rates of visual-motor, academic, adaptive, and social development after four months were found in children whose families scored more dysfunctional on the FAD. Second, there were significant differences between LD and
non-LD families on structure and interaction on five of the seven FAD scales: roles, behavior control, communication, affective-responsiveness, and general functioning.

Third, there was a positive relationship between healthy family functioning and socioeconomic level. Higher family income was significantly associated with increased education for mothers and higher academic functioning for first-graders. Socioeconomic effects were pervasive. Findings of a positive association between family functioning and child differences in development after four months suggests further potential for negative effects throughout K-12 grades. While as yet undetermined, family-based vulnerability and environments may be more changeable than intrinsically-based vulnerabilities.

Further recommendations for prevention, intervention and implications for future research were made.
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CHAPTER I

Introduction

The Public Law, Education for All Handicapped Children Act of 1975 opened vast opportunities and provided educational services for many children who did not have them previously. Since its inception, it led to the creation of a large entity of services with many subsystems such as special education, child study teams, and an expanded field of learning disabilities (LD). Many of these subsystems have since become institutionalized. The efficacy and high cost of programs and services as well as the medical model upon which they are based have often been questioned. Thus, the possibilities of improving child development, constructing a positive learning environment, and improving remedial special education through a broader conception of learning disability become important areas for investigation.

The term Learning Disabilities describes a difference between intellectual functioning and academic skill acquisition as measured by standardized tests. The LD child is average or above average in intelligence but underperforms in one or more areas of learning in school. This lower-than-expected performance is attributable to unknown causes but is usually assigned to a possible central nervous system dysfunction. The explanation of learning difficulties was significantly influenced by Public Law (PL 99-142 The Education For All Handicapped Children Act, 1975), which contained a definition of LD as a subcategory of underachievement and included disorders...
in one or more of the basic psychological processes involved in understanding or
in using language, spoken or written, which . . . may manifest itself in imperfect
ability to listen, think, speak, read, write, spell or do mathematical calculations.
Such disorders include conditions such as perceptual handicaps, brain injury,
minimal brain dysfunction, dyslexia, and developmental aphasia. Such terms do
not include children who have learning problems which are primarily the result of
visual, hearing, or motor handicap, emotional disturbance, or environmental,
cultural, or economic disadvantage. (The Education For All Handicapped
Children Act, 1975)

Statement of the Problem

A main limitation of the current conception of LD is a perception that the learning
problem resides principally within a child, and thus only a child is identified and
remediated, much as a bacterial infection is treated. This view does not account for the
influence of family and other social factors (school, community, culture) upon the
cognitive and social development of an LD child; influences that may insidiously
increase the “underachievement” of the LD child over time. In the ten-year longitudinal
study of the children of Kauai, beginning at pregnancy to age ten, Werner, Bierman, and
French (1971) concluded that the effects of environmental deprivation were more
powerful upon IQ than the degree of perinatal stress. Also, the effects of a stimulating
external environment appear to be most powerful in the early years of childhood when
the greatest degree of rapid growth and development take place (Popalia, Olds, and
Feldman, 1999). Dunst and Trivette (1986) have observed that some families create a
learning environment that nurtures and enhances an LD child’s cognitive and social
development, regardless of other advantages, while other families do not. Therefore, the purpose of this study is twofold: to establish if there is a difference between LD and non-LD family environments over time and their effects upon child development. Secondly, to establish the differences between LD and non-LD families on structure and interaction factors. Early identification and intervention of families at-risk for a weak or “negative” learning environment is an anticipated goal.

The theoretical foundation for this study is based on the ecosystemic model. This model proposes that parental and child cognitive/behavioral factors, which may be genetically based, reciprocally amplify one another in a downward, interactional spiral over time (Green, 1990). There are two processes hypothetically at work. First, the attention deficits of children with LD are maintained or increased by an “underorganized” family structure. Second, the information-processing deficits of LD children are maintained or increased by communicationally-deviant styles of parental communication (e.g., ambiguous, imprecise and indirect language) (Green, 1990). In addition, this weak or negative learning environment interacts with other links in a family’s social network such as the neighborhood, the value system of the school, and the classroom. The influences from these links, over time, can further weaken and amplify the structural and communicationally-deviant family learning setting in which an LD-child lives.

An example of the influence of the school as an ecosystem upon the child and family can be illustrated with the sometime questionable accuracy and validity of the child study team’s classification decisions. The child study team, with its use of supplementary specialists (as needed), evaluates and determines who is handicapped. In
practice, unlike the teachers, this child study team is often isolated as a school-system subgroup, and not under direct authority of the school principal. The team is perceived as not belonging to the school staff. Often their acceptance is mercurial, dependent upon whether the team classifies and removes a troublesome student. As such, it is vulnerable to staff, administrative, parental, and private clinician pressures for recognition or rejection based on its classification decision. As a separate subsystem, its members needs for belonging are increasingly met by the team members in the work environment, setting up strong loyalties and conformist pressures upon each member when there may be discrepant specialist findings (DeMeritt, 1995).

Other extrinsic factors that operate to increase the variance in a purportedly valid, intrinsically-based definition of LD are socioeconomic factors, political influences, and cultural-value differences. School districts vary socioeconomically and thus have differing populations and academic norms leading to a phenomena known as "geographically handicapped." An LD child moving from a higher functioning school into a new school with lower achievement norms could be eligible to have his or her classification discontinued.

Political influences also affect classification decisions. Many members of Boards of Education are politically elected and go on to other political offices. They hire, fire, and give tenure to superintendents and staff. The superintendent has the final approval on classifications and special class and school placements. In "sensitive situations", sometimes with influential parents, LD classifications and programming may fall victim to the political influence of an authoritarian-structured system.

Cultural-value differences have their impact as well. Mild learning difficulties
may be perceived very differently by Hispanic families because of their greater valuation on developing the whole child socially as opposed to the school's priority placed on academic achievement. Similarly, Hispanic parents place less faith on the ability of the academic tests and evaluations to assess the child's potential and may not agree to an evaluation or classification (Harry, 1992).

Based on the ecosystemic model, this study focuses on family and child vulnerability factors, such as perceptual deficits and poor family adaptation, which appear related to a weak or negative family learning environment (family structure and interaction variables). A weak or negative family learning environment exists when a family compromises on its common goal to socialize (educate) its children. To succeed a family climate must exist where the child feels safe and stimulated to follow his or her curiosity about the outer world and human relationships as well as supported to overcome the frustrations that lead to learning mastery (positive learning environment). The relative failure to reach this family goal (weak or negative learning environment) will depend largely upon its overall health/pathology (general functioning); its ability to resolve problems within and outside the family at a level that maintains effective functioning (problem solving); its clear and direct communication (communication); its ability to clearly assign and execute tasks that provide resources, nurturance, support, and personal development (roles); its ability for members to express the appropriate quality and quantity of emotion (affective responsiveness); its ability of members to express involvement and interest in the activities of one another (affective involvement); and its ability to set standards for members' behavior and its pattern of control (behavior control) (Green, 1989; Miller, Epstein, Bishop, Keitner, 1985; Wood, Chapin, &
Hannah, 1988).

Thus, it becomes relevant to examine the functioning (learning environment) of families with an LD first-grade child and the impact on their child’s visual cognitive, academic, adaptive, and social problem development after forty percent of the school year. Specifically, the performances of these families and children will be compared to a control group of families with a non-LD first-grader.

Direct assessment of first-grade participants will be made with the Visual Motor Gestalt Test, as developed by Lauretta Bender (1946), also referred to as The Bender Gestalt Test (Koppitz, 1975), and the Goodenough Draw-a-Man Test (Harris, 1963). In addition, the participants’ teachers will rate the child with the Achenbach Teacher’s Report Form (Achenbach, 1991), and each child’s family will be assessed on The McMaster Family Assessment Device (Epstein, Baldwin, Bishop, 1983). The use of multiple assessments is an advantage of this study because it focuses not only on the child but the school and family ecosystems. (The Interdisciplinary Council on Development and Learning Disorders, 2000). This is consistent with the ecosystemic model which argues against the professional use of narrowly focused child assessments (Bailey & Simeonsson, 1988; Bernheimer, Gallimore, & Weisner, 1990; Burden & Thomas, 1986; Deal, Dunst & Trivett, 1989; Fewell, 1986; Kames & Teska, 1980; Turnbull & Winston, 1984).

One objective of this study is to demonstrate the impact families with negative learning environments exert upon the learning of their LD children. It is conceivable that early identification and intervention of vulnerable families (with a child over five years) could prevent or reverse the downward spiraling of a weak or negative learning
environment. These changes could potentially impact positively upon the efficacy of special education programs and rates of LD children’s cognitive and social developmental growth.

**Background**

The LD child is at a greater risk developmentally than the non-classified child for many harming conditions. These range from the child’s inner biological environment, (e.g., genetic, prenatal, perinatal deficiencies) to the multiple, external environments or ecological systems such as the family, the school, the community and related systems that surround the child (Werner et al., 1971). The effects on the LD child’s development can be cumulative over time, countered only by the vitality of internal buffers and the strengthening stimulation of proximal environments, e.g., family, school, community, society (Werner, 1990). Therefore, early identification and intervention with families with an LD child vulnerable to co-constructing a weak or negative learning environment has untapped prevention potential.

The field of Learning Disabilities has done much for LD children. In current practice, The Individuals with Disabilities Education Act of 1991 (IDEA) provides for identification of learning-disabled children through child-study teams and provision of remediation of their learning deficits through special education systems. The Public Law, the child study team, the special education system, and the field of learning disabilities are, in the main, based on the medical model. This approach focuses mostly on children. It is a deficit, nonsystemic, individually-focused model with accompanying evaluations. It neglects the full impact of the broader ecological view of a child’s development, which is subject to a multiplicity of debilitating and protective factors which operate within
contexts beyond a child's inner world. What a child study team does not specifically assess is the vulnerability of the family to be a high-risk environment for weak learning, potentially intensifying the negative developmental effects over time. As part of the process of a child study-team evaluation, a social history is conducted with (a) member(s) of a family, but its emphasis is on the developmental history of the child and its orientation is in keeping with the deficit-remediation model of the team's psychological and learning evaluations. A recent law, PL 99-457, Part H (Education of the Handicapped Act Amendments, 1986), implicitly acknowledges this deficiency as it serves the families with children at-risk before age five by providing (with their permission) early intervention with a strength assessment and empowerment plan.

The approach this research takes integrates the field of family therapy with the field of learning disabilities. The field of clinical family therapy has been preoccupied with limitations, deficits, and illness-based models, very much like the field of learning disabilities. However, there is a current shift to a competency-based, health-oriented model, stressing and amplifying family strengths and resources (Walsh, 1993). In this shift of therapeutic focus from what went wrong to how can we make it better and function more effectively, Minuchin (1984) has redirected his efforts toward working with larger systems in social networks, such as social services. Combrinck-Graham (1990) argued for improving family competence. She saw work with larger systems and empowerment of family, friends, and teachers as more powerful ways to help children than efforts focused on pathology. To improve academic achievement, schools and special education systems are also seen as a fertile ground for following in the direction of clinical family therapy. It can do this by moving from a preoccupation with deficits
and illness to a broader competency-based, health-oriented model by not only identifying families vulnerable to creating weak or negative learning environments but by amplifying family strengths, resources and developmental learning. In sum, special education could embrace a biosocial model.

_Theoretical Rational_

Outside schools and special education systems, the field of learning disabilities (LD) remains steadfast in its adherence to intrapersonal conceptual models and assessments. The Education for All Handicapped Children Act encoded concepts based on the medical model of disability. LD has been attributed to genetic, biochemical, neurological, attributional, and information-processing deficits (Bryan, 1987; Das, Mulcahy, & Wall, 1982; Kolligian & Sternberg, 1987). While these different models lack agreement on the definition of LD, each theory focuses on factors intrinsic to a child’s biological and cognitive processes to the exclusion of family and other ecosystemic variables (Green, 1989). Meanwhile, other fields have incorporated ideas about the multiple influences of nature, nurture, their interaction, and systemic thinking. Behavioral genetics and family-systems research are proving that both individual heredity and family environment play significant roles in the development of mental abilities and emotional disorders (Angoff, 1988; Capron & Duyme, 1989; McGue, 1989; Plomin, 1989; Tienare, et al., 1987).

In the search for a comprehensive theory which includes family and social factors to explain learning disabilities (LD), four models seem to predominate: the environmental model, the genetic model, the vulnerability/stress model, and the ecosystemic mode (Green, 1990). While much of the research on LD and family
variables has been of concurrent rather than longitudinal in design, and have shown positive associations, the causal relationship between child and parent factors and the role heredity and environment plays in the development of family patterns has not been answered. The environmental model reflects a nurture stance from the perspective that underorganized family structure and deviant communication are necessary and sufficient conditions of LD in children (Green, 1990). Closer to the nature end, the genetic model embodies the outlook that the inability of the parents to organize the family and their deviant communication are evidence of their own learning disabilities. These associations between parent and child LD factors indicate genetic concordance and hereditary transmission (Green, 1990). Moving toward the viewpoint of the interaction of nature and nurture, the vulnerability/stress model is based on the premise that the inability of parents to organize a family and their deviant communication styles are specific stressors that amplify their child's genetic vulnerability for LD (Green, 1990). The ecosystemic model is based on the premise that parental and child cognitive/behavioral factors, which may be genetically based, reciprocally amplify one another in a vicious interactional spiral over time. The interactional spiral yields a communicationally-deviant family learning environment associated with LD in the child. This communicationally-deviant family learning environment and the child's LD may each be a part of mutual amplification processes in a family's social network such as the neighborhood, the value system of the school, and the classroom (Green, 1990). The communicationally-deviant family learning environment may make the LD worse by inhibiting LD growth, but it does not cause a LD.

The ecosystemic model appears to hold the most promise for a comprehensive
understanding of LD because it includes family and social factors. Hence it will be used as a theoretical foundation for the study. For example, socioeconomic status can strongly influence the accurate identification and long-term prognosis of children’s learning disorders. LD children from higher social classes have been seen to be more successful over time than those from lower classes (O’Connor & Spreen, 1988). A key strength of the ecosystemic model is that it better accounts for the dynamics of relative change. The development of competence or disorder in a child or family has multifactorial determinants, and neither competence nor disorder are static or unchanging. In studies on resilience in children, evidence points to a balance between the vulnerabilities of a child and family on the one hand and protective factors that shield both from damage by stressors on the other (O’Dougherty, Wright, & Masten, 1997). A vulnerability is defined as a characteristic of a system (child, family) that makes that system more susceptible to particular threats to development or functioning. For example, an LD child with a developmental delay vulnerability may have the protective factors of good intelligence and a pleasant, adaptable temperament. This child’s family may also be vulnerable because of low socioeconomic status and marital conflict but have protective factors of strong acceptance of the child’s handicap and parental availability at times of failure or distress. When the child and family’s vulnerabilities and protective factors are in balance, there is a greater likelihood for better adaptation, competence, and a positive learning environment. Likewise, when the vulnerabilities are excessive or protective factors are insufficient in either the child or the family or both, stressors can more easily overwhelm the system and result in poor adaptation, incompetence and a negative learning environment. In such a process, biological, psychological, familial and social network
factors are interactively changing in ways in which characteristics of each system and its many levels are increased or reduced together. Thus, the whole interconnected ecosystem responds to changes in its parts (Wendzof & Frey, 1985; Wynne, 1976; Wynne, Singer, Bartko, & Toohey, 1977).

Green (1989) observed that learning disabilities were one component of the broader category of underachievement, an aspect also recognized in the legal definition of LD (Education for All Handicapped Children Act of 1975, 20 U.S.C. § 1401 et seq. (West 1993). He further delineated four aspects of family interaction in the ecosystemic model that influence underachievement: family communication deviances; family attributions; family achievement values; and family structure. Due to measurement and sample size considerations, inclusion of family attributions and achievement values is currently beyond the scope of this research. The focus of this study is on family structure and interaction reciprocity effects over time and is equated with the hypothetical construct of a negative learning environment. Studies already in support of the influence of family structure have been discovered in clinical and experimentally controlled studies on family organization with the variables of family instability, underorganization, and chaos being associated with learning disabilities in children (Amerikaner & Omizo, 1984; Minuchin, Chamberlin, & Graubard, 1967; Minuchin, Montalvo, Guerney, Rosman, & Schumer, 1967; Owen, Adams, Forest, Stolz, & Fisher, 1971).

Although the ecosystemic model conceptualizes the weak or negative family learning environment to be communicationally-deviant, displaying patterns such as double binds and mixed messages, this design will exclude a specific, dependent measure of the communicational deviance and the reciprocal spiral over long time periods (the
FAD utilizes a communication subtest which may be a partial and indirect measure of communication deviance). A control group of nonhandicapped children and their families will be compared in a like manner with the LD children and their families.

The primary research question is whether the ecosystemic interactional spiral influences the achievement and development of LD children. The medical model postulates that the learning problem resides exclusively within the child. If that were unequivocally the case, then there should be no achievement or developmental differences after four months between LD and non-LD children irrespective of their families' learning environments (FAD scores).

Hypotheses

The present research is based on seven hypotheses:

Hypothesis I. Following four months of schooling, there will be a lower rate of visual-motor development for LD children than for non-LD children, after controlling for initial level of visual-motor development and family learning environment.

Hypothesis II. Following four months of schooling, there will be a significant positive relationship between post-test visual-motor developmental delay and the family learning environment.

Hypothesis III. Following four months of schooling, there will be a lower rate of academic, adaptive, and social development for LD children than for non-LD children, after controlling for initial level of academic, adaptive, and social development, and family learning environment.

Hypothesis IV. Following four months of schooling, there will be a significant negative relationship between academic development and the family learning
environment cavort.

_Hypothesis V._ Following four months of schooling, there will be a significant negative relationship between adaptive development and the family learning environment cavort.

_Hypothesis VI._ Following four months of schooling, there will be a significant positive relationship between social developmental deficits and the family learning environment cavort.

_Hypothesis VII._ Families of LD first-graders will score significantly lower on the family learning environment measure than the families of the non-LD first-graders.

The expectations of this research are:

1. There will be significantly more LD children that have families with negative learning environments (dysfunctional FAD scores).

2. There will be a significantly positive relationship between post-test visual motor developmental growth and a positive learning environment.

3. There will be significantly more LD children with lower rates of developmental growth (lower BGT and TRF scores).

Definitions

_Negative Learning Environment_. Theoretically, one of the common goals of families is to socialize (educate) its children. To succeed, a family climate must exist where the child feels safe and stimulated to follow his or her curiosity about the outer world and human relationships as well as supported to overcome the frustrations that lead to learning mastery (positive learning environment). The relative failure to reach this family goal (negative learning environment) will depend largely upon its overall
health/pathology (general functioning); its ability to resolve problems within and outside
the family at a level that maintains effective functioning (problem solving); its clear and
direct communication (communication); its ability to clearly assign and execute tasks
that provide resources, nurturance, support, and personal development (roles); its ability
for members to express the appropriate quality and quantity of emotion (affective
responsiveness); its ability of members to express involvement and interest in the
activities of one another (affective involvement); and its ability to set standards for
members behavior and its pattern of control (behavior control) (Miller, Epstein, Bishop,
Keitner, 1985; Green, 1989; Wood, Chapin, & Hannah, 1988). Operationally: a family
with a negative learning environment is defined as one who obtains a score of 2.0 or
above on the general functioning scale of the FAD.

Visual Motor Development is the level the child has achieved in the integration of
visual-perception and motor coordination. Operationally: visual motor development is
defined as the BGT score, which is the number of errors a first-grader makes in copying
all nine designs transformed into an age equivalence.

Academic Functioning is the level of mastery of grade-level curriculum.
Operationally: academic functioning is defined as the teacher’s ratings on TRF of
performance in grade-level curriculum academic subjects scored 1 to 5 for categories
ranging from Far below grade to Far above grade.

Adaptive Functioning is the level of adjustment to academic, behavioral, and
social grade-level expectations. Operationally: adaptive functioning is defined as the
teacher’s ratings on the TRF on four categories of adjustment, including academic
motivation, compliance with behavioral norms, compliance with learning expectations,
and happiness. Each category of adjustment is scored 1 to 4 ranging from Far below to Far above.

*Social Functioning* is the level of problem behaviors in categories of withdrawn, somatic complaints, anxious/depressed, social problems, thought problems, attentional problems, delinquent behavior, and aggressive behavior. Operationally: social functioning is defined as the total number of teacher-rated problem behaviors on the TRF compared to age level norms. This total score is converted into a T score to determine level of social functioning.
CHAPTER II

Literature Review

Causes of LD Intrinsic to the Child

The term Learning Disabilities describes a difference between intellectual functioning and academic skill acquisition as measured by standardized tests. The LD child is defined as having average to above intelligence but who underperforms in one or more areas of school-based learning. This lower-than-expected performance is attributable to unknown causes but is usually assigned to a possible central nervous system dysfunction. The definition of learning difficulties was significantly influenced by Public Law PL 99-142, which contained a definition of LD as a subcategory of underachievement and included disorders in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, which . . . may manifest itself in imperfect ability to listen, think, speak, read, write, spell or do mathematical calculations. Such disorders include conditions such as perceptual handicaps, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia. Such terms do not include children who have learning problems which are primarily the result of visual, hearing, or motor handicap, emotional disturbance, or environmental, cultural, or economic disadvantage. (The Education For All Handicapped Children Act, 1976).

The research literature contains considerable empirical evidence for the
hypothesised influence of neuropsychology, genetics, and information-processing deficits.

**Neuropsychological Theory**

In an historical review, Greenblatt and Greenblatt (1997) referred to the original terms of congenital word blindness and strephosymbolia (or twisted symbols) for one type of learning disability. Now this disability is referred to as developmental dyslexia. By attributing this disability to difficulties in cerebral dominance, Orton (1925) was apparently the first to imply an intrinsic neurological basis of LD within the child.

Additional support for this intrinsic neurological basis of LD within the child was found in the similarity of clusters of deficits discovered in both brain-damaged patients and the learning disabled. Damage that was subclinical in the learning impaired was termed minimal brain damage by Strauss and Lehtinen (1947). Clements (1966) distinguished functional deficits from structural ones with the term minimal brain dysfunction (MBD) syndrome. This syndrome applies to children of below average to above average intelligence with mild to severe learning or behavioral difficulties which are associated with central nervous system impairment. The dysfunction may affect such areas as perception, language, conceptualization, memory, or inhibit control of attention, impulse, or motor function.

Greenblatt and Greenblatt (1997), in a review of the research on the neuropsychological aspects of LD, show two predominant approaches. One approach views all types of LD as part of a unitary disorder. One example of this unitary approach is Bender’s (1958) maturational lag theory. A second example of this unitary approach is Cruickshank’s (1977) perceptual deficit theory. A third example is a verbal processing problem based on Vellutino’s (1978) verbal mediation theory. The second approach to
learning disabilities involves seeing each case of LD as fitting into a range of different syndromes based on etiology and information-processing abilities. An example of the second approach, multidetermined, is exemplified by Mattis et al. (1975). These researchers were able to differentiate two groups of non-readers which included 29 developmental dyslexics and 53 brain-damaged dyslexics (N = 82). A control of readers included 31 brain-damaged children. They found that the two dyslexic groups fell into one of three clinical syndromes: a language-disorder (39%), an articulation and graphomotor discoordination syndrome (37%), or a visuo-perceptual disorder (16%). The language-disorder group was characterized by a significantly lower verbal than performance IQ and anomia that interfered with vocabulary acquisition. The articulation and graphomotor syndrome group showed articulation and graphomotor deficits, but normal acoustosensory and language processes. The visuo-perceptual disorder group demonstrated impaired visual-perceptual processes and had a lower performance than verbal IQ. The finding that children with similarly severe weaknesses in reading showed different impairment patterns in higher cognitive processes is strongly illustrative of the multidetermined approach.

Several studies reviewed by Greenblatt and Greenblatt (1997) support the hypothesis that LD is made up of different syndromes or subgroups with similarity to three subtypes: a language disorder, a visual-perceptual disorder, and a motor skill disorder. Overall, LD is seen as an impairment in several neuropsychological processes, involving brain function instead of brain structure.

**Genetics Theory**

The spotlight on innate factors is also shared by the role genetic variables may
play in LD. Support for this hypothesis comes from the high percentage of children who have a family history of learning disability (Bannatyne, 1971; Mattis et al. 1975). There is a higher prevalence of LD in the family members of LD-children than in the general population. Twin studies show support for the hypothesis of genetic causation (Decker & Vandenberg, 1985). In 1985, Defries conducted the Colorado Reading Project and found reading disabilities to be highly heritable. Five to ten percent of school-age children are affected, with boys outnumbering girls by three or four to one (Rutter, 1978). Additional evidence for a familial link in developmental dyslexia is provided by Pennington and Smith (1988), who have described the relationship of phonological impairment to the phenotype associated with specific developmental dyslexia. They also described a linkage between dyslexia and chromosome 15 heteromorphisms. In sum, there is substantial evidence to warrant the addition of a genetic hypothesis to the many theories which posit LD to be intrinsic to the child.

Information-Processing Deficits Theory

The theory of information-processing deficits is a cognitive theory with the computer as an analogy. Sternberg (1985) formulated a triarchic theory of human intelligence, information processing and specific learning disabilities as a way to expand the existing componential-deficit approach. For Sternberg, there are several components and processes which may be intrinsically deficient and contributory to LD in the child. The lower-order components, if dysfunctional, can impair the efficiency of higher-order components. Lower-order components address concrete data in the learning of new information or knowledge acquisition. The three major lower-order components are selective encoding-deciphering relevant from nonrelevant data for a specific problem
solution; selective combination—assimilation and organization of selected information into a meaningful, useful cognitive structure; and selective comparison—the comparison process of the selected and organized new data with old information and antecedent cognitive structures. If there are deficiencies in any of these lower-order components, then the problem-solving may take longer or may not happen. Additionally, the higher-order components composed of sequences of executive mental operations may lack flexibility in differentially employing cognitive strategies on lower-order components with resultant problem failure or deficiency (Kolligian & Sternberg, 1987).

Another interface of learning-disability deficiency is in the process of automatization of information processing. Reading involves the encountering of novel and known information. Lower-level skills decode the known data, automatically leaving more attentional energy and mental resources for higher-level operations such as comprehension, reflection, and application. Failures in automatization require greater conscious energy and attention and may be associated with deficiency in sorting data to specific content domains for higher-level operations to process (Sternberg & Wagner, 1982).

Perfetti and Hogaboam (1978), Perfetti (1977), Perfetti, Finger, and Hogaboam (1978), Perfetti and Goldman (1976), and Perfetti and Hogaboam (1975) compared young, skilled readers with young, less-skilled readers and found three differences. First, less-skilled readers showed longer vocalization latencies to context-free printed words and pseudowords, while they do not differ from skilled readers in color and picture naming tasks. Second, less-skilled readers show slower lexical access (decision whether a word is a word or a nonword). This relates to their difficulties with encoding letter strings
rather than with a poor lexicon. Third, less-skilled readers are less efficient with phonological coding so essential to reading comprehension. Fourth, less-skilled readers also have difficulty with the complexity of the reading comprehension process, which requires efficiency in integration of the semantic, syntactic and interpretive levels of the text.

*Limitations of the Perspective that Causes of LD are Intrinsic to the Child*

Comprehending LD is in some ways analogous to our efforts to understand outer space and the planets. More is unknown than known. There are multiple causal theories that, rather than being exclusive, are intertwined and inhibit clear definitions and agreement. The heterogeneity of the population is so wide-ranging and diverse that the processes implicated in this group resist being fully encompassed by any one view. Even the instruments and tools used for the measurement and evaluation of its nature are underdeveloped.

While we have some empirical evidence of the moon, Mars and other exploratory frontiers, we also have LD cases with measurable neurological impairment, pervasive developmental disorders, and other organic handicaps. Hagin, Beecher, and Silver (1982) report that approximately 19% of LD cases show neurological deviations on a neurological examination.

In 1982, Hagin et. al followed an initial group of 650 kindergartners through the end of first grade and despite mobility they ended with a working total of 494. This total group was screened for those vulnerable to LD and a cohort of 124 cases or 25% was found. After diagnostic workups, these 124 cases were distributed as follows: Specific language disability (83 cases, 67%); neurological deviations (23 cases, 19%); general
immaturity (3 cases, 2%); emotional problems (6 cases, 5%); hearing (2 cases, 2%); cultural factors (2 cases, 2%); and false positives, that is, students who learned well at the end of first grade (5 cases, 4%). The 23 cases with neurological deviations were examined neurologically for muscle tone, power, and synergy; gross and fine motor coordination; cranial nerve functioning; maintenance of posture and equilibrium; deep, superficial, and pathological reflexes. According to Hagin et. al. (1982), it is rare that findings for this group of children point to focal brain damage and seldom can specific causal factors be found in their histories.

Green (1989) misinterpreted Hagin et al.'s (1982) findings by reporting the neurological deviation group to be only 5% of the LD cases. In the actual study the 5% referred to the total group of 494 instead of the identified 124 LD cases.

Owen, Adams, Forrest, Stolz, and Fisher (1971) studied educationally handicapped youngsters (76) and their same-sexed sibling (76) with matched educationally successful youngsters (76) and their same-sexed siblings (76) to better define LD characteristics and causes. Of the 304 youngsters, 264 were examined neurologically with only four subjects (5% of the educationally handicapped youngsters) found to have definitive signs of neurologic abnormality. An alternative explanation for another source of the educationally handicapped is implied in Owen et al.'s, (1971) statement: "Moreover, the emotional climate was frequently more unfavorable for the EH [Educationally Handicapped] child within the total family constellation" (Owen et al., 1971, p.1).

Accuracy and Validity of LD Evaluations

The sophistication of LD assessment with instruments and evaluators in both
research and educational settings is somewhat lacking and further obscures the identification of substantive factors needed for a more valid, comprehensive definition.

In 408 studies, 1400 different diagnostic methods were used in identification of LD-child subjects. This included as many as 40 different IQ tests and 79 varying achievement tests (Keogh, 1982).

Under the current legal definition of LD, the accuracy of the classification process is suspect. DeMeritt (1995) argued that children are overclassified in the suburbs as compared to the inner cities largely because of great parental, school staff, and private clinician pressures to get special services, school systemic pressures, and the failure of child study teams, among others, to create learning-environment change in the basic school system. In the inner cities there are relatively higher incidences of babies born addicted to drugs, infected with HIV, and fetal-alcohol-syndrome. Furthermore, there are more low-birthweight babies, teenaged, and unmarried mothers, poorer prenatal care, unemployment, and poverty. While these factors are considered to increase the vulnerability for LD, the big city school systems are classifying eight to ten percent of their students as handicapped. By comparison, the suburbs with far greater income, educational levels, stimulation and resources are nonetheless classifying between ten to twenty-five percent of the students as handicapped (NJ Department of Education, 1993).

Ecosystemic Cultural Influences

It is important to recognize cultural values as an essential part of the child’s ecosystem, although they were not specifically studied in this research. However, 45% of the LD families in this study were Hispanic, and 30% were African-American. A lack of understanding of differences in cultural values creates the potential for conflict and
misunderstanding by the school and child study team ecosystem. Values, like politics and socioeconomic districts, also vary, particularly the value placed on achievement by different cultures. For example, the concept of family is central to the Hispanic value system with the needs of the individual secondary to those of the family. Family reputation, obedience, and respect for authority are primary values. Close ties among families within traditional communities mean that identification with family is extended to identification with the community itself. Mainstream US society takes a very different, constrained view of the family by emphasizing the separateness and importance of the individual self (Condon, Peters, & Suiero-Ross, 1979; Ramirez & Castaneda, 1974). In US schools, this means individual competition and academic achievement as means to social status are more important than group cooperation—the Hispanic priority. In sum, the underdeveloped assessments and their applications in research, clinical, and educational practice raise questions as to the accuracy and validity of purely intrinsically-based LD diagnosis.

Exclusionary Criteria in the LD Definition

As previously stated, the legal definition of LD is too narrow to service all those eligible. Kirk (1962) pointed out that, prior to passage of the Public Law (PL 94-142) learning disabilities were defined as a form of retardation, disorder, or developmental delay in speech, language, reading, spelling, writing, or arithmetic resulting from possible cerebral dysfunction and/or emotional or behavioral disturbance. After enactment of Public Law (PL 94-142), learning disabilities were redefined to exclude emotional and behavioral factors as causes. This change further entrenched the exclusive view of LD's source being confined within a child.
In reality, the diagnostic differentiation between LD with a neurological basis and emotional disorders is often extremely difficult, if not impossible. Most of the psychiatric disorders on Axis I of the DSM-IV such as Attention Deficit Hyperactivity Disorder, Oppositional Defiant Disorder, Conduct Disorder, Disruptive Behavior Disorder NOS also are characterized by school underachievement.

Professionals and parents have reacted to this exclusionary criteria by modifying the definition of LD in the National Joint Committee on Learning Disabilities (NJCLD) to acknowledge other factors as co-occurring. They view learning disabilities as "a generic term that refers to a heterogeneous group of disorders manifested by significant difficulties in the acquisition and use of listening, speaking, reading, writing, or mathematical abilities." "They are presumed to be due to central nervous system dysfunction" (in Kavanaugh & Truss, 1988, pp. 550). While emotional difficulties, social skills impairment, socioenvironmental influences [family], and ADHD are included among factors that can occur concomitantly with a learning disability, it is clearly stated that the learning disability is not a direct result of these factors (in Kavanaugh & Truss, 1988, pp. 541-542).

In addition to the emotional-disturbance exclusion, the legal definition precludes learning problems which are primarily the result of environmental, cultural, or economic disadvantage. Many children who are economically deprived have been understimulated and have had inadequate schooling. Because of the underdevelopment of assessment, it is very difficult to differentiate reliably between LD with a presumed neurological basis and underachievement attributable to deprivation.

It would appear that the growing field of LD is too large and unknown, as yet, to
be accurately defined by the prevailing legal definition and the intrinsically-based theories alone. Torgesen (1975), a leading information-processing theorist, has reservations. In contrast to more traditional notions of LD as strictly a matter of cognitive ability or component deficits or as a difference between actual classroom achievement and expected ability (Strawser & Weller, 1985), Sternberg (1984) has viewed such notions as insufficient in that they do not adequately reflect the complex etiology of the LD child's academic performance. He has a broader view, that not only considers the importance of the components, but examines them within the experiential, contextual, and motivational history of an individual. Intrinsic components are not experience-nor context-free. Motivational patterns of the LD child, family and school contexts, as well as community and culture systems, can have significant effects on intellectual behavior in school (Sternberg, 1984). Humphreys and Revelle (1984) have developed an information-processing model that underscores the effects of motivational and situational variables on efficient cognitive performance. Kolligian and Sternberg (1987) endorsed LD evaluations that assess not only componental deficient functioning but motivational and situational variables as well.

With so many definitional difficulties, the broad heterogeneity of the population, and the intertwining of information-processing, neurological, motivational, emotional, and socioeconomic components of LD, Green (1989) believed it premature to limit the source of LD to these factors. Instead, he advocated a multi-axial approach to definitional criteria as most appropriate. Except for cases of mental retardation, pervasive developmental disorders (e.g., autism), measurable neurological impairment, visual, hearing and other organic dysfunctions, he asserted that it is arbitrary to assume that the
causes of LD are purely intrinsic to a child. Hagin et al. (1982) suggested that no one definition can serve all purposes equally well and that different definitions for different purposes may emerge, preferably ones that are more operationally effective for clinician, remediater, and researcher. Hagin et al. (1982) believed efforts at one all-inclusive definition are futile. Using multiple definitions would permit researchers to construct models addressing sample heterogeneity with age-specific, developmental and ecological factors considered.

A Broader Conception of LD

The LD population is complex, heterogeneous, and probably best conceptualized on a continuum. Of five LD groups (n = 76), only 42% could be placed in one defined group without overlapping the other four groups (Owen et al., 1971). There are those types that are exclusively biologically caused such as in the case of perinatal anoxia. These cases respond very little to environmental factors. Then there are those types that appear more socially determined such as the comorbid problems of ADHD and PTSD with attention and stimulus-discrimination difficulties found in traumatized (sexually-abused) children (Putnam, 1995). Between these extremes lies the majority of the LD population. This middle range of LD cases consists of various perceptual styles, memory capacities, attentional patterns and differing temperaments (Sheeber & Johnson, 1992). Their adaptive responsiveness depends on the limitations of their genetic predispositions and on the interactional environment in which they exist. Their outcome is conditionally relative. According to the ecosystemic model (Green, 1990), an LD child may have certain genetic vulnerabilities that remain dormant while living in a particular learning and living environment or ecology. In another, different environment the genetic
vulnerabilities might manifest as problems that could deteriorate, improve or remain stable, depending on the available buffers or protective factors. Which direction the symptoms take—deteriorization, improvement or stabilization for the middle range or majority of LD cases—is not just a question of whether there are intrinsically-based vulnerabilities, but rather the result of the whole ecology that surrounds the child, of which his physical brain is only a part (Green, 1990).

Unidimensional and Multidimensional LD Child and Family Research

The literature on handicapped children and their families reflects both the family therapy perspective that LD is systemic and interactional (Bailey & Simeonsson, 1984; Baker, 1984; Fish, & Jain, 1985; Powers, 1991) and the field-of-learning-disability's view that LD is an intraindividual deficit (Clements, 1966; Cruickshank, 1977; Orton, 1925; Strauss & Lehtinen, 1947). Much of the literature on the intraindividual deficit approach is founded on conceptualizing a child as the recipient of the mother's caregiving and environmental demands, good or bad, as if the child were a passive organism unable to effect change in the mother or environment (Lewis & Rosenblum, 1974). In contrast, the interactional model is based on describing the child's effect on parents and family and their effects upon the child as part of a complex system of interdependence and reciprocity (Bell, R., 1968, 1974; Bell, S., 1971).

In a frequently cited study, Friedrich and Friedrich (1981) found that 34 parents of handicapped children show more stress, less well-being, a less satisfactory marriage, less social support, and less religiosity than a control sample of nonhandicapped parents that were matched on age of child, family income, age of mother and family size, using five assessment instruments with acceptable reliabilities. The researcher with this
unidirectional view conceptualized the family as a passive victim of accumulated stress that becomes unmanageable and is expressed in symptoms. The conclusion of this study is limited by a lack of conceptual understanding and measurement of coping. In contrast, considerable literature indicates that many families with a handicapped child adapt well without symptoms (Harris & McHale, 1989; Kazak, 1989; Kazak & Marvin, 1984). Clearly, it is self-evident as well as adequately documented that families with a handicapped child experience greater caretaking demands and consequent stress than comparable nonhandicapped parents (e.g., Blacher, 1984; Crinic, Friedrich, & Greenberg, 1983; Gallagher & Vietze, 1986). These inconsistencies in the literature appear to be attributable to inadequate controls, methods, instruments, and samples (Crinic et al., 1983; Morgan, 1988; Stonemann, 1989). Much of the literature on families with a LD child represents a failure to consider influential variables that could impact on the differences in family management of stress. Those studies take a reductionistic approach by omitting assessments of families on multiple levels of analysis. This conclusion points to the limitations of unidimensional LD family research on adaptation to stress and supports a multidimensional approach (Lazarus & Folkman, 1984; Frey, Greenberg, & Fewell, 1989).

One such multidimensional study was done to examine how child characteristics, social networks, parent belief systems and coping styles relate to parental outcomes among 48 families of handicapped children (Frey et al., 1989). To capture variability in parental coping, both multiple resources and multiple outcomes were examined. In a cross-sectional, multiple-regression design with self-report data the predictor variables were assessed on the following instruments: child characteristics (Vineland Adaptive
Behavior Scale); child's sex (gender); social network (Family Support Scale); beliefs (Comparative Appraisals Scale), self-ratings of coping efficacy, ratings of spouse's coping efficacy, belief in personal control; and ways of coping (checklist). The parental outcome variables were assessed by the following instruments: Parenting Stress (daily parenting hassles); child characteristics (Questionnaire on Resources and Stress - Friedrich Edition); parent problems, pessimism; and family adjustment (Family Relationship Inventory); overall marital happiness (Marital Adjustment Scale); harmony and concordance (Home Quality Rating Scale); and psychological distress (Brief Symptom Inventory). The findings showed that child characteristics predicted mothers' and fathers' parenting stress and fathers' psychological distress. Parental belief systems predicted all three-parent outcomes (parenting stress, family adjustment, and psychological distress) for mothers and fathers. Ways of coping predicted psychological distress and fathers' family adjustment. Social network predicted family adjustment and fathers' psychological distress. Mothers who had either a positive belief system or a noncritical family network had low psychological distress. The findings support the value of a multidimensional study of family characteristics in managing the stress impact of a child's handicap.

*Characteristics, Stressors, Adaptation, and Imbalances of LD Children*

This section will examine studies of characteristics of handicapped children, studies that relate to stress that can imbalance a family's adjustment, studies on adaptation of families with a LD-child, and studies of characteristics of handicapped families with a focus on factors that can potentially impact on the family learning environment.
Characteristics of Handicapped Children

In the literature a number of studies can be faulted for using nonequivalent groups or no control groups. This leaves much uncertainty about the clear differences between children with and without disabilities (Dyson, 1991). In a well-designed study to better define the characteristics of academically handicapped young children and to clarify causes of LD, Owen et al. (1971) matched 76 educationally handicapped (EH) children, including both parents and a same-sexed sibling (i.e., a quartet) with 76 academically successful children and their parents and same-sexed sibling. The matching was done on educational, psychological, and medical variables. Socioeconomically, both LD and control groups came from a privileged suburban university community. The parents of both groups were contrasted on their adult reading abilities, their high school transcripts, and their perceptions and attitudes toward their children. The major findings of the study were:

1. EH vs. controls: (a) The Wechsler Intelligence Scale for Children Performance (WISC) IQ was significantly higher than the Verbal IQ; (b) the WISC picture completion test was significantly higher; and (c) the IQ and reading and spelling achievement were less highly correlated. The EH perceived their errors on the BGT as accurately as controls.

2. EH and their siblings (familial incidence): (a) On the WISC, the subtests of arithmetic, digit span, and coding were significantly impaired; (b) both were significantly poorer in school behavior and adjustment; (c) both had significantly poorer handwriting skills; (d) both had significantly impaired ability to reproduce designs on the BGT; (e) both had inferior drawings of a man on Draw-a-Man Test; (f) both were less able to
order, sequence, and recall auditory tapped patterns; (g) both were impaired in the ability to discriminate a double simultaneous tactile stimulation; (h) both were significantly poorer in right-left discrimination; (i) both had a significantly higher frequency of speech and language disorders.

3. Parents (familial incidence): (a) EH mothers and fathers had significantly lower grades in high school English courses; (b) EH fathers had significantly lower WRAT scores; and (c) EH mothers had significantly lower high-school math grades.

D. Parents perceptions and attitudes compared to controls: (a) EH parents perceived EH children's behavior as less acceptable and more disturbed on all 13 specific characteristics; (b) perceived EH children as different from siblings on 8 of 13 characteristics; (c) EH parents perceived EH children's relative inadequacy in language skills, academic motivation, and stronger insecurity feelings; (d) EH mothers of EH children perceived them as more impulsive and unable to structure their environment; (e) both EH parents rated themselves as expressing less affection toward the EH child than his sibling; (f). both EH parents put more pressure on the EH child than his sibling; and (g) EH children lived in a family environment that tended to be less-well-organized and less emotionally stable than controls.

5. Other findings on EH children: A relatively high-IQ group of children did poorly academically with superior mental abilities. They did not have physiological-organic nor speech or language impairments. The LD was speculatively attributed to personality maladjustments.

Social skills are another area of significant difference between a nonhandicapped and a LD child. In a meta-analysis of studies on social skills of LD children, Kavale and
Forness (1996) found that about 75% of LD children show social-skill deficits compared to nonhandicapped. The social-skill deficits span many dimensions of social competence and were obtained by a range of raters (self, teachers, peers). These deficits are best viewed as part of the general LD syndrome, according to the researchers.

The manifestation of social-skill deficits occur in both withdrawal and acting-out conduct (Quay, 1979). The LD child tends to experience more anxiety, withdrawal, depression, and low self-esteem than nonhandicapped peers (Cullinan, Epstein, & Bursack, 1981). Among adolescents, depression is more frequent than for younger children. Conversely, attentional problems are more predominant for younger children and seem to lessen with age (Maag & Behrens, 1989). However, a strong predictor of social and academic success for LD boys was the quality of family functioning (Hartzell & Compton, 1984). When making joint decisions, families of LD boys with reading problems are less effective communicators than families with normally achieving boys (Peck & Stackhouse, 1973).

Since an LD child experiences more anxiety, withdrawal, depression, low self-esteem, is less skillful in gaining emotional support from peers, and comes from a family that provides more pressure, less structure, organization, effective communication, and affection, then the likelihood may be high that the LD child experiences family life (Owen et al., 1971) and the ecology very differently than others. In a culture that values the individual and achievement over the group, being an LD child can be an unenviable, minority identity.

In summary, some of the potential identification characteristics of the young LD child are impaired design reproduction on the BGT, inferior drawings on the Draw-a-
Man Test, WISC PIQ 15 points higher than VIQ, higher Picture Completion Test, lower Arithmetic, Digit Span, and Coding Test, poor handwriting skills, poor right-left discrimination, difficulty in speech and language, poor school behavior and adjustment expressed as withdrawal or acting-out, greater experience of anxiety, depression, low self-esteem, attentional difficulties, social deficits within a wide-range of competency, and living in a family with less effective communicators.

**Stress, Adaptation, LD Families and Research Limitations**

This body of literature is subject to certain research limitations. Stress is an important factor because a family's capacity to accommodate to stress and to avert potential crises is an excellent indicator of family resilience or health (Steinhauer, Santa-Barbara & Skinner, 1984). Stress is greater in handicapped families. The imbalancing of its resources and buffers can create a family learning environment vulnerable to decreasing developmental growth. The success in management of the increased stress of these families depends on many variables that are often not considered or controlled for in the research. For example, the grieving process for the family of a handicapped child varies with the handicap. For many handicaps the stages of coping are akin to the process of grieving the death of someone close in which distinct stages toward acceptance occur (Blacher, 1984; Parks, 1977). Yet, it is different in families with a mentally retarded child. They experience periods of stress and sadness over a long, indefinite time (Wikler, Wasow & Hatfield, 1981). Kazack (1989) found that the type of disorder has a significant impact on family adaptation and demonstrates that handicapped families have a very broad range of functioning. These and other previously documented obstacles have interfered with the building of a consistent and coherent body of LD research with
families and children.

**Overview of Family Stressors**

McCubbin, Cauble, and Patterson (1982), in their edited book have given one of the most comprehensive descriptions of the stressors and hardships that families of children with handicaps experience. While they specifically studied families with cerebral-palsied children, the failure to manage some or all of these stressors can provide a hypothetical image of a negative family learning environment. These stressors of family life are summarized in eight broad categories. First are financial pressures that stem from medical consultations, medications, hospitalizations, special treatment, equipment, and programming. Second is the likelihood of strained emotional relationships in the family (Cantwell & Baker, 1984), such as overprotection, rejection, insufficient time for other family members, child scapegoating, blaming the parent with the genetic potential, and generalized increase in family conflict and tension. Trouble in managing family relationships (Friedrich & Friedrich, 1981) can trigger marital disharmony and breakdown (Gath, 1977). Third are the sacrifices and changes affecting family life because of increased parenting time and energy demands. These modifications may mean less leisure time and activities, inability to pursue a career, frequent medical travel, the consequence of less parenting for other family members, and demands upon them to share caretaking responsibilities. This disproportionate parenting can lead to family disorganization. Fourth are the stressors from the family's social life. Social rejection or negative behavior from neighbors or friends, family member embarrassment over the child's appearance or acts, fear of accidents, and limited mobility can all contribute to family social isolation (Seligman & Darling, 1989). Fifth are the constraints of time from
the extra demands of daily treatment or therapy, special diets, and extra appointments.

The sixth and seventh categories concern the family's contacts with hospitals, physicians and schooling, i.e., child study teams, special handicapped schools. Lastly, are the stressors that can come from the parental grieving process. Because the child's life has restricted opportunities and the youngster may experience an early death, the psychological hardships can be difficult (Wikler et al., 1981). These eight groups of stressors are potential imbalancing triggers that create a negative learning environment.

**Stress and Family Adaptation**

In a study of family adaptation to young children with developmental delays, Bernheimer, Gallimore, and Kaufman (1993) supplemented child assessment data with semistructured family interviews (n = 102) as urged by Part H of The Individuals with Disabilities Education Act of 1991 (IDEA). What emerged was evidence regarding family experiences of a child's limitations and the impact limitations have upon daily routine. Four different groups were studied based on (a) a family's perception of the child's problem e.g., medical, behavior, mild delay, moderately to severely delayed, and (b) a family's perception of the impact of the child upon the family's routine, e.g., high impact, low impact. The 102 families were then rated for amount of accommodation activity on 10 domains related to a child's delay (e.g., low, moderate, high). The four groups were then compared on the different domains of accommodation. The mean Chronological Age (CA) was 41.8 months, and the mean Gesell Developmental Quotient (DQ) was 72. The families were mostly middle-class, married, in their thirties and their socioeconomic status was normally distributed based on education and income using the Hollingshead Four-Factor Index of Social Status (Hollingshead, 1975).
Contrary to expectations, there was no relationship between family income or socioeconomic status and accommodation. Child impact on the family could not be predicted from the child developmental test scores. The greatest amount of accommodation or adaptation came from the high medical and high behavior groups. These findings supported the advantages of supplementing child test scores with parent perceptions and suggested that severe or moderate delays are not as important drivers of family response as are delays that are associated with serious medical or behavior difficulties. One weakness of the study lies in the ability to replicate the construction of the four types of groups. The types of groups that emerged were related to the particular composition of the 102 families selected and interviewed. Independent blind case analysis would not have the same extensive case knowledge from the field workers and might have arrived at different types of groups. While the method appears idiosyncratically favorable to identifying factors often missed and toward practical application, the generalization of the findings is limited.

Because of the aforementioned problems such as the broad range of family functioning, sample heterogeneity, poorly defined samples, lack of controls, inadequate measures and inappropriate measures, the contradictory findings in studies have given rise toward specific identification of variables associated with family adaptation. Some of those predictors are marital satisfaction (Friedrich & Friedrich, 1981), harmony and quality of parenting (Nihira, Meyers, & Mink, 1980), the availability of both parents at home, (Beckman, 1983), and the acceptance and understanding of the handicapping condition (Darling, 1979).

Studies on coping strategies and adaptation have shown that active problem-
solving approaches such as information seeking and use of professional support services are positively related to adaptation, while higher levels of stress are related to avoidance and wishful thinking strategies as well as blaming oneself for the handicap (Darling, 1979; Frey et al., 1989). In most studies on the effects of the social network on the adaptation to stress, the findings are positive (Dunst, Trivette & Cross, 1986; Frey et al., 1989; Intagliata & Doyle, 1984; Schilling, Gilchrist, & Schinke, 1984; Unger & Powell, 1980).

*Characteristics of Families with a Handicapped Child*

The studies on handicapped families are heterogeneous. The diversity extends to the differences between handicapped and nonhandicapped families as a product of increased stress, severity of a child's handicap, type of handicap, the family's developmental stage, resources, size, cognitive appraisals, interactions, structure, socioeconomic status, as well as additional factors.

The most stressful time for a family with a handicapped child is at birth when their expectations and fantasies for the future with their new child must be grieved and readjusted (Featherstone, 1980). The adjustment to this major crisis involves a family-integrated approach rather than a child-centered one as it reactivates previous unresolved issues. There are similarities to the bereavement process in regard to family members lost through death. Consequently, those counseling approaches are relevant for working through the pain to gradual adjustment. Stewart and Pollack (1991) asserted, "Indeed, we are inclined to believe that the risks of actual and latent rejection, over-involvement or family dysfunction as described in the literature are greatly increased if the overall needs of the family in crises are not met" (p.249). The risks for the family of a handicapped
child of becoming ecosystemically vulnerable to a negative learning environment.
therefore, can begin as early as the birth. While the healing process through the denial
and pain can take up to three years or longer for the mother, it is unknown how long the
process takes for fathers. The coping patterns of fathers reflect a greater overall
distancing. While fathers are supportive of their wives, they are avoidant of expressing
feelings (Stewart & Pollack, 1991).

The degree to which parents are affected at this time is influenced not only by the
severity, but also the clarity, of the disability's existence. That is, if the child is born with
an obvious birth defect such as Down's syndrome, the parents can immediately process
the event with a smoother overall parental adjustment. When the disability is not obvious
or is ambiguous until two or five years later, when educationally classified as
handicapped, the established expectations are much harder to change (Waterman, 1982).

A low level of family acceptance or denial of the disability interferes with
adaptation through early treatment and implementing a program intervention. This
degree of acceptance has been a family factor associated with academic progress in
children with learning disabilities (Switzer, 1990). The interaction of low acceptance
could contribute to a reciprocally negative family learning environment. A related factor
is the role the disabled child is given from the family members' collaborative perceptions.
Often a disabled child is given the role of "pet" or scapegoat, and that role can serve to
sustain family denial. Roles that diminish maturity and achievement expectations are
commonly observed in disabled children (Switzer, 1990). Roles in healthy family systems
seem to encourage growth and the development of a disabled child, while roles in
dysfunctional families are resistant to change, act to ward off disruption in a family, and
limit the development of a child (Rollins, Lord, Walsh and Weil, 1973).

Following the birth of a handicapped child, Harris and Powers (1984) have described four major stages of the family life cycle for families of a developmentally disabled child. These are preschool, school age, adolescence, and adulthood. The most stressful of the four are preschool and adolescence. In the preschool stage, the transition to school, the increased socialization and cognitive demands, and the clarification of ambiguity about the handicap occurs. Each transitional period exacts a greater stress toll on the family. These increased demands to adapt to change are often greater because of the lessened capabilities of the handicapped child and the acting-out that may accompany the adjustment efforts. The point where "at-risk" becomes "handicapped" occurs at age five when the child study team reassesses for classification as handicapped. This juncture is significant to the stress, the bereavement process and the adaptation of the family. It is an optimum period for family intervention to foster a positive family learning environment.

The differences between families with a handicapped child and those with a nonhandicapped child vary considerably, from a great deal to little. The severity of the handicap generally induces greater family stress, although the harshness and the type of classification can impact differently on a family (Breslau, 1982; Featherstone, 1980; Gallagher & Vietze, 1986; Harris, Handelman, & Palmer, 1985; Lobato, 1983, 1990; Wayman, Lynch, & Hanson, 1991). While all the families are at-risk because of the increased stress generated by having a severely handicapped or potentially handicapped family member, the emotional reactions differ only in degree when compared to those families without a handicapped child. That is, what they are feeling is within the normal
range, but the emotions become exacerbated as a result of their handicapped child. There is no evidence that those parents of children with severe developmental disabilities suffer more frequently from serious psychiatric illness (DeMyer, 1979).

Studies of families with a specific educational classification such as Perceptually Impaired are rare or nonexistent. There is more available research on the more severe handicaps and their families such as Down’s syndrome and Autism. The loss or major crisis when the handicap is diagnosed generates a reaction different from normal grief. Instead of progressive stages of denial, anger, depression and resolution over six months to a year, parents report periodic, significant bouts of sadness that are repetitive and longlasting (Wikler et al., 1981). Mothers appear more affected than fathers, for they more frequently experience physical and psychological stress, guilt, and sadness (DeMyer, 1979; Featherstone, 1980; Gath, 1977). While fathers acknowledge feeling guilt and depression, they express more concern for the emotional reactions of their spouses (DeMyer, 1979). The impact upon parents with autism is often different than parents with Down’s syndrome. Parents of autistic children appear to experience more stress and feelings of incompetence (Cummings, 1976; DeMyer, 1979; Gath, 1977).

Although, in general, ratings of marital satisfaction do not differ from those parents without a developmentally disabled child, parents of children with severe handicaps often have sexual difficulties because of the mother’s fatigue and concerns about having another disabled child (DeMeyer, 1979).

The impact affects not only the parents but other children in the family as well. Some researchers have reported parents as describing the siblings as especially helpful. Other research indicates that siblings note feelings of jealousy (DeMeyer, 1979; Harris,
1983) and anger and embarrassment (Featherstone, 1980). Sisters seem more affected than brothers by a sibling with a severe handicap (Cleveland & Miller, 1977). More recent research concludes that gender and birth order may have an interactional impact in that older sisters and younger brothers are most affected (Breslau, 1982). All too often the finding is that siblings avoid dealing with their feelings about their handicapped family members (Featherstone, 1980). Parents may perceive this silence as acceptance and not address the feelings, or fear approaching the sibling in the event they may express feelings they themselves have not resolved or are unready to confront. These simmering unsettled feelings can serve to reciprocally amplify a negative family learning environment for LD.

The boundaries of the family with a severely disabled child are vulnerable to becoming diffused and ill-defined with unclear roles and interactions reflecting excess enmeshment or disengagement. The handicapped child may not fit compatibly within the sibling subsystem (Harris, 1983). Other siblings may view themselves as half-parent and half-sibling as they are urged to take on caretaking to relieve the overburdened mother. This parentification may deprive the healthy sibling of socialization experiences needed for their normal development (Minuchin, 1974).

Parents and grandparents can also get caught up in boundary problems with a severely handicapped child (Featherstone, 1980; Harris & Powers, 1984). The increased need for supervision and attention, the higher strain on the marital relationship, as well as the underlying guilt feelings for birthing a damaged child may all lead to an overinvolved and enmeshed parent-child relationship with parent-child boundaries crossed. A disengaged relationship could develop from a child with high aggression or proneness to
self-injury or absence of affective response. This confounding of boundaries between parents and handicapped child can disrupt the boundaries with the nondisabled offspring, potentially amplifying the negative family learning environment associated with LD. The management problems with a severely handicapped child and the stigma of being different may prevent the family from partaking in community and public activities (Featherstone, 1980; Holroyd & McArthur, 1976). This boundary rigidity may lead to formation of an identity as a family with a handicapped member.

The reports on the educational and occupational achievements of LD children have been inconsistent. Favorable reports come from students with high socioeconomic backgrounds. O'Connor and Spreen (1988) conducted a follow-up study on a previous longitudinal study (Spreen, 1981) to determine the extent of influence of parental socioeconomic status (SES) upon the educational and occupational outcomes of their LD children. Their findings indicated that fathers' SES was a major factor in their children's educational and occupational outcomes but also affected intelligence and degree of neurological impairment. The researchers suggested that previous inconsistencies between studies may have been the result of uncontrolled SES and argued for greater control of this variable.

Mother/child parenting styles can also impact upon a child's development. While studying preschoolers who were not handicapped, Baumrind (1967), in a classic, often-cited study, demonstrated the influence of parenting approaches upon preschoolers' behavior. Of three groups of young children, the group that displayed self-reliant, self-controlled, approach-oriented buoyant behaviors were parented with an authoritative approach. This method was characterized by firmness, lovingness, demandingness, and
understanding. In contrast, children who were dysphoric and disaffiliated had parents who were firm, punitive, and unaffectionate (authoritarian). The third comparison group of children were immature and dependent. Their parents employed a permissive strategy. These mothers lacked control and were moderately loving while the fathers were ambivalent and lax. The parenting approaches of authoritarian and permissive can also be risk factors for creating a negative learning environment.

Little empirical work has been done on the interactions of families with a LD child. Amerikaner and Omizo (1984) explored whether there were interactional differences between three types of families with children: LD (n = 30), (ED) emotionally disturbed, (n = 30); and (N) normal (n = 30). Both parents (n = 180), predominantly white and middle-class, completed The Family Adaptability and Cohesion Evaluation Scales (FACES) (Olsen, Bell, & Portner, 1978). The results indicated that LD family interaction is significantly different from normal families, and quite similar to families with an ED-child, with a few minor exceptions. Reportedly, the FACES instrument does not have sufficient content validity to specify, clearly, the nature of the interaction difficulties. Subsequent research has challenged the theoretical validity of this instrument, particularly on the dimension of adaptability (Lec, 1988). Lee points out that the test questions on this dimension contribute to both linear and curvilinear relationships, rather than to only curvilinear relationships. Since Olsen, Russell, and Sprenkle (1979), in their Circumplex model, posits a curvilinear relationship for adaptability and cohesion in effective functioning families, a measurement conflict is created. This conflict results in inaccurate assessment of the chaotic levels of family function which are most critical to the findings of Amerikaner and Omizo’s 1984 study.
In summary, those factors with the potential for putting families at-risk are LD children with high medical needs and those with high acting-out behavior, severity of handicap, marital disharmony, poor parenting, unavailability of both parents, misunderstanding and nonacceptance of the LD, ineffective coping strategies, an unsupportive social network, grief over LD, handicapped family's stage of development, less organized and emotionally stable family structure, family interaction roles that discourage achievement and maturity (e.g., scapegoat, "pet"), and lower socioeconomic status.

Several family interaction studies were done with the families of young LD children to determine differences in comparison to normal controls. Cowen and Corey, (1985) and Cohen and Mok, (1986) studied 41 preschoolers, 2 to 5 years old, with a diagnosis of Cystic Fibrosis and a normal control sample. Parents of both groups were administered the FAM (Family Assessment Measure) general scale (Steinhauer & Santa-Barbara, 1984). Both groups of families were found to function well with no significant differences. There was a pattern of elevated scores on the defensiveness and social desirability scales (indication of a response bias toward those constructs) that was interpreted as an important coping strategy which helped parents to master long-term stress.

Trute and Hauch (1988) studied the families of three-year-old developmentally delayed children with 44% multiply handicapped, 33% Down's syndrome, and 20% severely disabled. The parents, 36 mothers and 27 fathers, were administered the FAM general scale. The mean scores of these families were not elevated beyond the FAM norms for adequate family functioning. There are two weaknesses to this study. First, there is no normal control, and, second, all of the parents sampled were selected from
family files based on their successful adaptation to the birth of their handicapped child. Therefore, the mean values of adequate functioning reported could underestimate the difficulty families with developmentally delayed children experience overall.

Trute (1990) sampled 88 families with developmentally delayed children by taking a cross-sectional random sample of both parents on the FAM-III (revised version). The findings indicated that families were functioning comparably to norms for the FAM-III of families without disabled children.

Reddon, McDonald, and Kyselea (1992) studied 16 families with children, aged 2-5 years-old, with severe mental retardation on the FAM general scale. They found the mean scores fell within the range of healthy family functioning. In addition, they reported that the severity of life events and changes was associated with poorer family functioning. The greater the resources and emotional support, the greater was the level of family functioning.

While all of the above delineated factors in young LD children and their families have the potential for creating a negative learning environment, it has not been empirically established whether there is a relationship between a negative family learning environment and a decrease of developmental progress in young LD children over time. Similarly, several studies conclude there are no differences between LD and non-LD families on healthy functioning, but their credibility suffers from design weaknesses (Cohen & Corey, 1985; Cohen & Mok, 1986; Trute & Hauch, 1988; Trute, 1990; and Reddon, 1989). It is Owen et al.’s (1971) study that comes closest to demonstrating lowered developmental progress in young LD children with families that are characterized by an underorganized structure and an interaction that is emotionally
unstable. However, his cross-sectional research design does not account for family interactional effects over time, and his assessment of the parents and family were with unstandardized structured and unstructured interviews. Subsequent to Owen's work, research has identified family structure and interaction variables that are characteristic of the LD child and family such as deviant communication, roles, problem solving, affective responsiveness, affective involvement, and behavior control (Blacher, 1984; Breslau, 1982; Cantwell & Baker, 1984; Cleveland & Miller, 1977; Darling, 1979; DeMeyer, 1979; Featherstone, 1980; Frey et al. 1989; Friedrich & Friedrich, 1981; Harris, 1983; Harris & Powers, 1984; Holroyd & McArthur, 1976; Kazak, 1989; Minuchin, 1974; Rollins et al. 1973; Stewart & Pollock, 1991; Switzer, 1990; Waterman, 1982; Wiker et al. 1981). However, these studies did not examine the effects of family structure and interaction variables on the achievement of the LD child.
CHAPTER III

Methodology

This chapter describes the research design, the participants, the procedures, the methods, and the reliability and validity of the instruments used.

Research Design

This study utilizes a causal-comparative method with a nonequivalent control-group design (Borg and Gall, 1989). The family functioning levels in relationship to the LD first-graders’ cognitive, academic, adaptive and social functioning and their non-LD controls over time (four months) were examined. The independent variable is family learning environment (family functioning). The dependent variables are visual-motor, academic, adaptive, and social functioning. The family constructs of structure and interaction (problem solving, communication, roles, affective responsiveness, affective involvement, and behavior control), as documented in the literature review, were examined in the supplementary analysis.

Participant Recruitment and Selection

All participants came from three northeastern, public school districts. Each school district had differing demographics. The district with the smallest sample was a rural town. Three elementary schools and six teachers participated. The next in size was a small city district. Three schools and 11 teachers participated. The largest was an inner-city school district comprised of predominantly Black and Hispanic children and families with lower incomes. Here, nine schools and 23 teachers participated. All participants
including families and young children were enlisted on a voluntary basis. Teachers were asked to obtain consent from one parent and each student by having them sign the consent to participate forms (Appendix A). Each first-grade teacher telephoned parents, sent written reminders, and follow-up Consent To Participate letters, until the level of full voluntary participation was reached for each class. Each teacher and each family that participated in the study received a $25 dollar check for their involvement.

A power study to determine the number of subjects required for the research design to discriminate hypothesized differences indicated a necessity for a minimum total of 80 families and 80 children (Stevens, 1996). In this determination of the appropriate power for this study, Stevens suggested that sample size alone is insufficient. Rather, it is crucial to consider the ratio of sample size (N) to number of variables (P). For a two group MANOVA (or MANCOVA), Stevens recommended a minimum N/P ratio of 20:1. Incorporation of four different variables, which will include three from the Achenbach TRF and one from the FAD led to using a minimum sample size of 80 to preserve the 20:1 ratio (80/4).

The initial selection pool for the non-classified control group was comprised of approximately 605 families with a child ranging from age six to seven. Inclusion criteria for the non-LD first-graders required an absence of previous classification or noncategorical classification as Eligible for Preschool and no previous grade retention or pending referral to the child study team for learning problems. From this potential resource only 45 families and their non-classified first-grade children consented to participate and were included in the control group. And so as to maintain comparability of samples in both groups, a surplus allowance of five families and five children were
randomly selected for reserve to safeguard against discontinuation, dropout, or invalid assessments for the post-testing session. Of the five “extra” participants, one relocated, one family did not return the completed FAD despite agreements to do so, and the remaining three were randomly eliminated before any of the independent or dependent measures were scored. This procedure resulted in a non-LD control group of 40 first-graders and their 40 families.

For the families with a first-grade LD child, ranging in age from six to eight-years of age, the potential pool was approximately three hundred families. Inclusion criteria for the LD first-graders was classification by the child study team as Perceptually-Impaired or Neurologically Impaired. From this latent source, 48 families and their classified first-grade children consented. An allowance of eight families was made for discontinuation, invalid assessments for the post-testing session, and for equalization of the two matching IQ groups (non-LD children and LD children). One youngster was placed out-of-district in a residential school, three relocated, one assessment was invalid, and three children were randomly eliminated to match the two groups on IQ. This procedure resulted in a group of 40 LD first-graders and their 40 families. After pretesting, the measures of both LD and non-LD children were scored on the Draw-A-Man Test and were matched for intelligence before any of the other measures were scored. The two children groups, LD first-graders and non-LD first-graders, were matched for grade and intelligence.

Procedures

All children in the study were administered the Bender Gestalt Test (BGT), and the Harris Draw-A-Man Test at the beginning of the study and only the BGT four months later. The teachers also rated the children on the Achenbach Teacher Rating Form (TRF)
initially and then again four months later. The family was given The McMasters Family Assessment Device (FAD) only once.

Pretest

Pretesting was conducted in the beginning of October 1998 with the small urban and rural school districts to, allow the teachers several weeks time to familiarize themselves with their first-grader participants and develop an observational data base for increased rating validity on the TRF. The larger urban school district pretesting was executed in February and March 1999 because of a delay in administrative approval. All pre-and post-testing of the BGT and Draw-A-Man Test were done in unused school classrooms, cafeterias, and libraries with a trained psychologist experimenter. During most assessments this experimenter had a blind (no knowledge of the purpose or hypotheses of the study) assistant (teacher, aide, psychologist) to assist in structuring and monitoring the accuracy and completeness of task execution. The same experimenter instructed the teachers on the administration of the TRF and reviewed each finished TRF for accuracy and completeness.

The FAD was delivered home to the family with a standardized set of administration instructions, both in the English or Spanish language, as indicated by the teacher and home follow-up calls. Provision was made for assessment completion in the school with the researcher’s assistance, at the family’s home with the researcher’s assistance or consultation by telephone if desired. After satisfactory review of each completed FAD a check for $25 was either mailed or sent home to the family by the teacher. Most families chose to complete the form at home, approximately 15% telephoned for clarifications. All FAD’s were completed by mid June 1999.
Post-test

The post-testing on the first group of first-graders pre-tested in October, 1998 was completed in January 1999 on the BGT and TRF. The second group of first-graders pre-tested in February and March 1999 were post-tested in May and June 1999 on the BGT and TRF.

The BGT was group-administered (Koppitz, 1975) with nine, enlarged (four times) cards presented one at a time until all students were finished. Participant students copied each design on a number-coded blank sheet of 8x11" paper with a #2 pencil. Erasures and paper rotations were not recorded. Estimated average administration time was 30 minutes. The Draw-A-Man Test (Harris, 1963) was administered immediately afterward using the same type of paper and pencils. The administration task was concretized to "Draw a picture of a man, a whole man." Harris (1963) found that both genders obtained higher scores on the Draw-A-Man Test than on the Draw-A-Woman Test.

The scoring of the pre-and post-test BGT were done by two certified school psychologists (blind) from the same school district with extensive prior experience, 30 and nine years, respectively. For the Draw-A-Man Test only one psychologist (blind), with 15 years experience, scored all 93 Drawings. The scoring system developed by Koppitz was used for the BGT, and the Harris scoring system was used for the Draw-A-Man Test. The Draw-A-Man provides a standard score in IQ units comparable to the intelligence tests used for classifying the LD children.
Measures

The McMaster Family Assessment Device (FAD). The independent variable is the learning environment within the families of the classified and the nonclassified first-graders as expressed in the general functioning score (composite of the six other scales) on the (FAD). This measure assessed the social climate of the family and has been used extensively since its inception by Epstein et al. (1983). Accordingly, considerable research has been generated with families (Brown University Family Research Program, 1995). The seven scales are problem solving, communication, roles, affective responsiveness, affective involvement, behavior control, and general functioning. The general functioning scale correlates well with the other scales. There are 80 statements about families to which a family member responds by choosing strongly agree, agree, disagree, or strongly disagree in accordance with the perception of the family over the past two months. Raw scores were converted into standard scores with a cut-off score of 2.0 on the general functioning scale to distinguish healthy (positive learning environment) from non-healthy (negative learning environment) families with a diagnostic confidence level of .83.

The reliability of the FAD varies from .66 to .76. Test-retest of 45 non-clinical subjects was done after one week. The correlations were: problem solving (.66), communication (.72), roles (.75), affective responsiveness (.76), affective involvement (.67), behavior control (.73), and general functioning (.71). The concurrent validity with the FAD and the Family Unit Inventory (FUI) on a non-clinical sample of 45 subjects was found to be substantial. The FUI was developed from factor analytic principles. Two second-order factors, integration and coping, were correlated with the seven FAD scales.
The integration factor refers to a family that is considerate, committed, home-centered, close, and loyal with a strong emphasis on family cohesion and positive family relationships. The coping factor refers to the action orientation of the family adapting to its surrounding ecosystem, i.e., the community, to derive a sense of enjoyment and mastery. According to Miller, Epstein, Bishop, and Keitner (1985), most of the correlations with the FAD scales and the FUI integration factor were greater than .50, while the correlations for the FUI coping factor and the FAD scales were less than .50. The correlations for the FAD and FUI integration factor were: problem solving (.67), communication (.66), roles (.30), affective responsiveness (.61), affective involvement (.51), behavior control (.38), and general functioning (.75). For coping and the FAD scales the correlations were: problem solving (.39), communication (.53), roles (.34), affective responsiveness (.39), affective involvement (.27), behavior control (.40), and general functioning (.48).

According to Beavers and Hampson (1990), the concurrent validity correlations between the Self-Report Family Inventory and the FAD were very substantial. Particularly relevant for the validity of this research was the correlation of the FAD general functioning scale and the SFI health scale, a comparable measure of family health/pathology at .766 at the p < .01 level.

A study of the discriminative validity of the FAD was conducted comparing the family FAD scores with those of experienced family therapists’ clinical ratings on forty-two psychiatric and physically ill patients and their families. The families rated by the clinician as unhealthy on a dimension that equated the scales of the FAD had
significantly unhealthy scores on all of the FAD scales except behavior control \( (p = .12) \), adding further validity support for the FAD (Miller et al., 1985).

*Bender Gestalt Test.* The Bender Gestalt Test (BGT) is the first of the two measures used to assess the changes in cognitive developmental growth within the two groups of young children. The BGT tests the child directly. Specifically, it assessed the rates of visual-motor cognitive growth between the classified and non-classified children groups. The BGT or Visual Motor Gestalt Test was developed by Lauretta Bender (1946) for use in perceptual experiments and consists of nine test cards with abstract designs on them. The developmental scoring system and the emotional indicators were developed by Elisabeth Koppitz (1968). The task is simple and brief. The child copied each design with a pencil on one blank, numbered page in a booklet of 10-8x11" paper pages. There were a total of nine designs. The time for completion of all nine cards ranges from four to 14 minutes with average time approximately six minutes and 20 seconds.

Each BGT design was scored for distortion of shape, for rotation of the whole design or part of it, for perseveration of parts, and for failure to integrate the parts of the design on a scoring sheet (Appendix B). The total number of errors indicate the child’s developmental level. High total scores mean poor performance, and conversely, low scores mean a good performance. The BGT is, above all, a developmental test for children. It taps the cognitive domain of visual motor perception and visual motor integration. The developmental Bender Test scoring system has been standardized for ages 5 years 0 months to 10 years 11 months at six-month intervals. A new normative sample was conducted in 1974 with 975 elementary-school pupils, age five to 11.
Geographically, 15% came from the West, 2% from the South, and 83% from the Northeast. From this distribution, 86% were white, 8.5% were African-American, 4.5% were Mexican-American and Puerto Rican, and 1% were Asian. The children lived in rural areas (7%), in small towns (31%), in suburbs (36%), and in large metropolitan centers (26%). The child's developmental score can only be interpreted meaningfully when his chronological or mental age is taken into consideration. For example, a child with good visual motor perception may reproduce the designs with a minimal of errors for his chronological age. Months later, his performance on a second administration of the BGT will likely improve with less errors and more accuracy. The normed developmental scoring system will account for expected cognitive development and yield a score that will reflect his growth in visual motor perception. In the same way, a child with a learning disability in visual-motor perception will also achieve growth in cognitive developmental scores over the years.

Interscorer reliability for the developmental BGT is very high. Based on 23 studies over 10 years with 31 interscorer correlations, the correlations range from .79 to .99. Twenty-five of the studies, or 81% of the correlations, are at .89 or better.

The test-retest reliability for 193 kindergartners (5 years to 6 years old) on a group administration over 14 days was .83 (Caskey, 1973). A test-retest of 140 kindergartners on a group administration over five months yielded a reliability coefficient of .65 (Keogh and Smith, 1968). A test-retest of 24 kindergartners on a group administration over three months resulted in correlations of .81 and .75 (Ruckhaber, 1964). All of these correlations were significant at the .01 level or better. These and other studies of shorter and longer time intervals indicate reasonable stability and reliability. Koppitz (1975)
maintains that “Erratic, inconsistent progress on the Bender Test reflects a child’s unstable functioning and is not due to unreliability on the part of the BGT scoring system” p. 30.

Koppitz (1975) approaches the construct reliability of the BGT as a developmental measure indirectly. She describes the processes of the child as he or she copies the design from the stimulus card. First, there is visual seeing of the design (physical vision). Second, is the recognition and recall of the design parts (visual association) and third, their relationship in two dimension to one another (visual perception). Fourth, in order to copy the design on paper motorically (grapho-motor), the child has to organize and integrate his or her visual associations and visual perceptions with his or her grapho-motor ability and then execute, fifth, the copying process with pencil on paper. The motivational demands of the task (testing) and the projection of emotional components (large designs, extra paper) is yet a sixth process. Koppitz implies that these processes are maturational with normed rates of developmental progress tied to chronological age. A poor BGT record may be due to any one of the above processes, but is most frequently due to problems with perceptual-motor integration (Heinrich, 1968; Wedell & Horne, 1969).

The usefulness of the BGT lies, not only in its short time administration, but also in it’s nonverbal task requirement, ease of scoring, broad range of population applicability, and high test-subject interest. There are different scoring systems for different age ranges from young children to adults. The convergent validity of the Koppitz developmental scoring system correlates significantly with the frequently used Keogh and Smith (1961) system for evaluations of kindergarten and first-grade children.
The Pascal and Suttell (1951) scoring method is more complex and more widely-used with adult psychiatric patients. Kawaguchi (1970) found the Pascal and Suttell system better for older children (e.g. 12 and above). Both Koppitz, and Pascal and Suttell systems correlated significantly with test scores of the mentally retarded (Cellura & Butterfield, 1966). Elliott (1968) compared the Pascal and Suttell test scores and the Koppitz emotional indicators with a group of emotionally disturbed 11 and 14-year-old boys and a normal control group, and found the Koppitz system discriminated equally as well as the more complex and time demanding Pascal and Suttell system. Quast (1961) designed a scoring system to identify brain-injury in patients. Holroyd (1966) found a high correlation (.93) between the two systems.

*Achenbach Teacher Rating Form.* The Achenbach Teacher Rating Form (TRF) was the second measure of cognitive and social developmental growth (Achenbach, 1991). It is a multiaxial empirically based assessment by the child’s teacher. There is a separate score for academic performance, a score for adaptive functioning, and a total score for social problems based on teacher ratings. A five-point Likert scale was used for academic performance and a seven-point scale for adaptive behaviors which is reported in a standardized format. A three-point scale was used for the 120 items in the problems scale. The problems scale can be categorized further into eight subscales: withdrawn, somatic complaints, anxious/depressed, social problems, thought problems, attentional problems, delinquent behavior, and aggressive behavior.

The normative sample for the academic and adaptive functioning scales were based on 1613 TRF ratings of non-referred,”healthy”, five to 18-year-olds chosen to be
representative of forty-eight states with respect to socioeconomic status, ethnicity, region, and urban-suburban-rural residence.

The test-retest reliability of the three scales for the 15-day interval is good. The mean correlation for the adaptive scales was .90, while the mean correlation for the problem scale was .92. The test-retest reliability with 19 boys referred for emotional and behavioral problems over two months was a mean correlation of .75 and .66 for four months.

Teacher inter-rater agreement was similar for teachers seeing pupils under different conditions (mean $r = .55$ for academic and adaptive scores; $r = .54$ for problem scores.

The source of the content validity of the TRF is the Childhood Behavior Checklist (Achenbach, 1991) designed to assess competencies and problems that are concerns to parents and mental health workers. In comparing scores of 1300 children referred for mental health services with 1300 demographically similar non-referred children, the referred children scored significantly higher ($p < .005$), according to Achenbach and Edelbrock (1981). The majority of the TRF items were taken from the Childhood Behavior Checklist. To validate the TRF with referral for mental health or special education services, a comparison of scores of 1275 referred and nonreferred pupils, matched for ethnicity, sex, age and socioeconomic status was made. The referred pupils obtained significantly higher scores on nearly all the TRF problem items and lower scores on all the adaptive functioning items than the nonreferred pupils.

Construct validity can be found in the correlations of the TRF and the widely-used Conners Revised Teacher Rating Scale (Goyette, Conners, and Ulrich, 1978). The
correlations were strong overall. In the scales most similar, conduct problems, 
inattention-passivity, and total problem scores, the correlations ranged from .80 to .83. 
On less similar scales the correlations ranged from .63 to .71.

Criterion-related validity is supported by the ability of the TRF’s quantitative 
scale scores to discriminate between referred and nonreferred pupils with demographic 
effects partialed out (Achenbach and Edelbrock, 1981).

Of several procedures for discrimination between referred and nonreferred pupils, 
one of the most effective ways is to classify pupils as nondeviant if their academic, total 
adaptive, and total problem scores are all in the normal range and as deviant if all three 
scores are in the clinical range.

*Draw-A-Man Test.* The Draw-A-Man Test was used to directly assess the 
intellectual functioning of both the LD and non-LD groups of first-graders. It was 
administered only at the pre-testing on a greater sample (93) than required by the 
design’s power study (N = 80). The scores were used for matching the LD and non-LD 
children groups on intelligence to better control for subject heterogeneity and for the 
influence of intelligence upon the findings on the BGT and TRF measures of the two 
groups.

The use of Human Figure Drawings, like the Draw-A-Man Test, as a 
developmental measure with good standardization and validity has been well established 
by Goodenough in her book *Measurement of Intelligence by Drawings* (1926). Harris 
(1963) revised and extended Goodenough’s work and defines the Draw-A-Man Test as a 
measure of intellectual maturity that correlates substantially with tests of intelligence,
and relates to the ability to do abstract thinking. There are no stronger correlations with motor, perceptual, or performance-test abilities than with verbal or conceptual abilities.

The child's task was simple and enjoyable. On 8x11" blank paper, he or she was asked to draw a picture of a man, a whole man, but no cartoon or stick figures, with a #2 pencil. Time varied with the size of the group from two to five minutes. The Draw-A-Man Test can be administered individually or in groups with equal reliability. The drawing is then scored (Appendix C) for the number of developmental items from a validated norm of 73 (e.g. head, eyes, pupils, etc.). The greater the number of items, the higher the intellectual score relative to the child's chronological age. There are different norms for boys and girls. The child's points or raw score is then converted to a standard score with a mean of 100 and a standard deviation of 15 for comparability with other intelligence tests.

The question of reliability has been evaluated firstly, by scorer consistency of the drawing and secondly, the test-retest over 10 days by an examiner. A number of studies show the intercorrelations between different scorings range from the low .80's to as high as .96 with values commonly in the .90's (Goodenough, 1926).

Harris (1963) tested four groups of kindergarten children on each of 10 consecutive days and found no significant difference for total variance. There were differences between boys and girls and some individual children. This finding influenced Harris's revision to include separate norms for boys and girls on the Draw-A-Man and Draw-A-Woman Tests.

The validity of the Draw-A-Man Test has been established by ruling out the effects of special drawing training or experience and correlations with other tests of
intelligence. In addressing the effects of drawing or influence by the test administrator, Harris (1963) conducted a study in two schools with first and second graders and the Draw-A-Man Test. The Test was administered twice. The first time it was given, alternately by the examiner, and then the teacher (recognized for an outstanding art program). The second time it was given alternately first by the teacher, and then the examiner. This procedure was repeated in another school with the examiner and another outstanding art teacher. The correlations between first and second testings range from .60, .73, .80, .81, .86 to .85, indicating no trend of a systematic nature attributable to the outside examiner or familiar teacher. The study further supports Goodenough’s 1926 conclusion that children with art training show no consistent differences between children without art training in drawing the human figure. Harris (1963) compared 164 kindergarten children on the Draw-A-Man Test and the SRA Primary Mental Abilities Test (Group) and obtained a very modest correlation of .46 total score. Williams (1935) compared 100 children aged three to 15 on the Stanford-Binet and Draw-A-Person with an IQ correlation of .65 and a MA correlation of .80. McHugh (1945) compared the Stanford-Binet and the Draw-A-Man with 90 kindergartners and found a correlation of .41 (IQ rather than MA value). Ellis (1953) compared the Stanford-Binet and Draw-A-Man with 116 children aged four to nine years and obtained MA correlations ranging from .60, .69, .75, .78, .79, to .92.

Demographics. A description of the participants’ demographics was compiled from the FAD Family Information Form (Brown University Family Research Program, 1995). This information form requests data for the variables of number of persons living in the household, their education, marital status of heads of household (mother, father),
family income, ethnicity, and race. The child’s age, gender, and intelligence have been added in the compiled presentation. These variables determined the comparability of the two sampled groups on socioeconomic status, single vs. two parent family systems, and ethnicity.
CHAPTER IV

Results

Quantitative Analysis

Data from this study were analyzed by a variety of univariate (descriptive statistics, linear regression, t-tests, analysis of variance) and multivariate (analysis of covariance and multiple analysis of covariance) statistics where appropriate.

Demographic Results

The discontinuous demographic variables used in this study were gender, levels of family income, marital status, and race for each family group (LD vs. non-LD).

The variable of gender for the first-graders indicates there were 24 LD boys (60%) and 16 LD girls (40%) for a total of 40 participants. There were 11 non-LD boys (28%) and 29 girls (72%) for a total of 40 participants.

There was a substantial difference between LD and non-LD family income. Over 52% of the LD families reported income under $19,999. The median income of LD families was under $19,999. Of the non-LD families, over 52% reported income under $49,999. The median income of non-LD families was under $59,000.

Forty-two percent of fathers of LD students did not report their marital status data compared to 7.5% of fathers of non-LD students. It has been speculated that this unreported data may be related to some families receiving public assistance while having the father employed but “unofficially” living at home. The fathers of LD children had a
much lower reported incidence of being married only once (25%) compared to the fathers of the non-LD male marital status (70%).

There appears to be a much greater tendency for more complete case reporting of both LD and non-LD female marital status than for years married, father’s age, and father’s income reported in Table 1. Twenty-seven percent of non-LD families have single parent households compared to 62.5% of the LD families.

On the variable of ethnicity the percentage of non-Caucasian LD families (56%) versus the Caucasian percentage (35%) was substantially greater than the non-LD family percentages (combined non-Caucasian 37.5% versus Caucasian 55%). This distribution of ethnicity, education, and income suggest that the LD and non-LD family groups may not have been socioeconomiclly or ethnically equivalent.

Tables 1 and 2 both show that there are significant differences between the LD and non-LD children groups for age and mother’s education. This group inequality prevented a desired comparable matching on age. The difference in age is attributable to the tendency of schools to retain a youngster in kindergarten or first-grade before he or she is classified as learning disabled, thereby increasing the mean age of the LD first-grade group. Also unequal were mothers’ education levels with the higher education in the non-LD group.

Of importance, however, is the absence of statistical significance in Table 1 of the intelligence or IQ measure, indicating that both LD and non-LD first-grade groups were equivalent. This equality also serves as a control over the influence of intelligence upon the subjects’ performance on the BGT and TRF measures.
### Table I

**IQ and Demographics of LD Families and Non-LD Families**

<table>
<thead>
<tr>
<th></th>
<th>LD Families</th>
<th>Non-LD Families</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Child's Age</td>
<td>6.57</td>
<td>.63</td>
</tr>
<tr>
<td>Mother's Age</td>
<td>33.48</td>
<td>9.25</td>
</tr>
<tr>
<td>Mother's Educ.</td>
<td>11.50</td>
<td>2.91</td>
</tr>
<tr>
<td>No. in Household</td>
<td>4.76</td>
<td>1.39</td>
</tr>
<tr>
<td>Father's Age</td>
<td>36.58</td>
<td>7.02</td>
</tr>
<tr>
<td>Father's Educ.</td>
<td>12.78</td>
<td>2.19</td>
</tr>
<tr>
<td>Years Married</td>
<td>10.94</td>
<td>7.49</td>
</tr>
<tr>
<td>Child's IQ</td>
<td>91.90</td>
<td>10.89</td>
</tr>
</tbody>
</table>

*Note:* IQ is not a demographic. The results illustrate how the two groups are matched.
Table 2

Tests of LD Family and Non-LD Family Demographics Effects

<table>
<thead>
<tr>
<th>Variable</th>
<th>MANOVA</th>
<th>Mean Square</th>
<th>df</th>
<th>Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child's Age</td>
<td>F= 5.30</td>
<td>.67</td>
<td>41</td>
<td>p&lt;.03</td>
</tr>
<tr>
<td>Mother's Age</td>
<td>F= .03</td>
<td>2.58</td>
<td>41</td>
<td>p&lt;.86</td>
</tr>
<tr>
<td>Mother's Educ.</td>
<td>F= 5.08</td>
<td>37.41</td>
<td>41</td>
<td>p&lt;.03</td>
</tr>
<tr>
<td>No. in Household</td>
<td>F= 2.35</td>
<td>2.8</td>
<td>41</td>
<td>p&lt;.13</td>
</tr>
<tr>
<td>Years Married</td>
<td>F= .37</td>
<td>14.8</td>
<td>41</td>
<td>p&lt;.54</td>
</tr>
<tr>
<td>IQ (Draw-A-Man)</td>
<td>F= 1.21</td>
<td>143.17</td>
<td>41</td>
<td>p&lt;.28</td>
</tr>
</tbody>
</table>

Note. * = Non-demographic variable that is used to match first-grade groups.
As Tables 1 and 2 reveal, there were no significant differences between LD and non-LD mother’s age, number in household, or years married. This difference, however, may be confounded by mitigating factors. First, of note in Table 1 is the reduced number of those reporting (N = 33 for LD); (N = 39 for non-LD). Second, data were gathered in the Fall of 1998 from the rural and small urban school districts in which there was a higher percentage (approximately 90%) of non-LD volunteers than LD volunteers (approximately 15%) even though there were adequate numbers of potential LD volunteers on the class lists. Permission was not obtained from the Superintendent of Schools for data gathering in one-third of the large urban district’s first-grade classes until January of 1999. The remaining (85%) of the needed LD Families and LD first-graders were then drawn from a lower socioeconomic city school district.

Furthermore, one of the limitations in obtaining written, family-reported data is the family’s distrust of how it will be used. On record there are many low-income families who are on public assistance without the financial support of the father. In reality, the father may live in the home and may work, contributing to the household income, albeit unreported. Social agencies, including schools, are obligated to report these discrepancies. It has been stated by many school personnel that the omission of answers to certain demographic questions may reflect this family distrust of reporting information such as such as Father’s Age, Father’s Education, and Years Married in Table 1.

*Draw-A-Man Test Results*

After all 93 Draw-A-Man Tests were scored blindly by a psychologist, frequency distributions of the IQ scores were made for the LD and non-LD first-grade groups, prior
to scoring the other three dependent measures. Subjects were then eliminated to equalize each group to \((N = 40)\). Specifically, two subjects were randomly eliminated from each of the three groupings of below average, average, and above average for a total of six subjects for the non-LD group. Similarly for the LD group, two to three subjects were randomly dropped from each of the below average, average and above average groupings for a total of seven subjects. Within these average groupings, the IQ score clusters with the highest frequencies were chosen for elimination to equalize the distribution.

*Bender Gestalt Interscorer Reliability*

The inter-rater reliabilities for the two scorers of the BGT are based on randomized, representative scoring samples. All protocols were without names and number-coded. The staff and raters knew only that the study concerned learning and families.

The interscorer reliability was conducted from a random sample of 20 Bender protocols for each independent scorer. In contrast to the accepted procedure of a complete, second-rater scoring of each others’ protocols, this alternate, but limiting, procedure was used because of the unexpected unavailability of one of the raters. Scorer #1 and Scorer #2 blindly scored only 20 each of one another’s previously scored protocols. The 40 randomly chosen measures were composed of two groups of 20, 10 LD first-graders and 10 non-LD first-graders, which were further subdivided into 10 pre-Benders and 10 post-Benders. The significant correlation of .83 at \(p < .01\) falls within the reported ranges of .79 to .99.

The author of this study administered, but did not score, the dependent measures to control for experimental bias. The demographic data were obtained at the
administration of the FAD. Both had standardized written instructions. Families were given the preference to complete the FAD at home, at the school, or over the telephone. The majority chose to complete the FAD at home.

Hypotheses Results

Hypothesis I: Following four months of schooling, there will be a lower significantly different rate of visual-motor development for LD children than for non-LD children, after controlling for initial level of visual-motor development and family learning environment. There was a lower rate of visual-motor development for LD first-graders than for non-LD first-graders, after controlling for initial level of visual-motor development and family learning environment, ANCOVA $F(3, 76) = 4.97$, $p < .02$. The $M$ of 8.97, and $SD$ of 3.05 for the LD first-graders’ pretest was higher, (developmentally slower) than the non-LD first-graders’ $M$ of 8.72 and $SD$ of 2.85, although not significantly higher ($t(78) = .37$, $p < .70$) see Table 4. The post-test ($M = 8.90$, $SD = 2.8$) for the LD group was significantly higher (developmentally slower) than the post-test ($M = 7.57$, $SD = 2.28$) for the non-LD group, thus supporting the hypothesis.

Hypothesis II: Following four months of schooling, there will be a significant positive relationship between post-test visual-motor developmental delay (post-test Bender Gestalt Test) and the family learning environment (FAD) covariate. The expected positive relationship between post-test visual-motor developmental delay and the family learning environment covariate was not significant, ANOVA $F(1, 79) = 3.59$, $p < .06$. Therefore this hypothesis was not supported. Table 3 shows the rates of visual motor developmental delay after four months for LD and Non-LD first graders.
Table 3
Rates of Visual-Motor Development for LD First-Graders

<table>
<thead>
<tr>
<th>Variable</th>
<th>BGT Pretest</th>
<th>BGT Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>M</td>
</tr>
<tr>
<td>LD Child</td>
<td>40</td>
<td>8.97</td>
</tr>
<tr>
<td>Non-LD Child</td>
<td>40</td>
<td>8.72</td>
</tr>
</tbody>
</table>

*Hypothesis III.* Following four months of schooling, there will be lower significantly different rates of academic, adaptive, and social development for LD children than for non-LD children, after controlling for initial level of academic, adaptive, and social development, and family learning environment. Significantly lower rates of academic, adaptive, and social development were found for LD first-graders than for non-LD first-graders on the Achenbach Teachers Rating Form, after controlling for initial levels of (1) academic, (2) adaptive, and (3) social development, and family learning environment (FAD) MANCOVA academic \( F(4, 74) = 38.75, p < .00 \), adaptive \( F(4, 74) = 15.56, p < .00 \), social \( F(4, 74) = 22.98, p < .00 \). Therefore this hypothesis was supported.

Table 4 shows the means for the LD first-grade Academic and Adaptive Pretest on TRF were lower (developmentally slower) than those same means for non-LD first-graders, as would be expected because of their learning difficulties. Both the Academic
Table 4

Rates of Academic, Adaptive, and Social Development

<table>
<thead>
<tr>
<th>Variable</th>
<th>LD First-Graders</th>
<th>Non-LD First Graders</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>M</td>
</tr>
<tr>
<td>Academic Pre</td>
<td>40</td>
<td>1.79</td>
</tr>
<tr>
<td>Academic Post</td>
<td>40</td>
<td>1.81</td>
</tr>
<tr>
<td>Adaptive Pre</td>
<td>40</td>
<td>11.22</td>
</tr>
<tr>
<td>Adaptive Post</td>
<td>40</td>
<td>11.02</td>
</tr>
<tr>
<td>Social Pre</td>
<td>40</td>
<td>52.77</td>
</tr>
<tr>
<td>Social Post</td>
<td>40</td>
<td>55.35</td>
</tr>
<tr>
<td>Family Func.</td>
<td>40</td>
<td>1.93</td>
</tr>
</tbody>
</table>

*= p<.00

and Adaptive Post-test means for the LD group were higher (developmentally slower) than the means for the non-LD first graders.

The Social Pretest means for the LD first-graders were higher (developmentally slower) than the means for the non-LD first-graders. The Social Post-test means for the LD group were higher (developmentally slower) than the Social Post-test means of the non-LD group.

After four months, the Academic, Adaptive, and Social Post-tests of the LD first-graders all scored significantly lower (p < .00) than the non-LD first-graders, after controlling for each groups' corresponding pretest scores and the FAD. This difference
indicates lower developmental academic, adaptive and social rates for the LD group as expected.

*Hypothesis IV.* Following four months of schooling, there will be a negative relationship between academic development and the family learning environment covariate. This hypothesis was supported, in that a significant negative relationship between lower academic development on the Achenbach Teachers Rating Form and the FAD for both LD and non-LD first-graders was found, LINEAR REGRESSION (-.30), p <.00. The coefficient squared shows that only 9% of the variance between Family Functioning (FAD) and the Academic Post-test (TRF) CAN BE ACCOUNTED FOR BY Family Functioning alone. Both LD and non-LD first-grader groups who showed lower Academic development on the post-test TRF also showed higher Family dysfunction on the FAD.

*Hypothesis V.* Following four months of schooling, there will be a negative relationship between adaptive development and the family learning environment covariate. A significant negative relationship was found between lower adaptive development on the Achenbach TRF and the FAD for both LD and non-LD first-graders LINEAR REGRESSION (-.27), p < .01. This result is in the predicted direction, thus supporting the hypothesis. The coefficient squared indicates that only seven percent of the variance between Adaptive Development and Family Functioning was attributable to Family Functioning. Both LD and non-LD first-graders, who showed lower adaptive development on the post-test Achenbach TRF, also displayed higher family dysfunction on the FAD.
Hypothesis VI. Following four months of schooling, there will be a positive relationship between social developmental deficits and the family learning environment covariate. A significant positive relationship was found between social developmental deficits on the Achenbach TRF form and the FAD for both LD and non-LD first-graders. LINEAR REGRESSION .28, p < .01. The coefficient squared of 7% indicates that only 7% of the variance between Social Development and Family Functioning is accounted for by Family Functioning. Both LD and non-LD first-graders who showed increased social developmental deficits on the post-test Achenbach TRF also showed greater family dysfunction on the FAD. Therefore this hypothesis was supported.

Hypothesis VII. Families of LD first-graders will score lower on the family learning environment measure than the families of the non-LD first-graders. Significant differences were found between the LD (M = 1.93, SD = .44) and non-LD families (M = 1.65, SD = .34), t (78) = 3.18, p < .00 on Family Functioning (FAD). As predicted, this finding demonstrates that the average FAD score for families of LD first-graders is significantly lower than the average non-LD family score. Therefore this hypothesis was supported.

Supplementary Analysis

First, the family constructs of structure and interaction (problem solving, communication, roles, affective responsiveness, affective involvement, and behavior control), as documented in the literature review, were examined for significant differences between LD and non-LD families in the supplementary analysis. Second, the relationships between family income, mother’s education, and developmental rates of LD and non-LD children were also explored.

Table 5 shows that the LD Families obtained higher means (less competent) on all
six of the FAD scales than the Non-LD Families. All six of the FAD NCM or Non-Clinical Means are substantially above all six of the means for the non-LD Families. This suggests that this sample of Non-LD Families is considerably healthier than the norms upon which the FAD scales were derived. Comparison of the LD Families’ means with those of the CM or Clinical Family means indicates that all six of the LD Family means are below (less dysfunctional) the Clinical Family means. The near exception is for the

Table 5

FAD Scale Statistics

<table>
<thead>
<tr>
<th></th>
<th>LD Families</th>
<th></th>
<th>Non-LD Families</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>M</td>
<td>SE</td>
<td>CM</td>
</tr>
<tr>
<td>Problem Solving</td>
<td>40</td>
<td>1.94</td>
<td>.06</td>
<td>2.38</td>
</tr>
<tr>
<td>Communication</td>
<td>40</td>
<td>2.16</td>
<td>.05</td>
<td>2.37</td>
</tr>
<tr>
<td>Roles</td>
<td>40</td>
<td>2.45</td>
<td>.05</td>
<td>2.47</td>
</tr>
<tr>
<td>Affective</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Responsiveness</td>
<td>40</td>
<td>2.07</td>
<td>.08</td>
<td>2.42</td>
</tr>
<tr>
<td>Affective</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Involvement</td>
<td>40</td>
<td>2.12</td>
<td>.08</td>
<td>2.23</td>
</tr>
<tr>
<td>Behavior Control</td>
<td>40</td>
<td>1.86</td>
<td>.06</td>
<td>2.02</td>
</tr>
</tbody>
</table>

Wilk’s Lambda Test: p<.05. **p<.01. ***p<.001.
roles scale, which approaches mean parity. This similarity of lowered difference in means further suggests that this sample of LD Families is not as dysfunctional as the clinical families with a psychiatric-hospitalized family member used in the norms.

Of the six FAD scales, problem solving and affective involvement, are the only two scales that do not show significant differences between the LD and non-LD Families. However, both of those scales showed a trend toward significance at the .09 and .08 levels, respectively. The other four scales, roles, behavior control, communication, and affective responsiveness, showed significant differences between the LD and non-LD Families: MANOVA roles, $F(1, 78) = 11.19, p < .001$; behavior control $F(1, 78) = 11.34, p < .001$; communication $F(1, 78) = 5.72, p < .01$, and affective responsiveness $F(1, 78) = 5.59, p < .02$. The Wilks’ Lambda $F(6, 73) = 2.50, p < .02$.

The research has shown that LD children from higher social classes are much more successful over time than those from lower classes (O’Connor & Spreen, 1988). Table 6 shows the significant correlations between family income, mother’s education and the dependent measures. First, higher family income is strongly associated with higher mothers’ education. This is consistent with current research. Second, higher family income is also strongly related to higher academic and adaptive performance (Academic Pretest, $r = .44, p < .01$; Academic Post-test, $r = .49, p < .01$; Adaptive Pretest, $r = .44, p < .01$; and Adaptive Post-test, $r = .34, p < .01$). Third, as family income decreases family function (effectiveness) also declines ($r = -.30, p < .01$). Similarly, as family income decreases social functioning likewise worsens (Social Pretest, $r = -.28, p < .05$; Social Post-test, $r = -.32, p < .01$).
Table 6

**Significant Correlations Between Demographics and Measures**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mother's Income</th>
<th>No.</th>
<th>Family Income</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family Income</td>
<td>.52**</td>
<td>(64)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family Function (dysfunction)</td>
<td></td>
<td></td>
<td>-30**</td>
<td>(74)</td>
</tr>
<tr>
<td>Academic Pretest</td>
<td>.44**</td>
<td>(74)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adaptive Pretest</td>
<td>.40**</td>
<td>(74)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Academic Post-test</td>
<td>.49**</td>
<td>(74)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adaptive Post-test</td>
<td>.34*</td>
<td>(74)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social Pretest</td>
<td>-28*</td>
<td>(74)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social Post-test</td>
<td>-31**</td>
<td>(74)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* = p < .05,  
** = p < .01
In summary, prior to data gathering, the expectations for this research were:

1. There will be significantly more LD children that have families with negative family learning environments (dysfunctional FAD score).

2. Within both handicapped and nonhandicapped groups there will be a positive relationship between post-test visual motor developmental growth and a positive family learning environment (nondysfunctional FAD score).

3. There will be more LD children with lower rates of developmental growth. The first expectation for finding significantly more LD children with families that have negative learning environments obtained support in hypothesis VII (more LD families with dysfunctional FAD scores). However, the second expectation for a positive relationship between post-test visual motor developmental growth and a positive family learning environment was not satisfied in Hypothesis II. This result suggests the FAD is a weaker predictor of visual-motor functioning for both first-grade groups (LD and non-LD). The third expectation for significantly lower rates of developmental growth (lower BGT, TRF scores) for LD children obtained support in Hypotheses I and III. Therefore, if there are significant differences between the LD and non-LD families in terms of negative learning environments, then there would also be support for family factors that are associated with learning disabilities and the ecosystemic model.
CHAPTER V
DISCUSSION OF FINDINGS

Introduction

The public law, Education for All Handicapped Children Act of 1975, opened vast opportunities and provided educational services for many children who did not have them previously. Since its inception, the law has led to the creation of a large coterie of services with many subsystems such as special education, child study teams, and an expanded field of learning disabilities. Many of these subsystems have since become institutionalized. However, the efficacy and high cost of programs and services as well as the medical model upon which they are based have often been questioned. Thus, the purpose of this study was to improve child development, construct better learning environments, and create better remedial special education through a broader conception of learning disability.

This study was designed to challenge the limitations of the medical model in the understanding of learning disability. The positive results in six of seven hypotheses support the broader, systemic view that families can enhance or impede their children’s learning and development, thus prompting identification and intervention for families at-risk. This investigation was based theoretically on the ecosystemic model, which implicates a possible genetic basis for cognitive/behavioral deficits, but further implies that these cognitive/behavioral deficits may reciprocally increase one another in a negative interactional spiral between family and the child over time. It is this
interactional spiral that creates a communicationally-deviant family learning environment associated with LD in a child. This investigation was focused on family and child vulnerability factors such as poor family adaptation and perceptual deficits that can offset protective buffers.

**Conclusions of Research**

As anticipated, this study generated evidence in support of three areas: (a) ecosystemic theory, (b) family structure and interaction variables that contribute to a negative learning environment (Supplemental Analysis), and (c) the relationship of socioeconomic level with family health (Supplemental Analysis). In the first area, the ecosystemic model provides a more comprehensive explanation of the positive findings in this study of the factors associated with LD first-graders’ visual motor, academic, adaptive, and social development than the prevailing intrinsic-based or “medical model” view of learning disability. So, in addition to the “medical model”, it appears to be beneficial to examine the influences of the family on LD. Resilience in spite of impaired development depends upon the steady balance between a LD first-grader’s vulnerabilities (e.g., developmental delay, temperament) and his or her family’s vulnerabilities (e.g., low socioeconomic status, unclear communication) on the one hand and on the other hand, the protective factors (e.g., nurturance, support, resource) that shield both child and family from damage by stressors. This is reflected in several of the hypotheses being supported. Specifically, Hypotheses I, III, IV, V, VI, and VII were positive. The LD first-graders’ levels of visual motor, academic, adaptive, and social development were lower than those of the non-LD first-graders. This suggests that the LD families and their first-
graders’ vulnerability/protective equilibrium was imbalanced compared to the non-LD families and their first-graders.

Each of the seven hypotheses will now be reviewed.

Hypothesis I: Following four months of schooling, there will be a lower rate of visual-motor development for LD children than for non-LD children, after controlling for initial level of visual-motor development and family learning environment. The results indicated that, although the two children groups were matched initially on intelligence and were not significantly different in visual perceptual pretest performance, the visual-motor development of the LD first-graders’ was lower than the non-LD first-graders four months later. It appears that this slower growth is a developmental manifestation of impairment in visual-motor and/or neurological processes and the normative differences in the range of scores for the two older subjects.

The second hypothesis was aimed at elucidating the role the principal ecosystemic factor-vulnerability (e.g., family) plays in this finding of slower visual-perceptual growth. It was predicted that after four months of schooling, there would be a positive relationship between post-test visual-motor developmental delay and the family learning environment covariate. The results for hypothesis II were not significant. This suggests that among the potential vulnerability factors influencing slower visual-motor development in LD first-graders, family factors (FAD) were not a significant predictor. Uniquely, this finding nearly reached significance with a p < .06 and was limited only to the visual perceptual development variable while the academic, adaptive, and social development variables all demonstrated family factors (FAD) to be significant predictors of vulnerability imbalance in hypotheses III, IV, V, and VI.
This apparent inconsistency seems more likely to be explained by differences in the nature of the dependent variables. One of the key differences in the nature of the four dependent variables is that the visual-motor development variable is more reflective of specific processes in the cognitive domain, comprising visual perceptual input abilities and processes; internal cognitive sorting, organizing abilities and processes; and perceptual, motoric output abilities and processes. The complexity and biological-neurological characteristics of this visual-motor dependent variable suggest a greater resistance to change through social influence. For example, it is commonplace for the child study team to prescribe visual-motor improvement goals along with materials and methods in an Individualized Educational Plan for the specially trained and certified teacher. The progress toward these goals is formally assessed every three years, frequently with only marginal improvement. By comparison, the variable of academic achievement can increase or decrease with support, tutoring, increased motivation, and changed contexts much more easily over a shorter time span. This changeability is also true of the adaptability and the social-development variables. These are variables which are more responsive to positive relationship influences than the visual-motor variable. It is foreseeable that the family’s effect on the visual-motor development variable could show significance in LD children over a longer time span than four months. Werner et al. (1971), for example, found significant drops in measured IQ in two-and ten-year follow-ups, which they attributed to the effects of environmental deprivation.

In the third hypothesis, it was expected that after four months of schooling, there would be a lower rate of academic, adaptive, and social development for LD children than for non-LD children after controlling for initial levels of academic, adaptive, and
social development, as well as family learning environment. These results evidenced significantly lowered development in the academic, adaptive, and social functioning of LD first-graders in comparison to their non-LD counterparts after only four months. These data were based on teacher observations. These significant differences between the LD and non-LD groups over four months highlight the beginning of a widening gap in development, despite equality in intellectual ability. In addition to intrinsic deficits, it is suggested that the gap is worsened by negative interactional factors in a child’s ecosystem.

Hypotheses IV, V, and VI were focused on the effects that a less healthy family, as an ecosystemic vulnerability-factor, may have upon a child’s vulnerability/protective balance. Hypothesis IV read: Following four months of schooling, there will be a negative relationship between academic development and the family learning environment variable (FAD). This finding of a significant negative relationship between academic development and the family learning environment shows that family dysfunction (FAD) is a predictor of lowered academic development in LD and non-LD first-graders. The portion of variance attributable to family functioning alone is nine per cent. While the level of influence is not as high as anticipated from the perspective of ecosystemic theory, this may be the result of several conditions. One administration of the FAD may reflect transitory stressors on a family rather than long-term family dysfunction. Therefore, a high FAD score may not necessarily be reflecting a negative interactional spiral over time. These questions could be more definitively answered in the future by identifying LD and non-LD age groups with dysfunctional families at a given point in time, followed by repeated FAD administrations and assessment of their
developmental growth over several successive time spans. It is foreseeable that, if a family dysfunction variance of nine percent occurred over four months, a greater proportion of family dysfunction variance could occur over twelve months or longer.

The finding that the FAD is able to predict academic and adaptive development is especially significant since it was designed to assess clinically dysfunctional families and not family learning environments. It is recommended that future studies examine the specific processes occurring within the family which produce positive learning environments. The six scales of the FAD do cast some evidential light on family learning environments and will be reviewed in subsequent sections of this study.

In Hypothesis V, it was anticipated that after four months of schooling there would be a negative relationship between adaptive development and the family learning environment variable (FAD). The confirming results for this hypothesis also show that family dysfunction (according to the FAD) is a predictor of lowered adaptive development in LD and non-LD first-graders. The portion of variance attributable to family functioning alone is 7%. While the level of influence is again not as high as expected from the perspective of ecosystemic theory, this may also be the result of the same conditions stated for hypothesis IV, namely the FAD's family learning environment assessment limitations, the short time period in which family dysfunctioning and the negative interactional spiral occurred or both. In the normative sample of the 1991 version of the Teacher's Report Form, the socioeconomic status (SES) differences on the total adaptive scales accounted for 4% of the variance (Achenbach, 1991).

In hypothesis VI, it was postulated that after four months of schooling, there would be a positive relationship between social developmental deficits and the family
learning environment variable. The results of this hypothesis show that family
dysfunction (FAD) is also a predictor of lowered social development in LD and non-LD
first-graders. The portion of variance attributable to family functioning alone is 7%.
While the level of influence is again not as high as expected, this, too, may be the result
of the FAD’s limitations, the short time period in which family dysfunctioning and the
negative interactional spiral occurred. Although this study did not specifically address the
portion of variance attributed to by socioeconomic status (SES), in the normative sample
of the 1991 version of the TRF, “The SES differences were much smaller on the problem
scales, with no SES effects accounting for >4% of variance “ (p. 75).

According to hypothesis VII, families of LD first-graders will score lower on the
family learning environment measure than the families of the non-LD first-graders. This
hypothesis found significantly more of the LD first-graders’ families obtaining less
healthy family scores (FAD) than the non-LD first-graders’ families. While this research
design precludes any claim to causality, this finding reflects a strong association between
LD first-grade families with less healthy family functioning levels, who have first-graders
with slower visual-motor, academic, adaptive, and social development in comparison to
the healthier family functioning of the non-LD first-grade families whose children have
higher levels of visual-motor, academic, adaptive, and social development after four
months.

The second area of supportive evidence found in this study is for the influence of
family interaction and structural factors that contribute to a negative learning
environment (Supplemental Analysis). In comparing sample results of this study with the
norms for the FAD’s seven scales, both the LD and non-LD families were healthier (less
dysfunctional) than the FAD’s Clinical and non-Clinical normative groups. A review of the normative studies indicates that the Clinical population group was composed of a majority of families with a psychiatric (hospital) family member. Whereas, the LD families did not report any family members with psychiatric involvement. On the composition of the non-Clinical population group, the normative study indicated that, of the total sample of 503 participants, 209 “family members” were students in an introductory psychology course who completed the FAD in class, reflecting their (one) perception of the family’s functioning. In contrast, the non-LD families were completed by a combination of both mother, grandmother and father, or either mother, grandmother or father. It is speculated that late adolescent psychology students may view their families as more dysfunctional. However, when comparison is made between the LD and non-LD families, the LD families scored below (more dysfunctional) than the non-LD families on all seven of the FAD scales. Of those seven, two problem solving and affective involvement nearly reached significance. The five other scales (roles, behavior control, communication, affective responsiveness and general functioning) involved statistically significant differences between LD and non-LD families.

Epstein et al. (1983) defined the roles scale as consisting of family roles that are repetitive patterns of behavior by which individuals fulfill necessary and other family functions such as provision of resources, nurturance and support, marital partner sexual gratification, life-skills development, and systems management and maintenance. The appropriate assignment and execution of role responsibility and role accountability for the family functions affect the health/dysfunctionality of the family. This scale assesses mostly structure and some interaction of the family. Significant difficulty on this scale
could affect the LD first-grader’s development through unclear or inconsistent family member role assignment, through insufficient educational stimulation, inadequate emotional-intellectual nurturance, and through poor support of life-skills development. Single parent families are at particular risk to vulnerability on this scale.

Epstein et al. (1983) defined the behavior control scale as a measure of the pattern the family adopts for handling all members’ behaviors under physically dangerous situations, the satisfaction and expression of psychobiological needs and drive situations, and socialization behavior both inside and outside the family situations. The four styles of behavior control are: (a) rigid, (b) flexible, (c) laissez-faire, and (d) chaotic. Flexible is viewed as the most effective and chaotic as the least effective. To maintain consistency of behavior control there is need for integration with the role dimension aspect of system maintenance and management. This scale assesses an element of family structure. The greater the dysfunctional level of scoring on the behavior control scale for the LD families, the greater is the likelihood that they are utilizing the chaotic and rigid styles of behavior control. This can relate to learning by students having either insufficient internal behavioral controls needed for sustained attention in class or too rigid controls affecting spontaneity and initiative in novel learning situations.

Epstein et al. (1983) defined the communication scale as assessing verbal exchange in terms of clear versus masked and direct versus indirect. The four styles are clear and direct, clear and indirect, masked and direct, and masked and indirect. The scale is based on the assumption that the more masked and indirect the overall family communication pattern, the more ineffective the family’s functioning. The clearer and
more direct the communication, the more effective the family’s functioning. The ecosystemic model connotes that the interactional spiral over time creates a communicationally-deviant family learning environment which is associated with LD in a child. Although family communication-deviance was not defined nor measured specifically as a variable, this communication scale may serve as an indicator of communicationally-deviant family learning environments which maintain negative transactional spirals. Children who do not receive clear and direct communication messages have difficulty reading social signals from peers and adults. This confounds their social problem-solving and cumulatively hinders their social-skill development.

Epstein et al. (1983) defined the scale of affective responsiveness as the ability to respond to a range of stimuli with appropriate quality and quantity of feelings. The more effective the family, the wider the range and the more appropriate will their emotional responses be in terms of quantity and quality for a given situation. It is speculated that the parental modeling of constricted and unexpressed affect could impede the development of empathy, of a capacity critical to successful relationships, and of social development.

Greenspan (1989) discussed six developmental levels of an infant-child’s ego formation. Each level requires a different set of responses from the parent in the child-parent interaction to optimize development. It is in the not good-enough fit of matching the child’s developmental need with the parental response that child vulnerabilities are increased. The scales on affective responsiveness as well as roles, communication, and behavior control (Epstein et al. 1983) may be assessing some of the mismatched developmental child-parent interactions.
The third area of supportive evidence for the relationship of socioeconomic level with family health was found in the supplemental analysis of the demographics. O'Connor and Spreen (1988) demonstrated that LD children from higher social classes are more successful academically and occupationally over time than those from lower classes. The demographics obtained in this study showed that higher family income is significantly associated with increased education for mothers. Similar to O'Connor and Spreen's findings, higher family income was also significantly associated with higher academic and adaptive student functioning. The rationale for this more successful functioning lies in the masked variables of greater financial resources to provide special help, educational motivation, access and pressure to schools for special services, ability to provide employment opportunities, greater understanding and thus management of the problem of LD.

Additionally, the demographics in this study showed that with lower family income levels, family functioning (health) and social functioning decreased. The number of two-parent versus one-parent households is also related to family income. Twenty-seven percent of non-LD families reported single-parent households compared to 62 ½% of the LD families. While these positive correlations and distributions do not confirm causality and there is justification for caution, we can speculate that the lowered income and one-parent household might serve as a contributor to numerous stressors upon the family system which could imbalance the vulnerability/protective-buffers balance.

Related Research

The findings of this study are supportive of many of the previously related studies. Werner et al. (1971), in their 10-year longitudinal study, concluded that the
effects of environmental deprivation were more powerful influences upon IQ than the degree of perinatal stress. The influences of a stimulating external environment appear to be most powerful in the early years of childhood when the greatest degree of rapid growth and development take place. In comparison, this research focused on a much smaller sample, a shorter timeframe (four months), fewer assessments, and a more specific, early childhood population (LD first-graders and their families). However, correlational supportive evidence was found for lower growth in visual-cognitive, academic, adaptive, and social development for LD first-graders. There was also correlational supportive evidence for lowered-LD and non-LD children’s academic, adaptive and social development in families with lower family income.

While Dyson (1991) blamed the uncertainty about clear differences between children with and without disabilities on numerous studies involving failure to use control groups, the findings of this research, with controls, add to the clarity of differences. Furthermore, it enhances the sparse literature on the milder-limitations of an LD population, those identified with perceptual and mild neurological deficits in mainstream classes, resource rooms, or in-district special classes.

Although Owen et al. (1971) designed their study of differences between children with and without disabilities with a larger population, with many more variables, and reported many more significant differences between groups, there were many similar findings to this study. This research found comparable support for Owen et al.'s study on the lower rate of visual-motor functioning for LD compared to non-LD children and additional support of LD children living in family environments that tended to be less-well-organized (at significant levels on behavior control and roles scales) and less
emotionally stable (at a significant dysfunctional level on the general scale) than controls. It further adds to their findings with greater specificity of family structure and interaction such as ambiguity of family role assignments (at significant levels on the roles scale), use of less effective indirect and masked communication (at significant levels on the communication scale), and emotional constrictiveness (at significant levels on the affective responsiveness scale) than controls.

In comparison with other research, this study’s findings of increased social deficits of LD first-graders supports Kavale and Forness’s (1996) meta-analytic finding that 75% of LD children show social-skill deficits as compared to non-LD children. Hartzell and Compton (1984) found quality of family functioning a strong predictor of social and academic success for boys. Correlational evidence for this finding was similarly observed in this research with LD first-graders and their families.

This study’s positive correlational results may be added to the sparse clinical and experimentally-controlled research that has found support for the influence of family structure upon children with learning disabilities. Variables such as family instability, underorganization, and chaos were associated with learning disabilities in children (Minuchin, Chamberlin, & Graubard, 1967; Minuchin, Montalvo, Guerney, Rosman, & Schumer, 1967; Owen, Adams, Forest, Stolz, & Fisher, 1971; Amerikaner and Omizo, 1984).

In this research significant differences between families with LD versus non-LD first-graders were found on the variables of behavior control, roles, communication, and affective responsiveness. The family structure variable of behavior control indicated less organization and greater rigidity in LD families. The combined family structure and
interaction variable of roles pointed toward multiple ineffectiveness. There was a lack of clarity in which members were assigned specific duties and whether the assignments were permanent or were interchangeable with other family members. Also, there was uncertainty both over which family members would execute specific, needed role-assignments and the specifics of how execution would occur. There was further ambivalence over which family members would take responsibility for the tasks of sufficient educational stimulation, emotional and intellectual nurturance, and support of life-skills development as well as the means for carrying them out in LD families. Further research is needed to explore the effects of SES and single vs. two-parent families on these tasks. Conceivably, single parent households could account for the ambiguous responsibility in tasks of sufficient educational stimulation, emotional and intellectual nurturance, support of life-skills development and their implementation. The family interaction variable of communication revealed more indirect and masked communication than the healthier clear and direct communication in LD families. Lastly, the family interaction variable of affective responsiveness indicated a narrower range of emotional expression and constricted affect in LD families which could interfere with empathy development in their first-graders.

Except for the longitudinal studies mentioned, most research in this area is cross-sectional in design. This study, however, is unique in that it assesses the family’s interactional effects of their child’s cognitive, learning, and social development over time (four months) with positive findings. It contributes to the existing literature on characteristic learning and developmental differences between non-LD and LD first-graders with their respective family differences. In particular, this study contributes to the
fields of both learning disability and family therapy by elucidating the LD-family’s significant patterns of structural and interaction factors. Furthermore, it provides support for designs that address LD children’s learning as an effect of multiple causation, and broadens the variables involved from child-intrinsic to child-ecological.

Implications

Implications for theory, research and practice will be discussed. Theoretically, the ecosystemic model provides a more comprehensive explanation of the positive findings in this study on factors associated with LD first-graders’ visual motor, academic, adaptive, and social development than the prevailing intrinsic-based or “medical model” view of learning disability. It seems that a more useful approach to understanding underachievement is one that takes into consideration physiological vulnerability and its functioning in an interactional framework. Therefore, in addition to the “medical model”, it appears to be beneficial to examine the influences of the family on LD.

While cross-sectional research is easier and quicker to do, short-term longitudinal studies, like this research, are increasing because the same participants can be tracked over time for continuity or change of patterns (Parke & Ornstein, 1994). Furthermore, it avoids confounding developmental effects with effects of cohort membership.

The structural and interactional differences between LD and non-LD families associated with lower visual motor, academic, adaptive, and social development over a short time period imply that an LD child’s learning environment may be more negative and inhibitory than the healthier non-LD families and their non-LD first graders. This pattern of weaker family functioning on roles, communication, behavior control, and affective communication provides a foundation for designing family interventions on
both individual and program bases. These interventions could target the vulnerability/protective-buffers imbalance, and increase the likelihood for enhanced child development. The assessment could be made, subject to voluntary family permission, by the child study team with a Parenting Stress Index (for the family's stressors) and the FAD (for family functioning), as parts of a social history-interview.

The finding of an association between family functioning and child differences in development after only four months suggests the possibility of a family's negative learning environment having an increased insidious effect upon a child's development during his or her entire school history. While yet to be determined, it would appear that family-based vulnerability and environments may be more responsive to change than intrinsically-based vulnerabilities such as neurological or information-processing deficits. Empirical evidence for this responsiveness would have implications for theory and practice. This potential for a greater rate of intervention improvement would justify the identification of families at-risk for impeding child development. Since PL 99-457, Part H (Education of the Handicapped Act Amendments, 1986) implicitly acknowledges this deficiency as it serves the families with children at-risk before age five by providing (with their permission) early intervention with a strength assessment and empowerment plan, this study argues for an extension of the applicability of the law to eligible LD children and their families above five years of age. Special education would move from a preoccupation with deficits and pathology to a broader competency-based, health-oriented, ecosystemic model by not only identifying families vulnerable to generating and continuing a negative learning environment, but amplifying family strengths, resources and developmental learning.
Such a shift need not be confined to special education. The finding of this study showed family dysfunction to be a predictor of lowered academic development in non-LD as well as LD students. Some effort to provide family intervention has begun along these lines with school-based facilities such as pregnant-teen programs, medical screening, individual and family counseling, financial and legal aide, child-care, and adolescent after-school recreation. These services allow for easier availability, earlier identification, and collaboration with school staff. The New Jersey Education Association has developed a school and family partnership program that provides funding for homework support, child disciplining skills, and parent involvement training (Conway, et al., 1997).

On a more individual basis, students with underachievement in both LD and non-LD families could be assigned, based on a family assessment, to classrooms and teachers who possess some of the characteristics from which the student may profit, i.e., a more organized, structured class or teaching style; greater affective expression, clearer, more direct communication. The changes in the child could impact upon the family.

There are implications for practicing family therapists who treat school-age children and their families. Initially, an assessment of the family’s interaction and structure with the FAD or similar clinical instrument could facilitate consultation with the student’s teacher or guidance counselor. The school’s resources, i.e., teaching style and classroom structure, may be utilized in order to facilitate a positive learning environment. Concurrently, a therapeutic partnership could empower the family according to their priorities to work with the school ecosystems. Another implication of this study for marriage and family therapists is the application of the FAD with families
referred with an unclassified underachieving child or adolescent. Particular focus could be on family strengths as well as vulnerabilities in communication, roles, behavior control and affective responsiveness. The differences in each member's perception of the family can be diagnostic of difficulties.

Limitations

The first limitation of this study is a lack of a family assessment device in the field that specifically measures negative family learning environments. The Family Assessment Device is not an instrument that was designed specifically for assessing negative learning environments in families of first-graders. It is an instrument that was constructed to evaluate family dysfunction in a clinical population. In this study seven to nine percent of the variability of the visual motor, academic, adaptive, and social development was predicted by the FAD. It is likely that specific family patterns of interaction and structure are related to the rate of a child's cognitive and social development.

With the exception of the BGT, the dependent variables were assessed by teacher observation. This limitation could be improved by use of self-report instruments, such as the Metropolitan Readiness Test, on the variables of academic, adaptive, and social development.

Another limitation concerns the inequality of gender. There were far more boys than girls. While this limitation inhibits drawing some conclusions about various gender differences, it does, in fact, reflect the actual distribution of gender differences in LD first-graders. The prevalence rate of the diagnosis of Attention Deficit Disorder associated with learning disabilities is much higher in boys than girls.
There is a limitation regarding the broad range of ages. Instead of the average age spread for a first-grader from six years-old to seven years-old, there were two additional eight year-olds. This limitation is tempered some by being representative of most LD first-grade school programs. It also is a reflection of schools' practice of often retaining a youngster once or twice before identification and classification. This process results in having older seven-and eight year-olds functioning on an academic first-grade level in a special first-grade class.

The effects of SES and single versus two parent families on the FAD was not examined in this study.

Future Research

Future studies may benefit from a longer time span, such as a full school year, to better decipher the effects of family functioning upon development. Self-report assessments have some advantages over teacher observation. They directly evaluate the self-perception of the child's behavioral domain. They eliminate the month or more needed for the teacher to develop a valid knowledge base of the observed students. The pre-and post-times could run through the summer without concern for losing the observing teacher when the grade changes. This would be beneficial for follow-up studies several months later.

In light of the powerful effects in this study of socioeconomic status new studies may likely benefit from equalization of socioeconomic levels in the LD and non-LD families and first-graders. Another variation of interest would be to divide the LD and non-LD families into four groups and to treat one LD family group and one non-LD family group with services designed to improve negative learning environment and/or
break a negative interactional spiral while the other two groups could serve as controls.

These experimental treatments might be based on the specific FAD scale weaknesses assessed as indicated in communication, roles, behavior control and affective responsiveness for each LD and non-LD group. This design would help establish causality between specific family structure and interaction variables and child development. Another alteration on this design might be to treat only the children from LD and non-LD families with negative learning environments based on their family's specific FAD scale weakness and to leave the children participants with positive learning environments untreated. That is, if the family were significantly weak on the communication scale, the intervention treatment would strive to increase clear and direct communication with the child. In practice, as opposed to research, the competency model can be implemented by establishing an egalitarian, respectful relationship with the family when presenting the FAD findings of strengths and weaknesses. Then, the choice of whether and what to strengthen and empower in the family would be made by them and executed in a partnership. Another study might assess the developmental differences between two groups of matched LD children, one with special education services (intrinsic approach) and one with only family intervention based on the FAD weaknesses (ecosystemic approach) for one year.

The construction of an instrument to target specific family factors associated with a child's learning and development could bridge the fields of family and learning-disability theories, and increase the practical utility of the instrument in school-prevention programs. A starting point for the design of such an assessment tool could be
an item analysis of the four scales of the FAD which significantly differentiated LD from non-LD families.

This study involved exploring the linkages between the field of learning disabilities and family-systems theory. Although the findings do not confirm causality, the encouraging preliminary results, which support an ecosystemic model of learning disabilities, were twofold. First, LD first-graders showed slower developmental growth academically, adaptively, and socially than non-LD first-graders after four months. LD families displayed less healthy functioning than non-LD families. These findings highlight the potential for identification and intervention of families at-risk as a means to deter impeded child development. Furthermore, these results challenge the intrinsic, medical model in preference for a biopsychosocial model for special education and the field of learning disabilities.

The second contribution of supportive evidence for the ecosystemic model is in the family system. The results illustrate the interaction and structure of families with apparent negative learning environments. The significant factors found are communication (direct and clear), roles (unambiguous, clearly assigned roles that also target nurturance and intellectual stimulation), behavior control (clear, consistent, but appropriately flexible, rules and boundaries), and affective responsiveness (a wide range of expressed affect appropriate to the interpersonal situation). It is these factors that seemingly hold the most promise for further pragmatic research and confirmation.

Early childhood learning in LD and non-LD families is an area of research that has been underexplored. Much of the research is unidimensional and is based on the medical model, which is inadequate and too simplistic for the phenomena. This study has
cast some light on the many shadows of this area by illustrating the multidimensional factors that are relationally interacting and may contribute to positive or negative change, such as the vulnerability/protective balance in both the child and the family system. It highlights the susceptibility of the delicate balance to delineated stressors and provides some understanding of a family’s organizational vulnerabilities in both their structure and interaction that may mitigate learning over time. The study provides a method for identifying family vulnerability imbalances for targeted interventions. Finally, it provides support for a theoretical framework, the ecosystemic model, that can further add to family practice and research.
References

*Monographs of the Society for Research in Child Development, 46,* (Serial No. 188).


New York: John Wiley & Sons, Inc.


Appendix A

Consent to Participate in Study
Consent to Participate in Study

I am Howard Baigas, a doctoral student at Seton Hall University. I would very much like you to participate in a research study. The purpose of this study is to gain a better understanding about learning in families of young children. If you decide to participate in the study, your involvement will take less than one hour of your time. We will ask you to respond to some statements about how you view your family on the Family Assessment Device and a few demographic (number of family members, years of schooling, etc.) questions about your family. Your child will be asked to copy some designs and draw a man (Bender Gestalt Test & Draw-A-Man Test) by a researcher with school staff for fifteen minutes at two different times four months apart. These tests are not likely to arouse discomfort. If they do, your child can talk to a trusted counselor or his teacher. The tasks are very similar to some that teachers often ask students to do during their teaching. Your child’s teacher will also be asked to rate your child on a questionnaire, similar to, but more detailed than, a report card (Achenbach Teacher Rating Form).

All information will have the names removed and replaced with a number so that you and your child can no longer be connected to any answers, thus ensuring confidentiality. After data analysis, the data will be destroyed. Your participation is completely voluntary. There will be no penalty to you or impact on your child’s schooling or class standing if you do not participate and you may both decline to participate or withdraw at any time during the study. This study has been approved by your school and the Superintendent.
There are no foreseeable risks or benefits from your participation. However, it may serve to improve our current understanding of the learning process and lead to better educational practices in the future. $25 will be paid upon completion of the Family questionnaires. Questions? If you have any questions, please feel free to call the doctoral student researcher and certified School Psychologist, Howard Baigas at (732). Please check the appropriate boxes and send this letter back to your child’s teacher.

___ I have read and I understand the permission letter. I give consent for my and my child’s participation in this study.

___ I want a summary of the research findings. I may be reached at (973)________
_________________________ 

___ I would like more information before giving consent for participation in this study. Call me at ______________________ 

___ I do not wish to participate in this study.

Parent’s Signature/Date__________________________________________________________
Student Assent to be in Study

I understand that I have been asked to be in a project that looks at how children learn. If I say yes to be in it, I will be asked to draw a picture and copy some designs (shapes) on drawing paper with other boys and girls in first-grade. It will take about fifteen minutes. I will do the designs and drawing once in October and once in February or March.

I understand that if I want to stop, I can, at any time and no one will get mad at me. It won’t have anything to do with my grades or report card.

I understand that my name won’t be used and the drawing and designs I make are private. After I am done, I can talk to my teacher or guidance counselor about it if I want to.

If I have any questions, I can ask my parents or my teacher or have them call Mr. Baigas at (732).

Student’s Signature/Date______________________________________________
Appendix B

The Developmental Bender Test Scoring System
The Developmental Bender Test Scoring System*

A selected sample of scoring items illustrate the scoring criteria. The types of errors can be categorized into variations of (a) Distortion of shape, (b) Rotation, (c) Integration, and (e) Perseveration. Designs

Figure A:

(a) Distortion of shape: Circle or square or both are excessively misshapen. Circle has points or angles, square has extra or missing angles.

(b) Rotation: Rotation of total figure or part of it by 45 degrees or more.

(c) Integration: Failure to join circle and square, circle and adjacent corner of square more than 1/8 in. apart; this applies also to overlap.

Figure 1 1) Distortion: Five or more dots converted into circles.

2) Rotation: Rotation of figure by 45 degrees or more.

4) Perseveration: More than 15 dots in a row.

Figure 2 3) Integration: One or two rows of circles omitted; row of circles added; four or more circles in the majority of columns.

Appendix C

Scoring sheet for the Draw-A-Man Test
Scoring Sheet for the Draw-A-Man Test

Man Point Scale

(Scoring: 1 point for each item present)

1. Head present
2. Neck present
3. Neck, two dimensions
4. Eyes present
5. Eye detail: pupil
6. Eye detail: brow or lashes
7. Eye detail: proportion
8. Eye detail: glance
9. Nose present
10. Nose: two dimensions
11. Mouth present
12. Lips, two dimensions
13. Both nose and lips in two dimensions
14. Both chin and forehead shown
15. Projection of chin shown; chin clearly differentiated from lower lip
16. Line of jaw indicated indicated
17. Bridge of nose
18. Hair I
19. Hair II
20. Hair III
21. Hair IV
22. Ears present
23. Ears present: proportion and position
24. Fingers present
25. Correct number of fingers shown
26. Detail of fingers correct
27. Opposition of thumb shown
28. Hands present
29. Wrist or angle shown
30. Arms present
31. Shoulders I
32. Shoulders II
33. Arms at side or gaged in activity
34. Elbow joint shown
35. Legs present
36. Hip I (crotch)
37. Hip II
38. Knee joint shown
39. Feet I: any indication
40. Feet II: proportion
41. Feet III: heel
42. Feet IV: perspective
43. Feet V: detail
44. Attachment of arms and legs I
45. Attachment of arms and legs II
46. Trunk present
47. Trunk in proportion, two dimensions
48. Proportion: head I
49. Proportion: head II
50. Proportion: face
51. Proportion: arms I
52. Proportion: arms II
53. Proportion: legs
54. Proportion: limbs in two dimensions
55. Clothing I
56. Clothing II
57. Clothing III
58. Clothing IV
59. Clothing V
60. Profile I
61. Profile II
62. Full face
63. Motor coordination: lines
64. Motor coordination: junctures
65. Superior motor coordination
66. Directed lines and form: head outline
67. Directed lines and form: trunk outline
68 Directed lines and form: arms and legs
69. Directed lines and form: facial features
70. “Sketching” technique
71. “Modeling” technique
72. Arm movement
73. Leg movement